**Project contract no. 036851**
**ESONET European Seas Observatory Network**

Instrument: Network of Excellence (NoE)
Thematic Priority: 1.1.6.3 – Climate Change and Ecosystems
Sub Priority: III – Global Change and Ecosystems

# Deliverable D31

# General Assembly report

Due date of deliverable: month 20
Actual submission date of report: January 2009, month 23

Start of project: March 2007 Duration: 48 months
Project Coordinator: Roland PERSON
Name of coordinator's organisation: IFREMER, France

Work Package n°8

Lead Authors for this deliverable: Ingrid PUILLAT and Roland PERSON

| **Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)** | | |
|---|---|---|
| **Dissemination Level** | | |
| PU | Public | **X** |
| PP | Restricted to other programme participants (including the Commission Services) | |
| RE | Restricted to a group specified by the consortium (including the Commission Services) | |
| CO | Confidential, only for members of the consortium (including the Commission Services) | |

# SUMMARY

# Executive summary

ESONET NoE was launched on 1st March 2008. After 8 months the General Assembly (GA) meeting was held in Faro, Portugal, on 22-23 October. This meeting was also an opportunity for bringing together most ESONET participants for other ESONET workshops.

Consequently WPs meetings were dedicated to making a checkpoint - state of achievement and plans for the next months, and to finalising the GA preparation. Then the results and ongoing activities of the seven main WPs until Sept 09 were presented on the first day of the General Assembly meeting. In the evening, this information was discussed in a joint meeting of the ESONET Strategic Committee and the EMSO-PP Strategic Board (STRAC). The second day of the GA meeting was dedicated to the coordination activities, including reporting, contract management, financial issues and links with the European Commission. A clear warning from both the European Commission and the ESONET coordination team was given concerning the reporting timeline: no delay shall be accepted. Following the General Assembly meeting the three ESONET Councils, for Data Management (DMC), Science (SCC) and Test and Operation at Sea (TOC), met in a parallel session to provide feedback and recommendations to the ESONET community.
The week was closed with the daylong ESONET Science Objectives workshop conducted by H. Ruhl (NOCS). Indeed, key scientific topics can be addressed by deep sea observatories in ESONET and a need to strengthen the links with specific topic-dedicated EU projects appeared to ensure that ESONET is still dealing with up-to date subjects and the appropriate questions.
In addition, two Steering Committee meetings were organised: one before the General Assembly meeting for preparation purposes and usual issues, and one after, for debriefing and making decisions related to General Assembly remarks. The Steering Committee minutes are available on the ESONET website.

The week timeline is summarised in the following Agenda. Throughout the next pages, each session is reported with its main conclusion.

This meeting included 76 participants from 38 institutions.

During this meeting, some key activities such as Demonstration Missions, Standardisation, Integration by Site, with the distribution of an ESONET questionnaire on available data sets from ESONET observatories (see: http://wwz.ifremer.fr/esonet_emso) and the definition of scientific objectives showed that the ESONET community took an important step towards integration, as a result of increased synergy. This will allow to define the ESONET Label, applied to ESONET Deep Sea Observatories, and to determine the active community by site and by theme.

The next General Assembly meeting should held in spring 2010, most likely the last one before the end of the ESONET project.

# ESONET General Assembly – October 20-24, 2008 – University of Algarve, FARO, Portugal

| Monday 20 | Tuesday 21 October | Wednesday 22 October | Thursday 23 October | Friday 24 Oct. |
|---|---|---|---|---|
| | 08:00 08:45 **Registration** | 08:00 08:30 **Registration** | | Breakfast |
| | 08:45 12:00 **EMSO meeting** *Amphitheatre. T. Gamito* | 08:30 11:00 **General Assembly** ***Amphitheatre. T. Gamito*** | 09:00 11:00 **General Assembly** ***Amphitheatre. T. Gamito*** | 08:30 12:00 Science Objectives workshop ***Library FCMA*** |
| | | *11:00 11:30* ***Coffee break*** | *11:00 11:30* ***Coffee break*** | |
| | 12:00 13:00 **WP1 – part 1** *Meeting room FCMA* **WP3 – part 1** *Library FCMA* | 11:30 13:00 **General Assembly (continued)** ***Amphitheatre T. Gamito*** | 11:30 13:00 **General Assembly (continued)** ***Amphitheatre. T. Gamito*** | |
| | *13:00 14:00* ***Lunch*** | *13:00 14:30* ***Lunch*** | *13:00 14:00* ***Lunch*** | *12:00 13:00* ***Lunch*** |
| | 14:00 15:00 **WP1 – part 2** *Meeting room FCMA* **WP3 – part 2** *Library FCMA* | 14:30 17:30 **General Assembly (continued)** ***Amphitheatre T. Gamito*** | 14:00 16:00 **Data Management Council** ***Room3.21 Pedagogical Component*** **Joint meeting on Data Management** **Test and Operation Council** ***Room 3.17 Pedagogical Component*** **Scientific Council** ***Room 1.6 Pedagogical Component*** | 13:00 15:00 Science Objectives workshop **(continued)** ***Library FCMA*** |
| | 15:00 17:00 **WP2** *Meeting room FCMA* **WP5** *Library FCMA* **WP7** *Room 3.21 Pedagogical Component* | | | *15:00 15:30* ***Coffee break*** |
| | | | *16:00 16:15* ***Coffee break*** | 15:30 17:00 Science Objectives workshop **(continued)** ***Library FCMA*** |
| | 17:00 19:00 **WP4** ***Meeting room FCMA*** **WP6** ***Library FCMA*** | *17:30 19:30* Tourist visit **Strategic Committee (ESONET)** ***Room3.21 Pedagogic. Component*** **Strategic Board (EMSO)** ***Room3.21 Pedagogic. Component*** | 16:15 18:15 **ESONET SC meeting part II** ***Library FCMA*** | |
| 20:30 **ESONET SC meeting part I** ***Amphitheatre D Pedagogic. component*** | | | | |
| | | *20:30* ***Evening dinner*** | | |

EMSO Meeting


# I. Minutes of the 6-month Meeting of EMSO-Preparatory Phase

# 1. General Information

**Date:** October 21st, 2008
**Venue:** Faro, University of Algarve (Portugal)
**AGENDA**

08:45 Welcome and agenda overview
09:00 General Status of the project
- Contract Status
- Consortium Agreement Status
- Website Management
- Appointment of Advisory Board

09:30 Report on the RI Meeting in Brussels (September 29th, 2008)
- Reporting requirements
- Legal Framework for RIs
- New EIB financial instruments

10:45 Planning of Activities and next deliverables
- WP planning
- Work distribution among the partners
- Next deliverables

11:30 Discussion on next actions

**PARTICIPANTS LIST**

| | Name | Institution | Country |
|---|---|---|---|
| 1. | Jaume Piera | CSIC | Spain |
| 2. | Juan Josè Dañobeitia | CSIC | Spain |
| 3. | Jorge Miguel Miranda | FCT | Portugal |
| 4. | Livia Moreira | FCT | Portugal |
| 5. | Vasilios Lykousis | HCMR | Greece |
| 6. | Anastassios Tselepidis | HCMR | Greece |
| 7. | Roland Person – EMSO deputy coordinator | IFR | France |
| 8. | Jean-François Rolin | IFR | France |
| 9. | Yves Auffret | IFR | France |
| 10. | Ingrid Puillat | IFR | France |
| 11. | Mick Gillooly | IMI | Ireland |
| 12. | Fiona Grant | IMI | Ireland |
| 13. | Paolo Favali – EMSO project coordinator | INGV | Italy |
| 14. | Laura Beranzoli | INGV | Italy |
| 15. | Pierluigi Franceschini | INGV | Italy |
| 16. | Namik Çagatay | ITU | Turkey |
| 17. | Christoph Waldmann | KDM | Germany |
| 18. | Michael Diepenbroek | KDM | Germany |
| 19. | Henry A. Ruhl | NOCS | UK |
| 20. | Per Hall | UGOT | Sweden |
| 21. | Benedicte Ferré (on behalf of Juergen Mienert) | UIT | Norway |
| 22. | Jens Greinert (on behalf of Tjeerd Van Weering) | NIOZ | The Netherlands |

# 2. Summary of the Presentations

## 2.1 Introduction

- Paolo Favali started with a welcome speech. It was pointed out that the project meeting was internal, yet extended to all interested participants within the ESONET domain. The first presentation was dedicated to a general overview of the status of EMSO-PP.
- Pier Luigi Franceschini gave a presentation regarding the meeting that took place in Brussels on 29 September. The presentation covered the following aspects:
    - Reporting requirements
    - New legal framework for Research Infrastructures (RI)

## 2.2 Discussion

- The voting procedure for the choice of the EMSO logo was agreed, as explained in the slides presented.
- FCT explained that the contract was signed by FCT and the reason for the amendments to the contract was to change the partner to FFCUL, as the latter has greater technical skills. FCT will provide contact persons for the different institutions in Portugal that will perform the different parts of the work within EMSO-PP.
- It was asked whether the KM3NET project envisioned a membership for EMSO, similarly to what is being done within the EMSO-PP Advisory Board. Paolo Favali said that a similar participation is envisioned for the EMSO-PP coordinator within the KM3NET Advisory Board.
- In terms of procedures, it was agreed to organise the WPs work (according to the e-mail the coordinator sent the WP leaders on 15th October). It was agreed that the deadline to provide feedback to WP leaders was 14th November. A tentative deadline on 10th December was set to finalise the process and produce the template.
- The following part of the discussion was dedicated to making a survey for each country participating in EMSO-PP about the advancement with respect to RI roadmaps and strategies for the different countries:
    - IMI: Ireland is about to issue a shortlist of RIs that are worth being funded (5 to 6) and EMSO seems to be within this list. The amount of money to be committed is still in a definition phase.
    - IFREMER: discussion on a national RI infrastructure roadmap is underway. Having a commitment at this stage is still premature. At the same time IFREMER has expressed interest in funding specific sites which are: Azores (where the MOMAR-D ESONET Demo Mission is currently running), Marmara Sea (where the MARMARA-DM is running) and Ligurian Sea.
    - INGV: in Italy discussion concerning a national RI roadmap is underway since March this year. The whole process was stopped when the Italian government changed; everything is presently in a standby phase. Urging for money at this stage would be too early and inappropriate.
    - ITU: Pressure is put on the government, in raising the issue of seismic risks. More lobbying is needed at this stage. The major funding agencies in Turkey are: TUBITAK, Prime Ministry Office and the State Planning organisations. The latter have already been informed, although it is too early to talk about commitment. Other stakeholders should be informed and get involved (i.e., Geological Survey, Oil Companies).

  - NIOZ: NIOZ representative (Jens Greinert) stated just recently he has currently no idea what is happening, but will keep himself informed.
  - HCMR: Greece currently has 7 ongoing projects in this field. Discussion about the priorities, synergies and peculiarities of projects are underway (EMSO and KM3NET, for example). Meanwhile the Greek partner will proceed to deploy a platform at 2000 m w.d. Moreover, a consortium is being formed among the research institutions (i.e., NESTOR, Technical Univ. of Crete, HCMR).
  - UIT: UIT representative (Benedicte Ferré) also started recently and will keep herself informed.
  - CSIC: the situation is quite uncertain at national level and the promotion of the RI has been slowed down. At this stage a survey of the RI is underway. The concern at the moment is how much money will be necessary to maintain these infrastructures. The government needs this information before committing itself to anything. It has to be clarified which ships, which logistics are needed, etc...
  - KDM: we have to be aware that there are competitors at national and at European level, for example the AURORA BOREALIS infrastructure. Many projects are competing for funding. Currently 5 institutions in Germany are planning their activities in this area towards understanding what the priorities are. Speaking of any money commitment at this stage is premature. Among the areas, the Arctic is one of the main priorities.
  - UGOT: the Swedish Research Council is the national authority in charge of funding and it has appointed a representative to the EMSO-PP Strategic Board. EMSO is in the list of priority RIs to be funded within the national roadmap, but there is no guarantee of funding. The feeling is that Sweden will be more willing to support RIs in which Swedish scientists have an interest. It has not been stated in any written form, but the Arctic area seems to be among the priorities.
  - FFCUL: there were several meetings with the Portuguese Science Foundation and it appeared that EMSO was not among the priorities for the next 2 to 3 years. Portugal is bringing several institutions together to show the government that this is an interesting area for scientists. The Azores site seems to be in a better position due to ongoing projects in that area. It was pointed out that we are competing with many other initiatives and that links among similar initiatives in this area are fundamental. It is not possible for all RIs at European level to be funded.
  - NOCS/NERC: the discussion seems to be at a very similar stage in comparison with other countries.
- Paolo Favali pointed out that one of EMSO's strengths is the fact that this RI is geographically distributed, therefore there are several places where it can be developed with different timelines according to the different interests of the countries. This could be an advantage.
- Per Hall (UGOT) confirmed that starting with 2 sites would also give results.

## 3. Actions

| SUMMARY OF ACTIONS TO BE IMPLEMENTED | | | |
|---|---|---|---|
| **N°** | **Who** | **What** | **By when** |
| **1** | INGV | Send final version of CA for signature | 24/10/2008 |
| **2** | INGV | Upload dissemination material on the website | 24/10/2008 |
| **3** | INGV | Upload new text for ESFRI on the website | 24/10/2008 |
| **4** | WP Leaders | Provide feedback on the procedure suggested by the coordinator re how to organise the WPs work | 14/11/2008 |
| **5** | Wp Leaders | Produce template | 10/12/2008 |
| **6** | All partners | Choice of EMSO logo | By the end of the meeting |


ESONET WPs Meeting

# II. Debriefing of ESONET WPs meeting

# 1. Introduction

These meetings were organised in successive parallel sessions of 2-3 WPs meetings to make a checkpoint for each WP and to manage the upcoming activities in working groups. It was also the opportunity to recruit new WP participants. A short debriefing is presented.

# 2. Agenda

| | |
|---|---|
| MEETING | WPS MEETING |
| DATE | TUESDAY 21 OCTOBER 2008 |
| PLACE | UALG |

During these meetings each WP made a checkpoint of ongoing activities: status, deliverables, needs, participants. A very short report was requested: excel file to be updated + template.

| WP1 – 12:00/13:00 – 14:00/15:00 – *meeting room FCMA* | |
|---|---|
| 1. Status of activities task by task | |
| 2. Deliverables foreseen and timeline to conduct the work for each WP1 task | |
| **WP2-15:00/17:00 - MEETING ROOM FCMA** | |
| *Presentation of the task objectives and accomplishments* | |
| 1. Sensor standardisation, Smart Sensor | Yves Auffret |
| 2. Quality control (ICD – document) | Anne Holford |
| 3. Underwater intervention | |
| 4. Sharing testing facilities | Jean Marvaldi |
| 5. GEOSS | |
| 6. Organisation of the 2 Best Practices Workshop | Christoph Waldmann |
| 7. Contribution of WP2 together with WP1 to demonstration missions | |
| 8. Deliverables within WP2 | |
| 9. Networking with international partners | |

| WP3 – 12:00/13:00 – 14:00/15:00 – *library FCMA* | |
|---|---|
| 1. Overview of past and current activities | *Henry Ruhl* |
| 2. Review of partner activities relating to WP3 – Respective partner representatives | |
| 3. Update on web survey results<br>*What were the successful results of the survey?*<br>*What will need to be done to recover remaining required inputs?* | *Yves Auffret* |
| 4. Discussion on "Science Objectives and Design of the European Seas Observatory Network (ESONET)"<br>*Is the report meeting the deliverable requirements?*<br>*How can it be improved?*<br>*How can any result of the initial demonstration missions be included?*<br>*What are the remaining steps to finalising deliverable D11?* | *Henry Ruhl* |
| *5. How will the remaining tasks, activities, and deliverables be handled?* | |
| WP4 – 17:00/19:00 - *MEETING ROOM FCMA* | |
| 1. Major problems encountered in the DM running | |
| 2. Possible modification of the implementation plan | |
| 3. Clarification on the cost statement preparation and on the reporting | |
| 4. New call for demonstration mission:<br>How many proposals?<br>Call for partners' participation needed? | |
| WP5 – 15:00/17:00 - *library FCMA* | |
| 1. Review of WP5 work plan from the Barcelona meeting | |
| 2. Review of Generic Cable and Generic Standalone working groups | |
| 3. Status of activities per task | |
| 4. Participation of ESONET partners and budgetary issues | |
| 5. Inputs required from WP3 (scientific needs) and WP6 (links with GMES/Kopernikus) | |
| 6. Review of deliverables and timelines associated with WP5 tasks | |

| | |
|---|---|
| WP6 – 17:00/19:00 – *library FCMA* | |
| Special focus on relations with industrial companies | |
| 1. Presentation of the ESONET "yellow pages" to promote offers in and outside the consortium | |
| 2. How European companies will help to fill in the scientific survey organised by WP3 (http://www.surveymonkey.com/s.aspx?sm=sV2ds3xya25Ksgulpj5riQ_3d_3d | |
| 3. Promotion and marketing plan in ESONET. Participation in major conferences (Oceans Bremen 09, …) | |
| 4. Relations with the Demo missions | |
| 5. Involvement of other companies in ESONET | |
| 6. Deliverables foreseen and timeline to conduct the work | |
| WP7 – 15:00/17:00 – *ROOM 3.21 PEDAGOGICAL COMPONENT* | |
| Agenda and needs for: | |
| 1. Debriefing of the two ESONET websites (new main one and educational one) | |
| 2. Factsheet translation | |
| 3. Material implementation in Aquaria | |
| 4. Real-time acquisition of images | |
| 5 Deliverables foreseen and timeline to conduct the work | |
| WP8 | |
| Reporting in ESONET | |

## 3. Report of WP1 meeting

Led by Michael Diepenbroek (MARUM)

**Participants list:**

Michel André (UPC)
Gael André (Altran Ouest)
Yves Auffret (IFREMER)
Eduard Bauerfeind (AWI)
Laura Beranzoli (INGV)
Jérôme Blandin (IFREMER)
Christian Curtil (CNRS-CPPM)
Jean-Jacques Destelle (CNRS-CPPM)

Michael Diepenbroek (MARUM)
Lyubomir Dimitrov (IO-BAS)
Paolo Favali (INGV)
Benedicte Ferre (University of Tromsoe)
Per Hall (Univ. of Gothenburg)
Anne Holford (UNIABDN)
Sergio Jesus (CINTAL)
Johannes Karstensen (IFM-GEOMAR)
Gilbert Maudire (IFREMER)
Stéphane Pesant (CNRS-LOV)
Imants Priede (UNIABDN)
Ingrid Puillat (IFREMER)
Jean-François Rolin (IFREMER)
Christoph Waldmann (MARUM)

**General comments on work progress:**

*Task 1a – regional observatories, Mathilde Cannat*
Michael Diepenbroek (representing Mathilde Cannat) outlined the activities of the first 18 months. For the **Exchange of Personnel** a new call was issued in June 2008 concentrating primarily around the personnel involved in demonstration missions. A fair evaluation system was elaborated. During the first "**All Regions Workshop**" working groups on each site were identified, as well as their scientific specificities. A questionnaire to gather information on existing site survey data, and on infrastructure requirements at each observatory node, is online (done together with WP5 task 5b).
A 2nd All Regions Workshop entitled "State of the art of science & technology of European observatories" is planned. The constitution of **Regional Implementation Groups** for each site is in progress (slightly delayed).

*Task 1b – data infrastructure, Michael Diepenbroek*
Michael Diepenbroek gave an overview of the activities of the first and following 18 months. The **data management plan** will be extended to meet the requirements and specifics in the demonstration missions and on possible test sites (Kostops was discussed shortly). The data management group now constituted will organize data flows from a selected set of observatories (incl. EUROSITES) and elaborate the corresponding updates for the data management plan. An upcoming data management meeting with partners from SeaDataNet and EUROSITES is planned for spring 2009. The data management group consists of representatives from ESONET demonstration sites, IFREMER, WDC-MARE, EUROSITES and SeaDataNet.
The **ESONET knowledge base** will be extended. Topology, data and information management plan, sensor registry, and QA/QC methodologies (together with WP2) will be comprised as a common knowledge base in a common web-based structure, the ESONET data & information portal extendible by possible information inventories of further tasks and by data mining (e.g. site survey data - link to activity 1a3). **Spatial Data Infrastructure (SDI**). The prototype of Spatial Data Infrastructure SDI was implemented with an online data portal. Current providers are: IFREMER, WDC-MARE, US-NODC (further NODCs indirectly). Next to be integrated: DMs observatories & MARS, NEPTUNE data. **Sensor registry** (incl. catalogue of instrument types, parameters, etc.) will be included in the ESONET SDI. The sensor registry will be registered at GEOSS as a generally available

component (common activity with WP2 task d). The interoperability is largely based on the implementation of SDI standards (in particular OGC SWE – close coop. with WP2). There was a short discussion on how the ESONET service in a later phase could be integrated into GEOSS data portals resp. GMES. A specific meeting with representatives of the GMES marine core service "MyOcean" was planned to take place in Faro (link to MyOcean via MERSEA), but had to be cancelled due to missing key players. In general, no delays for this task.

*Task 1d – VISO, Jürgen Mienert*
Benedict Ferré (representing Jürgen Mienert) outlined a first concept of the planned **Virtual Institute of scientific users of deep Sea Observatories (VISO).** VISO, in the first place, should help the community to elaborate joint research projects, concentrating on multidisciplinary science for members of large institutions but also of smaller universities through access to ocean data and related data sets including real-time data. VISO will coordinate top-level scientific research relevant under global climate change and facilitate optimal use of shared technical infrastructures and scientific facilities. Activities comprise those that spread excellence, including the training of scientific personnel and dissemination of knowledge to the authorities in charge, the public and socio-economic users. VISO was discussed controversially. It became clear that a workshop was urgently needed. The workshop is planned for spring or summer 2009.

*Task 1e – Integration into the global framework of observatories, Monty Priede*
**MOU or contracts at international level**. The first signature of an agreement for testing a prototype on NEPTUNE Canada (or ARENA Japan or MARS) and an agreement on an international network are in preparation. The MOU concentrates on fixed sea-floor infrastructures, long-term operation installations, maintenance and operation. The aim is the development of cabled systems with real-time data.
Gliders and ships are excluded from a variety of disciplines (biology, geosciences, neutrino astronomy) related to Lagrangian methods. Monty then outlined the links with various specific projects/observatories on the Japanese, US, and Canadian side. He further focused on the activities involving DELOS, GOOS, and ION. A small committee from different observatories and initiatives was formed. In May 2008 there was a corresponding meeting in Kobe (Chris Barnes, Martin Taylor, Roland Person). Dr. Yoshiyuki Kaneda, project director for DONET, JAMSTEC, Tokyo, suggested that JAMSTEC could lead for the first two years.
A one-year rotating secretariat may be more appropriate.
Meanwhile real collaboration is underway, e.g. JUB crawler on NEPTUNE.

## 4. Report of WP2 meeting

Led by Christoph Waldmann (MARUM)

**Participants list:**

Michael Diepenbroek (MARUM)
Johannes Karstensen (IFM-GEOMAR)
Yves Auffret (IFREMER)
Roland Person (IFREMER)

Jérôme Blandin (IFREMER)
Anne Holford (UNIABDN)
Henry Ruhl (NOCS)
Sergio Jesus (CINTAL)
Christoph Waldmann (MARUM)
Jens Greinert (NIOZ)
Lyubomir Dimitrov (IO-BAS)
Ammann Jerome (IUEM)
Shahram Shariat-Panahi (UPC)
Laura Beranzoli (INGV)
Paolo Favali (INGV)
Olaf Sveggen (Fugro OCEANOR)
Jean Marvaldi (IFREMER)

**General comments**:

The meeting was structured by the presentations of the individual task activities and accompanying discussions. The following presentations were given:

- Sensor standardisation, Smart Sensor (Yves Auffret)

Yves Auffret gave an overview about the standardisation activities within NEPTUNE Canada (time synchronisation) and at IFREMER as part of a national funded project. It was suggested to start with a certain type of controller board to be able to exchange programme codes and easily adapt different instruments by employing the same hardware.

- Quality control, ICD- document (Anne Holford)

Anne Holford gave an overview of the concept of using an interface control document for a standardised description of the integration and operation of instruments within observatories. The interface control document is supplemented by a quality plan which specifies the procedures that are applied in the interface control document.

- Sharing testing facilities (Jean Marvaldi)

IFREMER already has well-described testing procedures in place, which were described as part of this presentation. The task is to harmonise the different procedures among the participating institutions. A web questionnaire will help to collect all relevant information.

- Deliverables within WP2 and possible contributions of WP2 together with Demo missions (Christoph Waldmann)

The contents and the delivery dates for the corresponding reports were described. A general scheme for dealing with standardisation and interoperability issues related to the demo missions was discussed. A specific example related to the generic sensor package will help people involved in the demo missions toward completing the task.

## 5. Report of WP3 meeting

Led by Henry Ruhl (NOCS).

**Participants list:**

Luis Matias (FFCUL)
Michael Gillooly (IMI)
Fiona Grant (IMI)
Dominique Lefevre (LMGEM)
Tselepides Anastasios (HCMR)
Vasilios Lykousis (HCMR)
Yves Degrés (NKE)
Namik Çagatay (ITU)
Jens Greinert (NIOZ)
Gabriela Queiroz (UAç)
Ana Colaço (UAç)
Paolo Favali (INGV)
Ricardo Silva Jacinto (IFREMER)
Pierre-Marie Sarradin (IFREMER)
Jerome Ammann (IUEM)
Jorge Miguel Miranda (FFCUL)
Jean-François Rolin (IFREMER)

**General comments**:

Henry Ruhl opened the meeting with an overview of past and current activities:

D1, Definition of preliminary science priorities & co-authoring of text for 1st DM call
- Constituted group of experts
- Define preliminary scientific priorities
- Call for proposals made
- Established proposal review committee
- First DMs have been selected and are underway

D1 & D7, and All Regions meeting in Barcelona 2007
Four sessions outlined broad science areas
- Geohazards – *Mienert*
- Dynamics of Fluid-Controled Ecosystems – *Serrazin & Berndt*
- Evolution of Benthic Ecosystems and Halieutic Resources – *Priede* and *Santos*
- Global Change – *Sigray & Larkin*

These groups provided initial feedback to WP3 & WP4 on science priorities from the community and helped guide the first call for demonstration missions.

D6, Best Practices Proceedings with WP3 input on standard sensor recommendations
- Based on recommendations at first GA, plans to outline a potential Standard Sensor Package were discussed.
- An online survey was suggested as an objective way to gather input on the measurements to include in a Standard Sensor Package.

- Yves Auffret & H. Ruhl compiled the survey, queried the SC for comments on the survey, and opened the survey in early Sept.
- The survey got reasonable input on scientific objectives, but insignificant input on technical or design information.

Yves Auffret presented the outcome of the online survey. Twenty-nine participants started it and only eleven completed it. He mentioned that it takes half an hour to complete it. Of course, if the instrument description is incomplete, the instrument commercial reference may be provided. There was no consensus from the survey and, of those who 'completed' it, none filled in the technical part outlining sensor requirements.

Henry Ruhl reviewed the science questions in D11 - Science Objectives and Design of the European Seas Observatory NETwork (ESONET). The contents of the report were also the focus of the Science Objectives Workshop held on 24th October, where science experts provided feedback on the listed questions. Nearly all questions were seen as good, while some were viewed as certainly not fully addressable by the envisaged observatories alone. See the Science Objectives Workshop meeting notes for more details. This resulted in the submission of version 2 of the report with addressed comments.

There was also a discussion on what instruments might be included in a 'generic' sensor module. Three elements in the definition of Generic Instrumentation: generic instrumentation should not require further development; it is applied broadly (generic) or less broadly (specific); and in the DoW, it was a negotiation output where the integration effect of the work in common inside WP3 had to be shown. Therefore the generic instrumentation is an integration objective. A list of potential generic instruments was presented, but it was clear that some elements were not uniformly favoured, such as gravity, $CH_4$, time-lapse cameras. J-F Rolin suggested that the generic specifications to be part of D13 include several options. Furthermore, it was discussed that the generic elements presented in D13 could of course be reviewed by external experts and discussed further at the next Best Practices workshop, for example.

The remaining key objectives are the report on science modules (D13), the requisite inputs of WP3 to other work packages (such as inputs to WP5 and WP2 respectively for financial and standardisation planning). L. Géli, H. Ruhl, J. Greinert, Y. Auffret, and others will be contributing to D13, which will also be reviewed by science experts including members of the science council.

## 6. Report of WP4 meeting

Led by Laura Beranzoli (INGV).

**Participants list:**

Laura Beranzoli (INGV)
Johannes Karstensen (IFM-GEOMAR)
Vasilios Lykousis (HCMR)
Roland Person (IFREMER)
Jérôme Blandin (IFREMER)
Anne Holford (UNIABN)

Namik Çagatay (ITU)
Ricardo Serrão Santos (UAç)
Ana Colaço (UAç)
Jean-Pierre Hermand (ULB)
Ingrid Puillat (IFREMER)
Jean-François d'Eu (IUEM)
Christophe Waldmann (MARUM)
Sergio Jesus (CINTAL)
Michel André (UPC)
Lyubomir Dimitrov (IO-BAS)
Stéphane Pesant (CNRS-LOV)
Jérôme Ammann (IUEM)
Yves Auffret (IFREMER)
Eduard Bauerfeind (AWI)
Gabriela Queiroz (UAç)
Pierre-Marie Sarradin (IFREMER)
Luis Matias (FFCUL)
Jean-Jacques Destelle (CNRS-CPPM)
Cansun Guralp (GURALP)

**General comments**:

Comments on work progress:

| **Task name and leader** | **Comments: Status, problems, actions, needs** |
|---|---|
| a) ***Task 4.a.1*** - Call for proposal including preparation, planning and implementation (L. Beranzoli) | Status: at the time of the meeting, the draft of the 2nd Call for Demonstration Missions (DM) was already sent to the officer. Feedback from him is expected in time for the Call's agreed issue date (28 Oct. 2008). The first part of the meeting was dedicated to presenting the 2nd Call emphasising differences with respect to the 1st one.<br><br>No major problems were encountered in this task. |
| ***Task 4.a.2 – Update of reviewer list*** | This task was not discussed in the WP4 meeting *(SC and Chairs of the ESONET Councils in charge of providing additional names of referees).* |
| ***Task 4.a.3 – Selection process*** | This task was not discussed in the WP4 meeting *(The selection process is managed by the WP4 leader, the Chairs of the ESONET council. The next selection will be performed starting in late 2008).* |
| ***Task 4.b.1*** **-**Follow-up of demonstrations (L. Beranzoli) | Status: the second part of the meeting was restricted to the coordinators of the DM funded by the 1st call. In order to start with regular reporting about the status of the DMs, the actual starting date of each DM funded |

| | |
|---|---|
| | was checked together with the durations in order to ensure the end of all the DMs by Sept. 2010.<br><br>Moreover, a reminder of the submission of the 1st periodic report for each DM was given. This report should have been handed in by July 2008 but, at that date, as part of the DMs had been started for 1-2 months and part of them were not yet started, the report delivery was postponed to November 2008. |

**Agenda of the activities until the deliverables and Milestones**

| Task name | Timeline of activities' tasks |
|---|---|
| ***Task a.1*** - Call for proposal including preparation, planning and implementation | Oct. 28th, 2008 - Publication of call<br>Dec. 10th, 2008 - Deadline for submission of full proposals<br>Dec. 15th, 2008 - Evaluation of proposals' eligibility |
| ***Task 4.a.2 – Update of reviewer list*** | Nov. 2008 - Updated list |
| ***Task 4.a.3 – Selection process*** | Jan. 2009 - End of evaluation process by referees<br>Jan. 2009 – SC selects the proposals to be funded and communicates to the DM coordinators<br>Feb. 2009 - Elaboration of the evaluation summary rep.<br>Feb. 2009 - Letter to applicants<br>Feb. 2009 - Signature of first grant agreements |
| ***Task 4.b.1*** -Follow-up of demonstrations (1st call) | Jan. 2009 – check for any updating of the 1st report |
| ***Activity 4.b.2 – Reporting*** | Nov. 2008 - 1st periodic report<br>June 2009 – 2nd periodic rep. |

**General comments**:

| |
|---|
| MARMARA-DM coordinator, Luis Geli, was represented by ITU (Namik Cagatay)<br>LOOME coordinator, Dirk de Beer, was represented by UB (Christoph Waldmann) |

**Partners to be contacted and by whom (if needed):**

| |
|---|
| LOOME coordinator, Dirk de Beer, has to be contacted for more detailed info on the DM |

**GENERAL ASSEMBLY MEETING, Wed. 22 October:**

Please provide the names of 2 persons for your WP session during the General Assembly to gather the notes (questions + answers).
Persons in charge of these notes: L. Beranzoli/M. Cannat

Relevant WP4 information gathered during the General Assembly meeting:

| Questions asked (by whom?) | Answers given | Notes/remarks/actions |
|---|---|---|
| Clarification on eligibility costs (few participants) | Equipments are not eligible unless they are helpful to the whole consortium integration | |
| Clarification on the admission of non-ESONET partners | Admitted but as subcontractors | |
| Overall budget available | Budget can be increased from 900K Euros to 1M Euros | |

## 7. Report of WP5 meeting

Led by Mick Gillooly & Fiona Grant (MI).

**Participants list:**

Fiona Grant (MI)
Mick Gillooly (MI)
Gael Andre (Altran)
Pier Luigi Franchesini (INGV)
Laura Beranzoli (INGV)
Olav Godoe (IMR)
Gabriela Queiroz (UAç)
Juanjo Danobeitia (CSIC)
Jaume Piera (CSIC)
Miguel Miranda (UL)
Belarmino Barata (UL)
Monty Priede (UNIABN)
Nick O'Neill (CSA)
Eduard Bauerfeind (AWI)
Jean Jacques Destelle (CPPM)
Jean-François Rolin (IFREMER)

**General comments**:

A presentation on the status of WP5 was given by Fiona Grant and Mick Gillooly. Mick Gillooly again pointed out that a large number of institutes have requested a budget for WP5 and that work is not being undertaken by these partners.

A summary of the Generic Cable and Generic Standalone Site WGs was presented, together with associated timelines. Month 24 and Month 30 were highlighted as critical dates associated with important deliverables for WP5. The reporting to EMSO is listed under Task 5d and the EC is keen that the two projects liaise appropriately. It was noted that funding opportunities should be monitored throughout the lifetime of the ESONET NoE project. The Strategic Committee will be closely associated with this task as it will require very high-level cooperation between institutions and countries.

An update of ESONIM End Users and Potential Customers for Ocean Observatories was initiated under Task 5a1. A case study by Fugro Oceanor was presented suggesting that the budget for operational oceanography could amount up to €10M annually.

In Task 5a5 – A Review of Funding Mechanisms was presented showing the EU's Practical Guide to EU Funding. It demonstrates that projects can avail of funding opportunities synergies between:

- 7th Framework Programme for Research
- Competitiveness & Innovation Programme
- Structural Funds

Some points raised were the following:

- Among the many areas supported by the Structural Funds are R&D and innovation.
- The allocation of funds in a given Member State or region varies according to its level of development.
- Most regions will have funding available from the Structural Funds in support of RTDI.
- Structural Funds for innovation and research in the 2007-2013 period will be greater than €99 billion.
- For the poorer regions, the co-financing of and the access to innovative experience facilitated by the governance system characteristic of cohesion policy are crucial to this purpose.

Also under Task 5a5, the Risk Sharing Finance Facility (RSFF) of the EIB was presented. WP5 queried as to whether the STRAC should be advised for new funding mechanisms to facilitate proposal development between Member States.

Included in Task 5a5 were some slides relating to the estimates of Costs for All Sites. The former cost estimates of ESONET CA (approximately €210M in total) were compared to the cost estimates developed by applying the ESONIM model to all sites (up to approximately €640M in total). Fiona Grant demonstrated how the cost model had been modified for the Arctic node based on updated information. The Arctic node cost estimate has fallen by approximately 35%. Noted updates to be included relate to costs associated with the standalone nodes in the configuration, and updated operation and maintenance costs.

Task 5a5 - Review OPEX v1 was prepared as part of the generic cable WG. Jaume Piera and Juanjo Dañobeitia made a first estimate of operational costs. The cost of ROV represents a large part of this OPEX (up to 60% if the Victor 6000 is used). CSIC stressed that the vessel costs should amount to a minimum given that research costs as opposed to commercial costs were used in the estimates. Several attendants *(Monty Priede, Tassos Tselepides, JJ Destelle)* highlighted the opportunity to use neutrino telescope project experiences. Jaume Piera and Jean-Jacques Destelle (Antares-CPPM) will exchange on the past experience of operation costs at the Antares sites.

Cost estimates may be built on the basis of technologies different from past experience (Neptune Canada, Antares, Nemo from cables for instance), but they must be mature enough because EMSO PP is focused on calls for tenders in 2012. *(Discussion between Monty Priede and Jean Francois Rolin plus others)*

Task 5a5 – Review of KM3NET CAPEX was undertaken. A large proportion of the current estimates relate to the detection and calibration units of the neutrino telescope.

Task 5b – Proposed EU Legal Framework for ERIs was presented to participants. Detailed information was also supplied at the EMSO meeting on the previous day.

Task 5b – LEE Database is being prepared by Michel Andre as part of the Legal, Ethical and Environmental (LEE) task.

Task 5b – ESONET Atlas is being prepared by Altran and some examples from the Celtnet site were presented. This work is still underway. It was emphasised that, in conjunction with WP1 (data mining task), only four responses to the Altran questionnaire were received. This makes updating all the engineering and financial estimates for ESONET sites very difficult, if not impossible. Participants were asked once again to respond for those sites they are responsible for.

Task 5d - Initial Report to EMSO on Implementation Plans in ESONET NoE prepared in June 2008. WP5 leaders await a response in relation to the comments and recommendations made in the report. These are:

- There do not appear to be any significant overlaps in the work plans of ESONET NoE and EMSO PP but this will need to be assessed as the projects progress.
- It is recommended that prioritisation of the sites for business plans be progressed as soon as possible to ensure that ESONET NoE and EMSO PP deliver the best value for money with the time and resources available.
- Legal and financial consultants are expensive and the budget for WP3 and WP5 will be exhausted within a short timeframe, even with limited external consultation. It is suggested that the Steering Committee consider optimisation of consultation through various mechanisms.
- WP5 leaders advise that, before any work is started in EMSO, the observatory locations and node configurations should be audited. The list of contact points and 'owners' of the infrastructures should be revised and confirmed (underway in ESONET NoE WP1 and WP6), in that they provide the data required on nodes, location requirements, etc. Regional nodes that are unable to identify such owners should be discussed at Steering Committee level.
- It is important that initiatives outside the scope of ESONET and EMSO are monitored. The legal framework for ERIs being developed at EU level should be closely monitored to ensure that the framework is appropriate for European deep sea observatory infrastructures which have multiple owners and dispersed geographical locations.

Other items discussed: Decommissioning of cables was discussed and case studies from UK Oil and Gas Decommissioning WGs were presented.
Task 5b - COWRIE EMF fields – A report by the Collaborative Offshore Wind Research into the Environment (COWRIE) will be available for comments in the coming months.

Participants were reminded that other projects on the ESFRI roadmap are actively searching for funding to construct and operate their infrastructure. Some of them are very vocal and have a strong political agenda. There are developments at EU level in relation to which infrastructures will be constructed and the ESONET community should be prepared to respond. It is critical that ESONET and EMSO develop a coherent case for implementation based on **sound scientific and societal needs.**

To summarise the WP5 meeting and presentations:

- From the Barcelona meeting we developed two Working Groups – Generic Cabled Site and Generic Standalone Site.
- We welcome inputs from any partner able to contribute to tasks.
- To date only four responses have been received to the Altran questionnaire – it is critical that each site updates information on the configuration to feed into WP5.
- Key deadlines are Month 24 for Initial Implementation Plans and Month 30 for the Final Report on Best Practices, Guidelines for LEE issues and Implementation Plans.
- WP5 leaders are recommending that we convene a meeting to encourage stakeholder engagements (Member State, Commission, Private Sector, Research Community, Public Interest).
- Should the STRAC be advised of new funding mechanisms to facilitate proposal development between Member States?
- WP5 leaders are recommending the production of a synthesis report, making out a case for seafloor observatories. The report can be published and used as a basis for advancing the arguments for the development of seafloor observatories as advocated by the ESONET NoE STRAC in 2007.
- ESONET sites will be ranked in order of maturity for submission to EMSO which will prioritise them for future planning.

- **There is an urgent need for engagement by partners to meet the deliverables and maintain momentum.**

| **DATE: 07/08/2008** | | | | | | | **PERIOD: June 2008 - Oct 2008** |
|---|---|---|---|---|---|---|---|
| **WORK PACKAGE: 5** | | | **TITLE: Implementation strategies** | | | | |
| **PERSON(S) IN CHARGE: M. GILLOOLY - IMI (IE) / J. DANOBEITIA - CSIC (ES)** | | | | | | | |
| **TASKS** | | **ACTIVITIES** | | **Task leader (Organisation)** | **Initial end date (month)** | **Status (%)** | **Comments** |
| **Task N°** | **Task** | **Activity N°** | **Activity** | | | | |
| 5.a. | Science, engineering and business plan for generic sites | | | J. PIERA - CSIC (ES) / O. PFANNKUCHE - KDM (DE) | 24 | | |
| | | 5.a.1. | Science - Generic Cable Site WG | FG/NO'N | 24 | 25% | NO'N has been working on "Potential customers of observatories, stakeholders with commercial potential and potential revenues - Task A - WP5" |
| | | 5.a.2. | Science - Standalone Site WG | FG/NO'N/OP | 24 | 25% | NO'N has been working on "Potential customers of observatories, stakeholders with commercial potential and potential revenues - |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | Task A - WP5" |
| | | 5.a.3. | Engineering - Generic Cable Site WG | JP & Co. | 24 | 5-10% | Work plan devised and WG constituted. Some preliminary approaches discussed. |
| | | 5.a.4. | Engineering - Standalone Site WG | OP & Co. | 24 | 5% | Work plan devised. |
| | | 5.a.5. | Business Plan & Financial Model - Generic Cable Site WG | FG & Co. | 24 | 15% | KM3NET cost model received - some comparison work done. Legal framework for ERI, VAT free infrastructures. Assessment of change to Celtnet model complete. Awaiting further input from science/engineering tasks. |
| **TASKS** | | **ACTIVITIES** | | **Task leader (Organisation)** | **Initial end date (month)** | **Status (%)** | **Comments** |
| **Task N°** | **Task** | **Activity N°** | **Activity** | | | | |
| | | 5.a.6. | Business Plan & Financial Model - Standalone Site WG | OP, FG & Co. | 24 | 5% | Work plan devised. |
| 5.b. | Legal, Ethical & Environmental | | | M. ANDRE - UPC (ES) | 24 | | A worldwide database on the distribution of cetaceans is about to be completed. It includes all the Marine Protected Areas belonging to territories, countries, biogeographic zones and marine regions. |
| | | 5.b.1. | Building-up Methodology | | 24 | | |
| | | 5.b.2. | Gathering of Information | | 24 | 50% | Database available and information being input to it. |
| | | 5.b.3. | Analysis of Content | | 24 | | |
| | | 5.b.4. | Best Practices and Guidelines | | 24 | | |
| 5.c. | Comparative work | | | M. GILLOOLY - IMI (IE) / F. GRANT - IMI (IE) | 24 | 0% | |
| 5.d. | Reporting to EMSO | | | M. GILLOOLY - IMI (IE) | 24 | 30% | Draft initial report to EMSO on implementation has been submitted for |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | appraisal. | | |

| **Partners list:** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| IMI | ING V | IFREMER | CNRS | IPGP | CSIC/ UPC | IFM-GEOMAR | CSA | ALTRAN OUEST (ATLANTIDE) | | |

| **Deliverables list:** | | | | |
|---|---|---|---|---|
| **N°** | **Title** | **Expected date (month)** | **Status (%)** | **Comments** |
| D5 | Series of individual implementation plans for specific cabled observatory sites | 24 | 0% | |
| D14 | Report on workshops to facilitate and broker partnership, tutorials/meetings on implementation plans and replies to infrastructure proposals; on-site assessment, legal model, environmental constraints and their associated ethical issues | 24 | 30 % | Tutorial and meeting on implementation plans held in Barcelona (Feb 2008). Altran have commenced issuing a questionnaire on LEE issues. |
| D20-2009 | Document outlining agreement on cooperation between organisations involved in developing technology | 24 | 0% | |
| D21-2009 | Report on confidential meetings between commercial companies and ESONET WP leaders re working relationships and ESONET requirements | 24 | 0% | |
| D22-2009 | Report of meeting to discuss long-term funding for seafloor observatories involving funding agencies representatives | 24 | 0% | |
| D23-2009 | Report on integration between respective teams (research teams, technical teams, companies and SMEs) and working relationships beyond the life of ESONET | 24 | 0% | |
| D24-2009 | Report on integration between respective teams (research teams, technical reams, companies and SMEs) and working relationships beyond the life of ESONET | 24 | 0% | |
| D46 | Report to EMSO on Implementation Model (ESONET NoE) | 24 | 50 % | Draft initial report to EMSO on implementation was submitted for appraisal. |
| D47 | Online database to include local, national and European legal, ethical and environmental (LEE) documents | 24 | 50 % | Database available and information being input to it. |
| D48 | Final report on Best Practices and Guidelines for LEE issues | 24 | 0% | |

| Milestones and expected results list: | | | | |
|---|---|---|---|---|
| **Task N°** | **Title** | **Expected date (month)** | **Status (%)** | **Comments** |
| 5.a. | Meeting with EMSO on implementation model | 18 | 0% | Requested meeting with EMSO on Monday 20 October - draft report submitted for appraisal. |
| 5.b. | Meeting on relations with funding agencies | 24 | 0% | |
| 5.c. | Meeting on ESONET core services | 24 | 0% | |

## 6. Report of WP6 meeting

Led by Jorge Miguel Miranda (FFCUL).

**Participants list:**

Jorge Miguel Miranda (FFCUL)
Nick O'Neill (CSA)
Olaf Godoe (Institute of Marine Research)
Monty Priede (UNIABDN)
Jean-François Rolin (IFREMER)
Olaf Sveggen (FUGRO OCEANOR)

**General comments**:

A presentation on the status of WP6 was given by Jorge Miguel Miranda.
Nick O'Neill started the discussion: for ESONET customers, the request is unchanged since ESONIM, and the Oceanor Fugro market study is therefore the best "benchmark" available to have a gross evaluation of the market size and evolution. Following this study, the overall size of the current market for Ocean Observation is close to €10.7M turnover per year.

Olaf Sveggen from Fugro Oceanor stated that their core business was related to the water column and buoys, not observatories, and therefore the figures above must be considered with care. The most relevant deliveries of observatory-like instruments were ordered by the Statoil Met offices in Iceland and Ireland, Oceano in Portugal and HCMR. The area of activity relates mainly to environmental protection and tsunami detection. It is important to know what services seafloor instruments can offer: while geologists are happy with seafloor observations, climate modellers seem less enthusiastic and biologists request more sensing in the water column.

Jorge Miguel Miranda considered that each node has its own characteristics with its particular science case. He also pointed out the importance to have the possibility to exploit data even if there are limitations on its availability.

Monty Priede considered that oil companies are progressively moving to areas where knowledge is poor (only drop cameras and photographs are available). They are interested in environmental assurance (not environmental impact) and this can be addressed with deep ocean observatories, as is the case of DELOS.

Olav Rune Godoe confirmed the above statement: oil companies want to be able to defend themselves against potential environmental damage. DELOS shows that a package of instruments can be paid by the operation of oil companies, as both the company and the authorities need to access data.

Jorge Miguel Miranda considered the need to improve the contents of ESONEWS and hoped that the arrival of Demonstration Missions would improve them. The next subjects of ESONEWS are DELOS in November and GEOSTAR in October. Concerning "ESONET Yellow Pages" (activity 6c.2), there is a need to link them with the ESONET-EMSO webpage. Jorge Miguel Miranda also described the possibility to load the "yellow pages" with existing information in European databases and the possibility to increase the quality of the contents (e.g. IEEE standards will be documented as well as SensorML).

## 7. Report of WP7 meeting

Led by Laurenz Thomsen (JUB).

**Participants list:**

Luis Matias (FFCUL)
Stéphane Pesant (CNRS-LOV)
Ingrid Puillat (IFREMER)
Ana Colaço (UAç)

**General comments**:

In L. Thomsen's (JUB) absence, I. Puillat (IFREMER) and Ana Colaço (UAç) started the short discussions with the exploration of the ESONET website: the educational part led by JUB and the main website, which is completely redesigned.

A few comments were made:

- concerning the educational part:
  - the video camera link cannot be found
  - need to carefully check if not too many pages are Hermes-related
  - need to check where the material is sent (photos CD + Rose Video)
- Concerning the new version of the main ESONET website: need to add legends to images and bathymetries
- Concerning the WP7 overall: communication with JUB for WP7 activities is not easy: many emails unanswered.


ESONET 2nd General Assembly

# III. ESONET 2nd General Assembly

# ***ESONET***
# ***2nd General Assembly***

Faro (Portugal) –
22-23 October 2008

## 1. Introduction

The second ESONET General Assembly was held in Faro on 22-23 October 2008. Several other meetings and workshops, associated with ESONET activities were also organised in the same location during this week. This second General Assembly aimed to share main results after 18 months of activities together with the programme until September 2009 for constructive discussions and comments. A specific session was set during the second day for official approval of decisions made by the ESONET Steering Committee. This part sums up the two days of the General Assembly: the GA agenda, the list of participants, a summary of the discussions, approvals made during the meeting and a copy of all slides presented (see Appendix B).

Seventy-five ESONET members and invited persons participated in the General Assembly.

## 2. Agenda and list of attendees

| **Meeting** | **General Assembly** |
|---|---|
| **Date/time** | **22 October – 08:30/18:00**<br>**23 October – 09:00/13:00** |
| **Place** | **University of Algarve – FARO - Portugal**<br>**Amphitheatre T. Gamito** |

| **Wednesday 22 October** | | | |
|---|---|---|---|
| 08:30<br>09:00 | Welcome | | ECT |
| 09:00<br>09:30 | General presentation | | ECT |
| 09:30 | WP1 presentation (30') | Discussion (15') | M. Diepenbroek |
| 11:00 | WP2 presentation (30') | Discussion (15') | C. Waldmann |
| *11:00*<br>*11:30* | *Coffee break* | | |
| 11:30 | WP3 presentation (30') | Discussion (15') | H. Ruhl |
| 13:00 | WP5 presentation (30') | Discussion (15') | M. Gillooly |
| *13:00*<br>*14:30* | *Lunch* | | |
| 14:30<br>16:00 | WP4 (10') + Demo mission (4X15') | Discussion (20') | L. Beranzoli |
| 16:00 | WP6 presentation (30') | Discussion (15') | JM. Miranda |
| 17:30 | WP7 presentation (30') | Discussion (15') | L. Thomsen |
| 17:30<br>18:00 | Discussions | | |
| *18:00*<br>*20:00* | *Tourist visit* | | |
| *20:30* | *Evening dinner* | | |
| **Thursday 23 October (morning)** | | | |
| 09:00<br>09:45 | WP8 + Financial | | ECT |
| 09:45<br>10:00 | European Commission Officer | | ECT |
| **10:00**<br>**13:00** | Contracts, Agreements, Votes<br>➔ see APPROVAL FORM | | ECT |
| *End of the General Assembly* | | | |

## List of all Participants

| First name | Last name | Position | Institution | City | Country | email | GA 22 * | GA 23* * |
|---|---|---|---|---|---|---|---|---|
| Thorkild | Aarup | | Intergovernmental Oceanographic Commission of UNE | Paris | France | t.aarup@unesco.org | Yes | Yes |
| Gael | André | engineer | Altran Ouest / Atlantide | Brest | France | gael.andre@altran.com | Yes | Yes |
| Michel | André | | UPC | Vilanova i la Geltrú, Barcelona | Spain | michel.andre@upc.edu | Yes | Yes |
| Yves | Auffret | engineer | IFREMER | Plouzané | France | yauffret@ifremer.fr | Yes | Yes |
| Belarmino | Barata | | FFCUL | Lisbon | Portugal | bbarata@fc.ul.pt | Yes | Yes |
| Eduard | Bauerfeind | researcher | Alfred Wegener Institute for Polar and Marine Research (AWI) | Bremerhaven | Germany | eduard.bauerfeind@awi.de | Yes | No |
| Andree | Behnken | | MARUM | Bremen | Germany | andree.behnken@uni-bremen.de | Yes | No |
| Laura | Beranzoli | researcher | INGV | Rome | Italy | Beranzoli@ingv.it | Yes | Yes |
| Jérôme | Blandin | engineer | IFREMER | Plouzané | France | Jerome.Blandin@ifremer.fr | Yes | No |
| M. Namik | Çagatay | researcher | Istanbul Technical University Emcol (ITU) | ISTANBUL | TURKEY | cagatay@itu.edu.tr | Yes | No |
| Mathilde | Cannat | researcher | IPGP | Paris | France | cannat@ipgp.jussieu.fr | Yes | Yes |
| Ana | Colaço | researcher | University of Azores | Horta | Portugal | acolaco@uac.pt | Yes | Yes |
| Christian | Curtil | | CNRS - CPPM | Marseille | France | curtil@cppm.in2p3.fr | Yes | Yes |
| Juanjo | Danobeitia | researcher | CSIC | Barcelona | Spain | jjdanobeitia@cmima.csic.es | Yes | Yes |
| Yves | Degres | engineer | nke | Hennebont | France | ydegres@nke.fr | Yes | No |
| christophe | Desbois | administrative | IFREMER | Brest | France | christophe.desbois@ifremer.fr | Yes | Yes |
| Jean-Jacques | Destelle | engineer | CPPM/CNRS-IN2P3 | Marseille | France | destelle@cppm.in2p3.fr | Yes | Yes |
| Jean-Francois | D'Eu | engineer | IUEM-Plouzané | Plouzané | France | deu@univ-brest.Fr | Yes | No |
| Michael | Diepenbroek | | University of Bremen Marum | Bremen | Germany | mdiepenbroek@pangaea.de | Yes | Yes |
| Paolo | Favali | researcher | INGV | Rome | Italy | paolofa@ingv.it | Yes | Yes |
| Benedicte | Ferre | researcher | Department of Geology (UiT) | Tromsø | Norway | bferre@usgs.gov | Yes | Yes |
| Pier Luigi | Franceschini | administrative | INGV | Rome | Italy | emsopp@ingv.it | No | No |
| Louis | Géli | researcher | IFREMER | Plouzané | France | louis.geli@ifremer.fr | No | Yes |
| Mick | Gillooly | | Marine Institute (IMI) | Galway | Ireland | michael.gillooly@marine.ie | Yes | Yes |
| Olav Rune | Godoe | researcher | Institute of Marine Research | Bergen | Norway | olavrune@imr.no | Yes | No |
| Fiona | Grant | researcher | Marine Institute (IMI) | Galway | Ireland | fiona.grant@marine.ie | Yes | Yes |
| Jens | Greinert | researcher | NIOZ | Texel | The Netherlands | greinert@nioz.nl | No | Yes |
| Cansun | Guralp | engineer | Guralp Systems Limited | Reading | UK | cguralp@guralp.com | Yes | No |
| Per | Hall | researcher | Univ. of Gothenburg (UGOT) | Gothenburg | Sweden | perhall@chem.gu.se | Yes | Yes |
| Peter | Haugan | researcher | University of Bergen | Bergen | Norway | Peter.Haugan@gfi.uib.no | Yes | Yes |
| Jean-Pierre | Hermand | researcher | Université Libre de Bruxelles (ULB.) | Brussels | Belgium | jhermand@ulb.ac.be | No | Yes |
| Anne | Holford | engineer | Aberdeen University (UNIABDN) | Aberdeen | UK | a.holford@abdn.ac.uk | Yes | Yes |
| Ammann | Jerôme | engineer | IUEM | Plouzané | France | jerome.ammann@univ-brest.fr | Yes | No |

* Attendees at the General Assembly of Wednesday 22 October
** Attendees at the General Assembly of Thursday 23 October

| First name | Last name | Position | Institution | City | Country | email | GA 22 * | GA 23* * |
|---|---|---|---|---|---|---|---|---|
| Sergio | Jesus | researcher | CINTAL | Faro | Portugal | sjesus@ualg.pt | Yes | No |
| Johannes | Karstensen | researcher | Leibniz Institute for Marine Sciences, IFM-GEOMAR | Kiel | Germany | jkarstensen@ifm-geomar.de | Yes | Yes |
| Richard | Lampitt | researcher | NOCS | Southampton | UK | R.Lampitt@noc.soton.ac.uk | No | Yes |
| Pascal | Le Grand | administrative | European Commission | Brussels | Belgium | pascal.le-grand@ec.europa.eu | No | Yes |
| Dominique | Lefevre | researcher | CNRS LMGEM | Marseille | France | dominique.lefevre@univmed.fr | Yes | Yes |
| Joaquim | Luis | researcher | Univ. Algarve | Faro | Portugal | jluis@ualg | Yes | Yes |
| Vasilios | Lykousis | researcher | HCMR | Athens | Greece | vlikou@ath.hcmr.gr | Yes | Yes |
| Guiditta | Marinaro | | INGV | Rome | Italy | marinaro@ingv.it | Yes | Yes |
| Jean | Marvaldi | engineer | IFREMER | Brest | France | jean.marvaldi@ifremer.fr | Yes | Yes |
| Luis | Matias | researcher | CGUL/IDL/IM | Lisbon | Portugal | lmatias@fc.ul.pt | Yes | Yes |
| Gilbert | Maudire | engineer | IFREMER | Plouzané | France | gilbert.maudire@ifremer.fr | Yes | Yes |
| Miguel | Miranda | researcher | FFCUL | Lisbon | Portugal | jmmiranda@fc.ul.pt | Yes | Yes |
| Livia | Moreira | | FFCUL | Lisbon | Portugal | lmdmoeira@fc.ul.pt | Yes | Yes |
| Maria | Neves | researcher | Universidade do Algarve | Faro | Portugal | mcneves@ualg.pt | Yes | Yes |
| Nick | O'Neill | researcher | CSA | Dublin | Ireland | noneill@csa.ie | Yes | Yes |
| Maureen | Pagnani | | NOCS | Southampton | UK | mred@noc.soton.ac.uk | | |
| Roland | Person | researcher | IFREMER | Brest | France | roland.person@ifremer.fr | Yes | Yes |
| Stéphane | Pesant | researcher | CNRS-LOV | Villefranche-sur-Mer | France | pesant@obs-vlfr.fr | Yes | Yes |
| Jaume | Piera | researcher | CSIC | Barcelona | Spain | jpiera@cmima.csic.es | Yes | Yes |
| Olivier | Pot | | IPGP | Paris | France | pot@ipgp.jussieu.fr | Yes | Yes |
| Imants | Priede | researcher | University of Aberdeen | Aberdeen | UK | i.g.priede@abdn.ac.uk | No | Yes |
| Ingrid | Puillat | researcher | IFREMER | Brest | France | ipuillat@ifremer.fr | Yes | Yes |
| Atun | Purser | student | Jacobs University Bremen | Bremen | Germany | a.purser@jacobs-university.de | Yes | Yes |
| Gabriela | Queiroz | researcher | Universidade dos Açores | Ponta Delgada | Portugal | maria.gp.queiroz@azores.gov.pt | Yes | Yes |
| Paulo | Relvas | researcher | Univ. Algarve | Faro | Portugal | prelvas@ualg.pt | Yes | Yes |
| Jean-François | Rolin | engineer | IFREMER | Plouzané | France | jrolin@ifremer.fr | Yes | Yes |
| Henry | Ruhl | | NOCS | Southampton | UK | h.ruhl@noc.soton.ac.uk | Yes | Yes |
| Pierre Marie | Sarradin | researcher | IFREMER | Plouzané | France | pierre.marie.sarradin@ifremer.fr | Yes | No |
| Ricardo | Serrão Santos | researcher | University of the Azores | Horta | Portugal | ricardo@uac.pt | Yes | Yes |
| Shahram | Shariat-Panahi | researcher | UPC | Vilanova i la Geltru | Spain | shahram.shariat@upc.edu | Yes | No |
| Ricardo | Silva Jacinto | researcher | IFREMER | Brest | France | ricardo.silva.jacinto@ifremer.fr | Yes | Yes |
| Olaf | Sveggen | administrative | Fugro OCEANOR | Trondheim | Norway | o.sveggen@oceanor.com | Yes | Yes |
| Michael | Taroudakis | researcher | FORTH / IACM | Heraklion | Greece | taroud@iacm.forth.gr | Yes | Yes |

* Attendees at the General Assembly of Wednesday 22 October
** Attendees at the General Assembly of Thursday 23 October

| First name | Last name | Position | Institution | City | Country | email | GA 22 * | GA 23* * |
|---|---|---|---|---|---|---|---|---|
| Anastasios | Tselepides | researcher | Univ. of Piaeus / HCMR | Heraklion | Greece | ttse@her.hcmr.gr | Yes | Yes |
| Angela | Vulcano | | Ministry of University and Research | Rome | Italy | angela.vulcano@miur.it | Yes | Yes |
| Christoph | Waldmann | | Bremen University/MARUM | Bremen | Germany | waldmann@marum.de | Yes | Yes |
| Phil | Weaver | | NOCS | Southampton | UK | p.weaver@noc.soton.ac.uk | Yes | Yes |
| Ian | Wright | | NOCS | Southampton | UK | i.wright@noc.soton.ac.uk | Yes | Yes |
| Nevio | Zitellini | | ISMAR | Bologna | Italy | Nevio.zitellini@bo.ismar.cnr.it | Yes | Yes |

* Attendees at the General Assembly of Wednesday 22 October
** Attendees at the General Assembly of Thursday 23 October

# 3. Debriefing of the main discussions

## 3.1 General introduction by Roland Person

The aim of ESONET NoE is to create an organisation capable of implementing, operating and maintaining a network of multidisciplinary ocean observatories in deep waters around Europe. The NoE managed the participants' resources and planned a Joint Programme of Activities (JPA) for the first 18 months in order to ensure maximum integration, remove barriers and find durable solutions for this future organisation.
All partners within ESONET NoE committed themselves to achieving the durable integration objectives set out in the description of work for that grouping and to granting their actual activities in the network.
The JPA is the streamlining of 7 interconnected Work Packages (WPs) in three main areas (plus WP8):

| WP | WP Title | WP Leader | Objectives |
|---|---|---|---|
| WP 1 | Networking | Michael Diepenbroek | Implementation of a service-oriented multi-purpose observatory network: exchange of personnel, data management, international cooperation |
| WP 2 | Standardisation and Interoperability | Christoph Waldmann | Establish a standing committee for standardisation issues and their implementation |
| WP 3 | Observatory design related to scientific objectives | Henry Ruhl | Define the best methodologies, scientific packages, instruments and underwater components to be applied in a long-term cabled observatory |
| WP 4 | Demonstration missions | Laura Beranzoli | Fund and coordinate sea tests for components of the observatory network designs |
| WP 5 | Implementation strategies | Mick Gillooly | Analyse and integrate the activities and assist in the preparation of applications to National and International funding agencies |
| WP 6 | Socio-economic users | Jorge Miguel Miranda | Promote the need of sub-sea observatories, disseminate the results of ESONET NoE and establish permanent links to socio-economic users<br>(See ESONEWS) |
| WP 7 | Education and outreach | Laurenz Thomsen | Develop and support comprehensive interdisciplinary programmes for research, education and public outreach on deep waters around Europe<br>(educational website, web portal) |
| WP 8 | Management and governance structure | Roland Person | Organisation, management, and governance of the structure of ESONET NoE |

In summary, the main milestones of this first year were the first call for Demonstration Missions (in month 2), the first call for exchange of personnel (in month 2 but no answer, then a new call took place in month 18), the first All Regions workshop (in month 6), the first Best Practices workshop (in month 8) and the first Educational and Training workshop (in month 12). Moreover, the main deliverables were achieved but often with delays.

The general conclusion for these first 18 months is rather positive with successful meetings and the constitution of the working groups. This integration process is a key element of success for ESONET because it will provide a good basis to consolidate the network during the remaining 3 years. Nevertheless, there are too many points pending to be improved: activity reports and administrative forms need to be received on time, ESONET emails need to be read and any activities should be suggested, because without activities, no money!

The JPA for months 13-30, as detailed in the following WPs presentations, was submitted to the commission in the first week of October. The main milestones are:

| | |
|---|---|
| Month 20 | Second call for DM – Coordination with GMES plans on core services |
| Month 24 | Definition of ESONET LABEL and its protection at European level |
| Month 28 | First reports on the demonstration missions |
| Month 30 | Second Best Practices workshop |
| Month 32 | ALL REGIONS WORKSHOP N°2 |

An association with the Global Monitoring for Environment and Security (GMES) represents a unique opportunity to complement satellite observations and Lagrangian measurements (ARGO). This aspect, mentioned in the DoW as an important objective for the ESONET strategy, does not appear in Year 1. In the new JPA, some links with WP1 and WP6 were identified, but too few clear actions are described. Actions should be better identified in the planning of the next 18 months' activities to develop links with the Marine Core Service (MCS).

### 3.2 WP1: Networking

*Task a: Integration and exchange of personnel:*
Mathilde Cannat (IPGP) presented the results of the 1st year, concerning ESONET nodes integrations and the call for Exchange of Personnel.
A questionnaire was prepared in order to gather information on available data for each site (data mining). This information will be used firstly to prepare a state of the art on environmental and legal conditions (link with WP5). Indeed, on each node it will help to address specific questions as, for instance: Does high-resolution bathymetry exist? Is there a protected marine area? Are there cables? This is a first step to establish the needs and constraints to cable connect ESONET nodes. It is thus requested to complete the questionnaire
http://wwz.ifremer.fr/esonet_emso/news_and_events/others/2008_12_11_questionnaire_on_the_available_data_sets_for_each_esonet_observatory_1 and to send it back to Gael Andre gael.andre@altran.com at Altran/Atlantide as soon as possible. This initiative also helps to complete the list of specific persons to be contacted for each node.

*Task b: Data infrastructure*
No comment

*Task c: Sharing facilities*
*No comment*

*Task d: Scientific integration.* The implementation of a permanent structure to support the long-term integration of the European scientific community working on deep sea observatories is one of the main objectives of ESONET. A first proposal has to be prepared for spring 2009.

*Task e: International cooperation*
Contacts were established for the signature of a memorandum of understanding between Sub Sea Observatory Operators (International Association of Sub Sea Observatory Operators (IASSOO)). It is important to have no overlapping with GOOS and ION.
It is suggested that this task should be closed, transferring it to WP8, and that the coordination team manages the implementation of a small international group composed of major sea

observatory programme leaders. It is suggested that Pr. I.E. Priede (UniABDN) be the ESONET representative in such a group.
If it is possible, a meeting with NEPTUNE Canada, OOI, MARS and DONET will be arranged during AGU in December.

The need to strengthen ESONET's link with GMES is clear. Henry Ruhl (NOCS) explained that the Science meeting on Friday specifically addressed this issue. This link is in charge of WP3.
I.G. Priede suggested that ESONET be in charge of the organisation of the next SCC meeting. Alan Chave from the Woods Hole Oceanographic Institution wanted somebody else to coordinate such an event. The last one was in Tokyo in 2007. It would be important to reduce inscription costs (too expensive for students).

### 3.3 WP2: Standardisation and interoperability

The WP leader mentions a very positive participation of DBScale and Fugro in this WP.
Some task teams are working on standards issues.
Contributing to GEOSS standardisation and implementation activities (Task e) requires a lot of work (E. Delory, dBscale). Remote sensing is leading this field. It is a long way before sea observatories provide data (strengthen links with ANTARES).
The second Best Practices workshop will be organised by KDM/Marum at IFREMER Brest. The second All Regions workshop will be organised in the same period.

After discussion on the Demonstration Missions, a review of Demo Mission texts as such was suggested by the WP2 groups (implementation plan, deployment procedures, calibration…).

### 3.4 WP3: Observatory design related to scientific objectives

WP3 has not yet answered all the questions. It depends on the scope of the scientific issue. For example, power analysis needs a complete evaluation. The generic sensors module is not well defined. Monty Priede highlights that the generic sensors module must not be too expensive. A limited list with a reasonable number of specificities will be issued. WP3 has not reached that point yet.
Fixed observatories constitute the scope of ESONET. AUV and gliders are not included at this stage: they are included in the specific modules to be interfaced at a certain level.

### 3.5 WP5: Implementation strategies

Part of the WP5's Description of Work (DoW) was rewritten. Work started in the Barcelona meeting in March 2008.
WP5 participants insisted on the Altran questionnaire and requested a reply asap.

Prioritisation of sites must be progressed by EMSO. It is better to focus on less than 12 sites.

It would be interesting to have a list of the observatories' high impacts on science.

Monty Priede mentioned tsunamis:

Have buoys solved tsunami detection?

No. There is a need for something else than tide gauges.

Vasilios Lykousis (HCMR) indicated that the Oceanor system will be deployed as an experimental effort in Greece. It is part of ESONET's efforts from Greece.

### 3.6 WP4: Demonstration missions

The first call for demonstration missions and its selection process were presented, as well as the second call. Then each selected demonstration mission was presented.
No specific comment.

#### *3.6.1 Presentation by Laura Beranzoli*

A new call, including Physical Oceanography, will be launched in a one-step submission. The available budget is increased from €900K to €1M.

#### *3.6.2 LIDO – Presented by Michel André*

The "tsunami detection algorithm" was presented.
Draft website: www.lab.upc.es/lido/acoustics

#### *3.6.3 LOOME – Presented by Christoph Waldmann*

Deployment for 1 to 1.5 years on the Håkon Mosby Mud Volcano site. Information on the successful deployment of the equipment was presented: the site is still active, 3 major events are expected during this 1.5 year. Equipment: seismometers, subsurface temperature and pore pressure lance, surface temperature and chemistry, imaging gasflares by sonar, ADCP, camera water column (methane sensor and CTD).
Currently: no real-time link due to limited budget. But it would be important to have at least one high-frequency period from time to time (10 minutes per day: this will be achieved).
The principle of the triggered event was exposed.

#### *3.6.4 MARMARA – Presented by Namik Çagatay*

The speech started with MARMARA's WP4 (Data Integration and Modelling) presentation: to provide costs and feasibility. The MarNaut cruise (2007) and its numerous results were presented. During the first "workshop and kick-off meeting" of 16-18 June 2008 in Istanbul, 17 papers were presented and discussed.

The R/V Le Suroît cruise for MarmEsonet (40 days) was presented; it is funded by IFREMER and scheduled for July/August 2009. The cruise proposal is available at http://www.edf.u-3mrs.fr/~henry/marmara/public/MARMESONET.pdf

Three additional site surveys were expected:

- R/V Urania: for site survey and equipment deployment in the east Çmarcik Basin.
- R/V Piri Reis: for extra site surveys in central High and Çmarcik areas.
- R/V Yunus: to decide the best location for SN4 deployment in the east Çmarcik Basin.

Available instruments for MARMARA-DM were presented:

- 20 OBs
- 6 piezometers
- 8 flowmeters-osmometers
- One SN4 station with seismeter, CTD and chemical sensors
- Radon station
- An acoustic bubble emission monitoring system

KOERI plans to deploy 5 cabled seafloor seismological stations. A comparative study and project feasibility analysis were carried out. Work is in progress in ESONET WP5 and IFREMER. Possible collaboration between KOERI and GURALP was discussed.
A special Marmara session was held in Ankara for the period of 23-27 March 2008 and two papers were published.
To find information on the Marmara project, a recent project website was opened: www.esonet-marmara-dm.itu.edu.tr

A question about the Marmara project's data storage was raised: Mathilde Cannat suggested storing these data in Cerege and in Istanbul. The modelling will be done by both. Moreover, all partners can access the data through the Cerege.
Jerome Amman asked whether a permanent link would be installed.
Periodic visits by acoustics are planned for SN-4 only.
No water column measurements are planned.

#### *3.6.5 MOMARD-D - Presented by Mathilde Cannat*

The MoMARSAT cruise and its objectives were presented:

- To deploy a multidisciplinary acoustically-linked observing system, with satellite connection to shore
- To demonstrate the overall management of this system during 1 month even if its operation will actually continue during 12 months

MoMARSAT cruise n°2 ("Recovery") was planned for summer 2011.
The condor project, planned between 2008 and 2011, is an observatory for the long-term study and monitoring of Azorean seamount ecosystems.
Another project to instrument the inter-island cable Flores Faial was mentioned.

### 3.7 WP6: Socio-economic users

After a general presentation of WP6 activities, discussions focused on ESONEWS, the ESONET newsletter. There is a need for material to be published and it was requested to send it to Miguel Miranda.
A report called "Report on Regional Observatory Stakeholders" was prepared, updating the information concerning ESONET future nodes, their basic design, institutions involved in their development or in the data that will be available in the near future.
The report of the Core Services was prepared by Nick O'Neill and will be available in month 21 in the D16 report.
Toward a better distribution and circulation of data concerning the FP6 project, "yellow pages", linked with the ESONET webpage, are being created. Insufficient effort on the website was noticed.
For the next ESONEWS, a video will be added on the website. All the series acquired will be accessible on the website.
It was noticed that all things should be working together as soon as they are done.

### 3.8 WP7: Education and outreach

This part is a brief overview, presented by Autun Purser (JUB) on behalf of Laurenz Thomsen (JUB). Trainees want practical work for the second Training workshop. It was reminded that Demo Mission documents must be sent.
Quizzes and games are presented on the website.
WP7 is requested to work on translations from English and German into other languages.

The issue of the website's limits was addressed. J.M. Miranda asked: why do we have several sites (ESONET, EMSO, Educational website)? This cannot stay as it is. There are too many websites with different presentations. Efforts to harmonise the web pages have to be made.

### 3.9 WP8: Management and governance structure

Partners have to work to deadlines to provide the coordinator with reports and financial information. EC contribution is a reimbursement: no effort justified = no money.
The ESONET Coordination Team (ECT) requests partners to meet the agenda to establish the annual report in March. We have to provide the complete report on 15 April. A meeting with reviewers will be organised by the EC in Brussels in May.

A workshop dedicated to yearly reporting in ESONET will be organised in January or February and the administratives of ESONET partners will be invited, as well as scientific correspondents. There is no obligation to attend. It is organised for partners who are unaware of the NoEs reporting process and for those who have difficulties to reply.

It was suggested to change the logo. Partners preferred to keep the old one. Some modifications could be put forward.

An agreement for associated partners is under preparation.

### 3.10 European Commission Officer

EC official P. Le Grand made comments after the 1st yearly reporting and its review by the European Commission.
Next year, the yearly review meeting will be held in Brussels and all documents will be reviewed. If a partner does not provide the documents, it will not be paid.

ESONET is multidisciplinary. For the next DEMO Missions, disciplines other than Geology must be addressed.

ESONET has to clarify the integration roadmap. The establishment of the permanent structure is important for the next period.
A list for integration checking would be:

- Management,
- Joint research agenda,
- Centralised decision-making,
- Joint infrastructure,
- Long-term training program,
- Internal competition and quality assurance,
- Opening for new associated partners.

The GEO work plan for 2009-2011 is under preparation. ESONET, Eurosites, Acobar, Tenatso are projects associated with GEO. It seems that the marine community is less fragmented than others. It must be remembered to register services at:

www.earthobservations.org

A long discussion then took place about the permanent structure which would succeed to ESONET and EMSO-PP. EMSO could be a tool as a permanent structure for the community

(P. Favali). EMSO and ESONET will eventually become one same structure (L. Beranzoli). EMSO provides a legal framework. The question is how will the scientific community participate? VISO could be an answer, as a virtual institute (R. Person). A permanent structure is required from the DoW. VISO will continue ESONET while EMSO will provide the infrastructure (I.E. Priede).
The EC has no plan to ask the ESONET community to work on the continental shelf. It represents too much in the national area of research and each coastal country has its own policy. In addition, 6-7 years ago, the Commission urged our community to avoid the shelf (I.E. Priede).

The EC officer will ask if it is legally possible in the call for exchange of personnel to use ESONET funds once or twice in order to send people outside Europe (for instance to work with Neptune Canada).

### 3.11 Approvals in General Assembly

After the presentation of ESONET activities by WPs leaders, information on financial matters, on contract modifications and all administrative issues with the associated discussions, the General Assembly was requested to approve of some specific topics according to the ESONET consortium agreement rules. These specific topics were highlighted on the slides during the meeting as well as by using an approval form attached to the agenda and specific documents appended to this agenda. Only one representative per ESONET member has the right to vote. The results are presented hereafter.

## APPROVAL RESULTS

| | |
|---|---|
| **Meeting** | **General Assembly** |
| **Date/time** | **Thursday 23 October – 10H00/13H00** |
| **Place** | **University of Algarve – FARO - Portugal<br>Amphitheatre T. Gamito** |

| | | | **Unanimously approved** |
|---|---|---|---|
| **Approval #1** | Approval of new Joint Programme Activities including – JPA – (including list of deliverables) | *See DoW on www.esonet-emso.org* | Yes |
| **Approval #2** | Henry Rulh is replacing Christian Berndt as WP3 leader. He joined NOCS in July 2008. | | Yes |
| **Approval #3** | S. Pouliquen (IFREMER) is replaced by G. Maudire (IFREMER) as the new chairperson of the data management council (DMC) | | Yes |
| **Approval #4** | Amendments to the ESONET contract – special clauses 23 and 39 | *see appendix B2* | Yes |
| **Approval #7** | Cancellation of SIS participation | *see appendix B3* | Yes |
| **Approval #8** | Alcatel is replaced by SEND as the new representative member of the PESOS group | | Yes |

Other information:

1/ New ESONET members' presentation: CNRS affiliate, CSIC affiliate

*CNRS contractor, managed by special clause 23 in the contract, represents several members. One new member - the LMGEM - and its activities are presented. D. Lefevre was there.

*CSIC contractor, managed by special clause 23 in the contract, represents one member: UPC, represented by M. André. UPC was already expected and described in the appendix of the DoW as a CSIC member, but the initial contract with the EC did not manage it.

2/ Presentation of an example of an ESONET associated partner's status and of the associated agreement contract.

### 3.12 Miscellaneous

Yves Auffret presented pictures from the Tempo-mini real-time link being tested on VENUS Canada. Michel André presented the acoustic data analysis programme which will be used in LIDO and the kind of whale songs expected.

## APPENDICES A:

*Appendix A1: Presentations of the General Assembly*
*Appendix A2: Amendments to the ESONET contract*
*Appendix A3: SIS cancellation*

# ANNEX A1
# Presentation of the General Assembly

# ESONET NoE
# STATUS after 18 months

Roland PERSON
Ifremer

Esonet General Assembly, 22-23 oct. 2008, Faro, Portugal

## objectives and main milestones

. **The aim of the ESONET NoE is to create an organisation capable of implementing, operating and maintaining a network of multidisciplinary ocean observatories in deep waters around Europe from the Arctic Ocean to the Black Sea.**

**The NoE will structure the resources of the participating institutes to create the necessary critical mass, remove barriers and through a joint programme of activities arrive at durable solutions for this future organisation.**

## objectives and main milestones

**"Each of the partners within the ESONET NoE has to recognise that through their participation in one of the 3 ESONET "groupings", i.e. CORE, OSI and SME/Company, each and every partner has committed themselves to achieving the durable integration objectives set out in the Description of Work for that grouping. "**

***Alan Edwards 1st GA Brest March 2007***

**ESONET is a NoE:**

**-Grant to partner is linked to its actual activities in the network**

**- Work program is updated each year after review of the annual activity report**

**- Only partners of ESONET can be funded**

**-A partner who would like to contribute to a task, has to contact the corresponding WP leader**

**- Calls for offer are published and opened to ESONET members. They are evaluated by international experts.**

**- Moreover classical evaluation criteria, we have to consider contribution to the integration of the European ocean observing community, and multidisciplinary aspects.**

## ESONET NoE - WorkPackages Activities

| WorkPackage Number | WorkPackage Title | WorkPackage Leader | Leader Affiliation |
|---|---|---|---|
| WP1 | Networking | Michael Diepenbroek | KDM |
| WP2 | Standardisation and Interoperability | Christopher Waldmann | KDM |
| WP3 | Observatory design related to scientific objectives | Henry Ruhl | NOC |
| WP4 | Demonstration missions | Laura Beranzoli | INGV |
| WP5 | Implementation strategies | Mick Gillooly | IMI |
| WP6 | Socio economic users | Jorge Miguel Miranda | FFCUL |
| WP7 | Education and outreach | Laurenz Thomsen | KDM |

| WP#1 | Networking | Mickaël Diepenbroek | KDM |
|---|---|---|---|

**Task a: Exchange of personal (Mathilde Cannat)**

**Task b: Data management (Mickaël Diepenbroek)**

**Task c: Sharing facilities (jean Marvaldi)**
***moved to WP2***

**Task d: Integration of scientists at European level (Juergen Miniert)**

**Task e: International cooperation (I.G. Priede)**

| WP#2 | Standardisation and Interoperability | Christopher Waldmann | KDM |
|---|---|---|---|

**Aims of WP2: *Overcome Fragmentation*** of technical approaches
Establish a ***standing committee*** for standardisation issues and their implementation

Task.a Sensor interoperability (C. Waldman)

Task.b Quality assurance and interoperability (A. Holford)

Task.c Interoperability for underwater intervention (J.F. Drogou)

Task.d Sharing facilities (J. Marvaldi)

Task.e Contrinution to GEOSS

Task f Organisation of 2nd Best Practices meeting

| WP#3 | Observatory design related to scientific objectives | Henry Ruhl | NOC |
|---|---|---|---|

**O. Pfannkuche & L. Geli**

*Provide scientific specifications permanently updated with latest discoveries to NoE
*Reporting on generic (global) scientific questions that have to be addressed with observatories
*Reporting of specific scientific questions that need to be answered in the short term

•Task a: Sciences objectives

•Task b: Generic science modules

•Task c: Specific science modules

| WP#4 | Demonstration missions | Laura Beranzoli | INGV |
|---|---|---|---|

**M. Cannat & E. Gracia**

Demonstration Missions (DMs) focus on underwater multidisciplinary cabled and non-cabled observatory systems and networks (including their components) and on the trans-national usage of regional observatories. DMs address also to the existing auxiliary infrastructure provided by ESONET partners (e.g., research vessels, underwater vehicles, observatory test sites).

**Task a: call for demonstration missions (L.Beranzolli)**

***First call delayed from month 2 to month 8***

***Second call in October 2008. Priority to disciplines not directly involved in the first selected DMs***

**Task b:Follow up demonstrations**

| WP#5 | Implementation strategies | Mick Gillooly | IMI |
|---|---|---|---|

**J. Dañobeitia**

**(revised structure)**

**Task a) Science, engineering and business plan for generic sites**

- ***Activity 5a1 - Science - Generic Cable Site WG***
- ***Activity 5a2 - Science - Standalone Site WG***
- ***Activity 5a3 - Engineering - Generic Cable Site WG***
- ***Activity 5a4 - Engineering - Standalone Site WG***
- ***Activity 5a5 - Business Plan &Financial Model - Generic Cable Site WG***
- ***Activity 5a6 - Business Plan &Financial Model - Standalone Site WG***

**Task b) Legal, Ethical & Environmental**

**Task c) Comparison cabled vs non-cabled.**

**Task d) Reporting to EMSO and mobilize the network of excellence on long term strategy funding plan**

| WP#6 | Socio Economic users | Jorge Miguel Miranda | FFCUL |
|---|---|---|---|

**J.F. Rolin & N.0'Neill**

**Task a: Core services stakelojders**

**Task b: Regional services stakeholders**

**Task c: Promotion and SME policy**

**ESONEWS**

| WP#7 | Education and Outreach | Laurenz Thomsen | KDM |
|---|---|---|---|

**T. Tselpides, A. Colaço**

**Task a: Education tools**

- **Educational web site**
- **Class material**

**Task b: Web portal**

**Task c: Communicate results**

| WP#5 | Implementation strategies | Mick Gillooly | IMI |
|---|---|---|---|

J. Dañobeitia

(revised structure)

Task a) Science, engineering and business plan for generic sites
- *Activity 5a1 - Science - Generic Cable Site WG*
- *Activity 5a2 - Science - Standalone Site WG*
- *Activity 5a3 - Engineering - Generic Cable Site WG*
- *Activity 5a4 - Engineering - Standalone Site WG*
- *Activity 5a5 - Business Plan &Financial Model - Generic Cable Site WG*
- *Activity 5a6 - Business Plan &Financial Model - Standalone Site WG*

Task b) Legal, Ethical & Environmental

Task c) Comparison cabled vs non-cabled.

Task d) Reporting to EMSO and mobilize the network of excellence on long term strategy funding plan

| WP#6 | Socio Economic users | Jorge Miguel Miranda | FFCUL |
|---|---|---|---|

J.F. Rolin & N.0'Neill

Task a: Core services stakelojders

Task b: Regional services stakeholders

Task c: Promotion and SME policy

ESONEWS

| WP#7 | Education and Outreach | Laurenz Thomsen | KDM |
|---|---|---|---|

T. Tselpides, A. Colaço

Task a: Education tools
- Educational web site
- Class material

Task b: Web portal

Task c: Communicate results

## objectives and main milestones

**Main milestones of the first year:**

| Initial agenda in the DoW | Actual Status |
|---|---|
| •Month 2: 1st Call for demonstration missions | Month 4 |
| •Month 2: 1st Call for exchange of personnel | No answer, New call month 18 |
| •Month 6: First All region workshop | Month 6 |
| •Month 8: 1st Best practice workshop | Month 11 |
| •Month 12: First educational and training workshop | Month 11 |

Main deliverables achieved but often with delays

## objectives and main milestones

**General conclusion for the first year of activities:**

- **Successful meetings**
- **Experts groups constituted**

**But**

- **too many « sleeping partners »:**
  - *** no activity report in time**
  - *** delays to fill administrative forms**
  - *** don't read emails**
  - *** don't propose any activity**
  - *** …**

**But in a NoE: No activity = No Money**

## objectives and main milestones

**JPA months 13-30**

**Activities for month 13-30 discussed with the Commission**

**Prepared by WPs leaders with task managers**

**First version transmitted to the EC in April**

**Final version submitted to the Commission in first week of October**

**Funds requested for activities in WPs up to end of 2008 (including DMs) will be transferred next week**

## objectives and main milestones

**JPA months 13-30 : Main milestones**

| | |
|---|---|
| **Month 20:** | ***Second call for DM***<br>***Coordination with GMES plans on Core Services.*** |
| **Month 23;** | **Viso worhshop** |
| **Month 24 *:*** | ***Definition of ESONET LABEL and its protection at European level.*** |
| **Month 28 *:*** | ***First reports on the demonstration missions.*** |
| **Month 30*:*** | ***Second best Practices workshop*** |
| **Month 32*:*** | ***ALL REGIONS WORKSHOP N°2.*** |

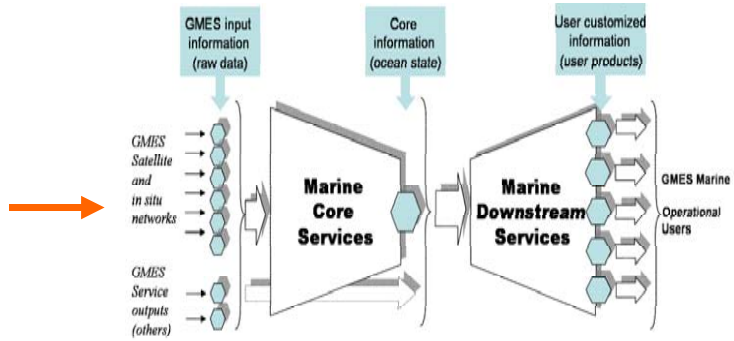
**Reviewers comments**

"The **integration process** is a key element of success for ESONET. Three major meetings took place during the first year, and a number of expert groups have been constituted. **This provides a good basis to consolidate the network during the remaining 3 years.** At this stage of the project however, it is timely to **clarify the integration roadmap** for the rest of the project, and identify the precise composition, role and function of the different "expert" entities….."

**Reviewers comments**

- The GMES perspective represents a unique opportunity for the deployment of a permanent network of deep-sea observatories, to complement satellite observations and lagrangian measurements (ARGO). This aspect is mentioned as an important objective for the ESONET strategy in the DoW and is again briefly mentioned in Annex I (updated DoW), page 8. There was no activity in this regard in Year 1 and the new JPA does not make explicit reference to contacts being established with the GMES community in general, and the Marine Core Service in particular (MERSEA, MyOcean consortium etc.). A clear action should be identified in the planning of the next 18 months activity to develop links with the MCS (through WP5 and WP6).

*GMES marine "system architecture"*




# ESONET General Assembly

## 1st Annual Review and future activities of ESONET

**Wednesday-Thursday, 22-23 Oct 2008**

**Faro Portugal**

European Commission
Research DG
Management of Natural Resources RTD.I.4
Project Officer « Marine Resources »
Presentation : Mr. Pascal Le Grand

## 1st Annual Review

- ✓ Significant delays in producing the necessary reports and documents. The reviewers kindly accepted to go through 2 different versions of the documents, which they did not have to.
  - Reviewers recommended that the management structure is re-enforced. Coordinator committed **3 full time persons** to the management of the project.
  - **ALL** partners must send their documents on time to coordinator. The project partners that do not do so can have their paiment postponed by 1 year.

## 1st Annual Review

- ✓ Call for DEMO missions successful despite delayed input from WP3 on the scientific priorities.
  - WP3 to ensure that scientific priorities are revised before the 2nd call and are incorporated into the awarding criteria.
  - 1st call of DEMO missions have received a great deal of attention from geophysics community.
  - Total budget of 1st and 2nd call ~ 40 % ESONET budget → Must ensure that DEMO missions engage the whole range of scientific disciplines covered by ESONET (opportunity of Friday's workshop).

## 1st Annual Review

- ✓ GMES / KOPERNIKUS perspective.
  - Clear action needed in next 18 months to develop links to the Marine Core Services.
- ✓ Exchange of personnel.
  - 1st call was not successful.
  - New call: deadline for submission: 21 November 2008.
  - Duration of exchange up to 1 year.

## GEO workshop Sept 2008

- ✓ Was an opportunity to contribute to drafting of new GEO Work Plan for 2009-2011.
- ✓ Marine sciences appear to be already well coordinated compared to others.
- ✓ Several EU projects present: ESONET, EuroSITES, ACOBAR, TENATSO.
- ✓ ESONET can make profit of GEOSS structure to establish standards, publicize its services (register them), contribute to wiki, etc., in the global context, US included.
  - http://www.earthobservations.org

## Priority for the future (1)

(Extract from annual review)

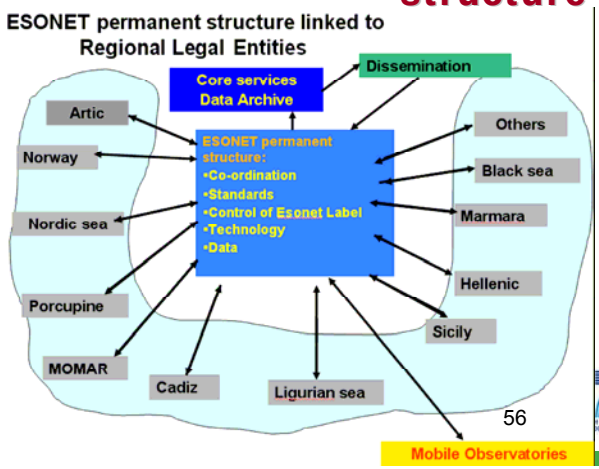
- ✓ The integration process is a key element of success for ESONET. 3 major meetings took place during the 1st year, and a number of expert groups have been constituted. This provides a good basis to consolidate the network during the remaining 3 years. Time to clarify the integration roadmap for the rest of the project.

## Priority for the future (2)

(Extract from annual review)

- ✓ The project has initiated a number of key actions e.g. the integration groups; data management protocols; PESO consortium agreement etc. However, progress is not well balanced between the different work packages and partners. More evidence of integration should have been apparent by the end of Year 1.
- ✓ The first all regions workshop was successfull and allowed the constitution of Regional Implementation Groups.

## Priority for the next 18months: establish the ESONET permanent structure (1)



## Priority for the next 18months: establish the ESONET permanent structure (2)

*Commitment towards integration can be shown by a structured combination and balanced spectrum of activities such as:*

- *efficient governance and steering provisions with the involvement of the top management;*
- *Convincing joint research agenda;*
- *Centralised, joint decision making;*
- *Joint infrastructures, shared facilities;*
- *Established joint long-term training programmes (e.g. joint doctoral school);*
- *Internal competition and quality assurance;*
- *Structured opening for joining of new (associated) partners or affiliates.*

## Any Questions?

Pascal.le-grand@ec.europa.eu

**European Commission**
**DG RTD**
**Unit I.4 Environment / Management of Natural Resources**

# Work Package 1 - Networking

Mathilde Cannat, Michael Diepenbroek,
Jürgen Mienert, Monty Priede





## Overall objective:

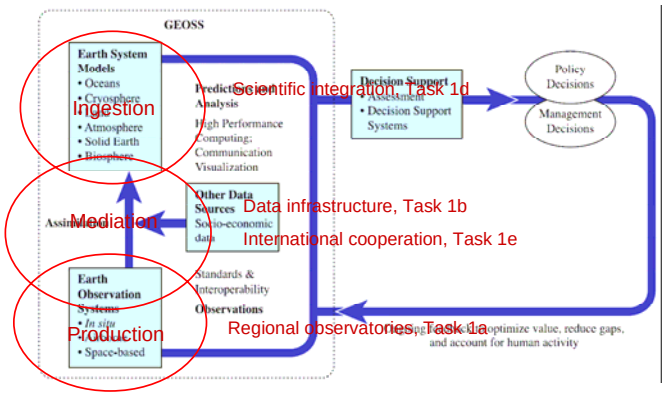
Implementation of a service oriented multi-purpose observatory network available to different stakeholders

Problems to be solved

- fragmentation of communities
- lack of synergetic effects between efforts & initiatives
- heterogeneity of organisational and technical approaches
- heterogeneity of equipment, analytical methods & data
- dynamics of technical developments












**Task 1b – data infrastructure**

Standardized data flow and services in a commonly usable network

Activities

- Activity 1b1: Data management plan
  - *extension and updates of the data and information management plan to meet in particular DMs*
  - *the constituted data management group will organise data flows from a selected set of observatories (incl. EUROSITES) and elaborate the corresponding updates for the data management plan*
  - *meeting with partners of SeaDataNet and EuroSites (during this meeting -Thursday)*
  - *Data management group consists of representatives from ESONET demonstration sites, Ifremer, WDC-MARE, EUROSITES and SeaDataNet*
- Activity 1b2: ESONET knowledge base (extension of topology of existing observatories)
  - *Topology, data and information management plan, sensor registry, and QA/QC methodologies (WP2) will be comprised as a common knowledge base in a common web based structure, the ESONET data & information portal*
  - *extendible by possible information inventories from further tasks and by data mining (e.g. site survey data - link to activity 1a3)*

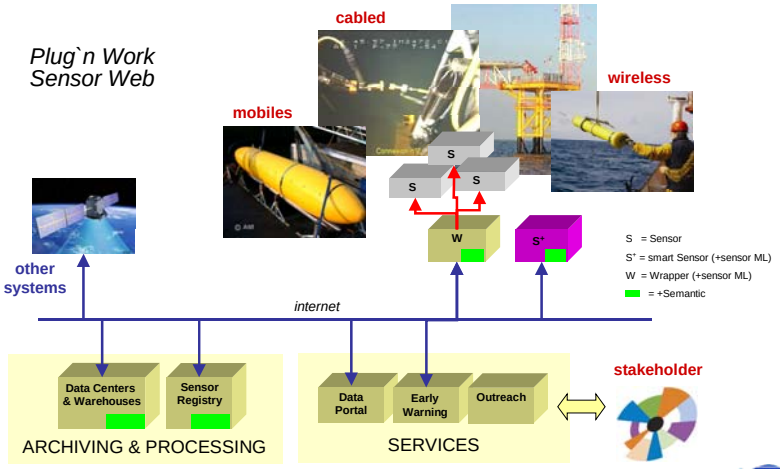
## Task 1b – data infrastructure

Activities

- Activity 1b3: Spatial data infrastructure
  - *prototype of Spatial Data Infrastructure SDI implemented – data portal online*
  - *current provider: Ifremer, WDC-MARE, US-NODC (further NODCs indirectly)*
  - *next to be integrated: DMs observatories & MARS, NEPTUN data*
  - *sensor registry (incl catalogue of instrument types, parameters, etc.)*
  - *to be included in the ESONET SDI.*
  - *sensor registry will be registered as GEOSS as a generally available component in GEOSS (common activity with WP2 task d).*
  - *interoperability is be largely based on the implementation of SDI standards (in particular OGC SWE – close coop. with WP2)*
  - *in a later phase serving also to GEOSS data portals resp. GMES*
  - *a specific meeting with representatives of the GMES Marine core service "MyOcean" is planned for Faro (link to MyOcean via MERSEA).*

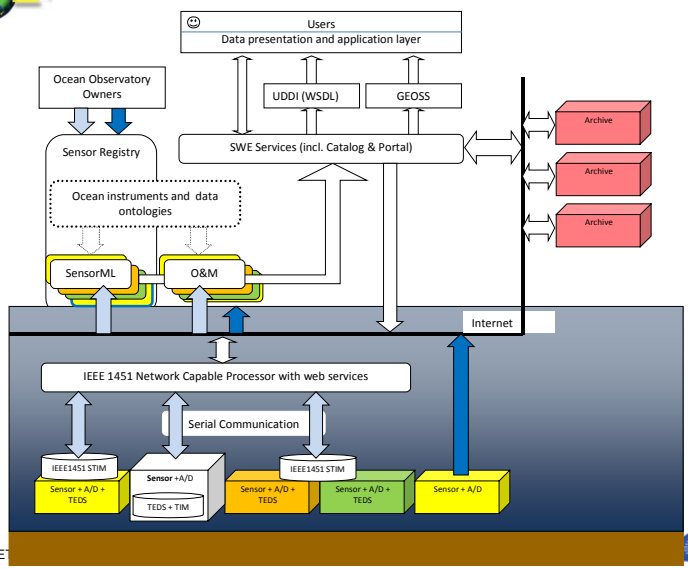










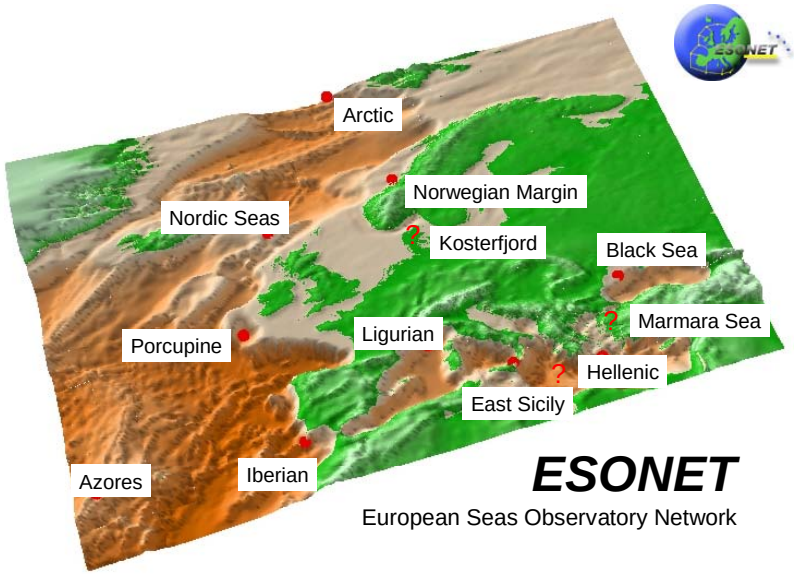
WP1e Integration of ESONET
Into the international earth observation framework

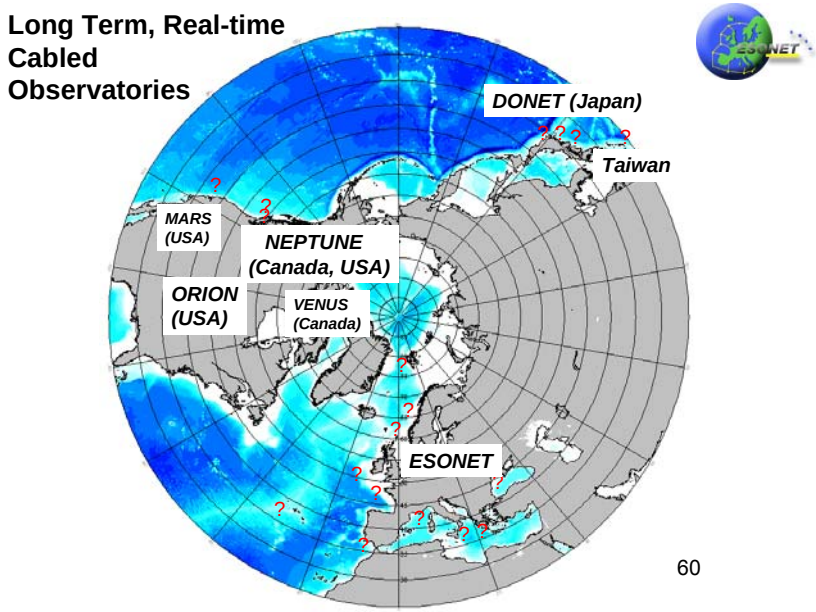
Monty Priede

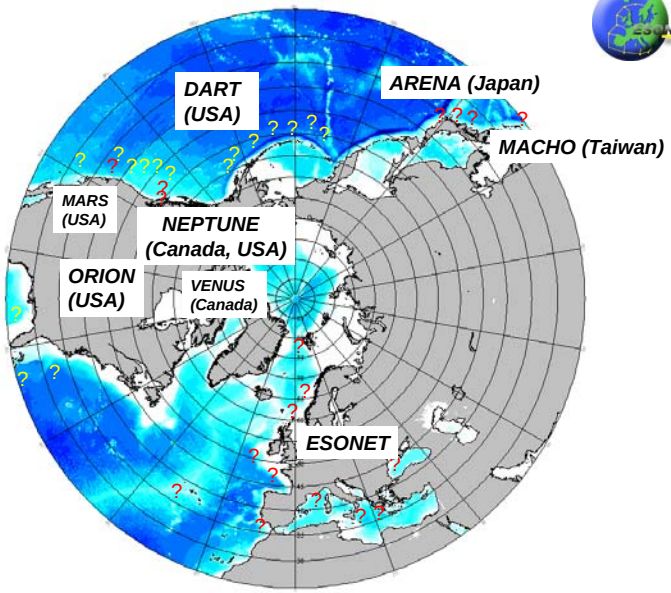
Oceanlab
University of Aberdeen

# Deliverables

- 1e3Plan for signature of MOU or contracts at international level. First signature of an agreement for testing of a prototype on NEPTUNE Canada (or ARENA Japan or MARS) month 24
- 1e4 Agreement on an International network month 24






Deliverable 1e3

*"plan for signature of a memorandum of understanding or contracts at international level"*

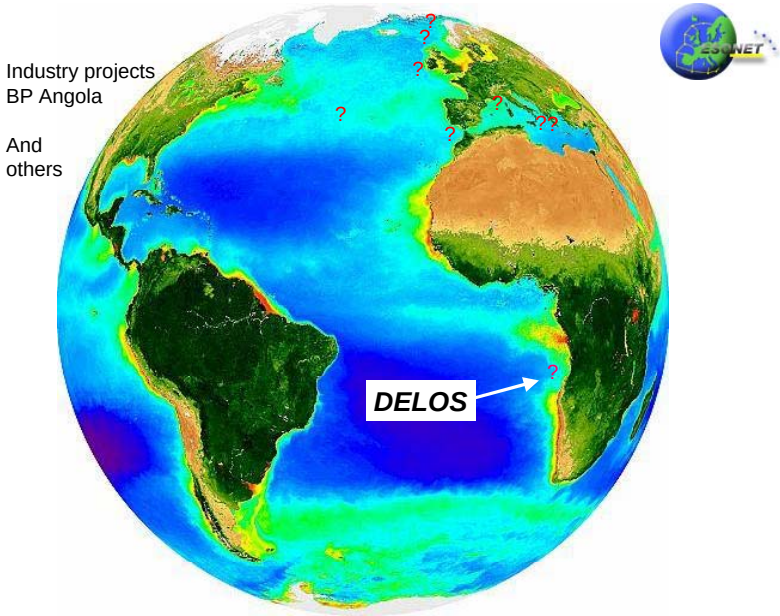
International Association of Sub Sea Observatory Operators
IASSOO

ESONET Links with

DONET
Japan

OOI-RSN
MARS
USA

Venus
Neptune, OTN
Canada




Deliverable 1e3

*"plan for signature of a memorandum of understanding or contracts at international level"*

Existing Organisations:

GOOS (Global Ocean Observing System)
EuroGOOS
ION (International Ocean Network).

## Deliverable 1e3

*"plan for signature of a memorandum of understanding or contracts at international level"*

- fixed sea floor infrastructure
- long-term operation. installation,
- maintenance
- Operation
- The aim is cabled systems with real-time data
- variety of disciplines.
  - Biology-Geosciences- Neutrino Astronomy
- exclude lagrangian methods, gliders and ships

## 1. Small Committee

1. Single representative from each state or federal political entity.

| | | |
|---|---|---|
| ESONET-EMSO | - Europe - | Roland Person |
| NEPTUNE- Canada | - | Chris Barnes |
| OOI-regional nodes- | USA | John Delaney |
| DONET | - Japan | Yoshiyuki Kaneda |

## 2. Big Committee

Recognised Projects-

ESONET Europe - Roland Person
EMSO Europe - Paolo Favali
NEPTUNE- Canada - Chris Barnes
VENUS- Verena Tunnicliffe
OII-regional nodes – USA John Delaney and component projects/
KM3NeT (Kilometer Cube Neutrino Telescope) Uli Katz or deputy
ANTARES- Neutrino Telescope- France
NEMO-SN1- Italy
NESTOR- Greece
EUROSITES – Europe - Richard Lampitt Southampton
DELOS - Deep Sea Long Term Observatories- Angola, Phil Bagley
MARS - Monterey Bay Aquarium Research Institute. USA.
MACHO Taiwan
OTN – Canada and elsewhere, Ron O'Dor
Others…. Japan, China, & elsewhere

May 2008 Kobe (Chris Barnes, Martin Taylor, Roland Person)

Dr. Yoshiyuki Kaneda, Project Director for DONET, JAMSTEC, Tokyo, Proposed that JAMSTEC could lead for the first two years,

One-year rotating secretariat may be better

---

Meanwhile real collaboration is proceeding. e.g JUB crawler on Neptune

How to access data from different laboratories for community wide research via a Virtual Institute

WP1d

Virtual Institute of scientific users of deep Sea Observatories (VISO).

Juergen Mienert & Benedicte Ferre, Uit

Esonet General Assembly, 22-23 oct. 2008, Faro, Portugal

## Objectives

Multidisciplinary science for members of large institutions but also of smaller universities through access ocean data and related data sets including real-time

? Integration into a community that helps them to elaborate joined research projects.

## Why?

Promote and coordinate:

- Top level scientific research relevant under global climate change
- Optimal use of shared technical infrastructures and scientific facilities
- Activities to spread excellence that include training of scientific personnel and dissemination of knowledge to responsible authorities, the public and socio-economic users

## What?

- Oceanographic data for chemical, physical and biological conditions of the water masses
- Acoustic data for assessment of food chains in marine biology
- Video data of seafloor processes for assessing the macro and microfauna and sediment dynamics

## How?

- Workshop for implementing the VISO
- Invite key-scientists that are responsible or already part of a VISO
- On the base of existing infrastructure data, organizing data geographically or thematically for common research projects
- Providing the framework for international research groups (PhDs for example)

## Examples

- Global seismic network
- Global magnetic network
- IFREMER, AWI
- EUROCEAN

## Deliverable

- Report about the development of a virtual institute for European-seafloor observatories (June 09)

# WP2 -Standardisation and Interoperability

Lead by: Christoph Waldmann
MARUM, Bremen
waldmann@marum.de

**Participants:**

**UniAbdn, IFREMER, INFN, UPC, dBScale, FUGRO**



## WP2 objectives

In general

- Forming task teams on standards
- Review and test existing standards
- Set up links to international initiatives (NEPTUNE, OOI, DONET)
- Promote GEOSS principles
- Active involvement in GEOSS activities

## WP2 work done during the 1st year

Specificities of the first year

Task teams formed on

- Instrument qualification
  lead by Anne Holford
- Task teams on underwater intervention lead by Jean- Francois Drogou
- Task team on sharing facilities lead by Jean Marvaldi

## Quality Plan

### Reliability Engineering

- Define Procedures for Evaluating Component Failures
- Identify Observatory Failure Parameters & Fault tree
- Define Review Process for Analysing Failure Modes
- Define Deep-Sea Observatory High Level Test Procedure
- Define Observatory System Assembly & Test Programme

## 2.c.2. Status – 40%

- Review of common or shared procedures (50%)
- Review offshore standard evaluation and define a recommendation for marine science observatory intervention (80%)
- Design recommendations for training, simulation and testing (10%)
  - Underwater intervention on scientific permanent observatories – Draft document in progress
  - Standards and recommended practices for underwater intervention and structures interfaces in the Offshore industry – Final report

## Sharing facilities

### Perspectives (1)

| Activity | Designation | Initial End Month | Initial End date | Comments | Deliverables | Designation | Delivery month | Delivery date |
|---|---|---|---|---|---|---|---|---|
| 2.d.1 | Data base testing facilities | 19 | Sept - 2008 | Implemented on BSCW space for Esonet partners information receipt. To be transferred later on Esonet web site | | | | |
| 2.d.2 | Core Group for testing | 20 | Oct - 2008 | Participation declared by 5 Esonet partners Open to additional interested partners | D10 | Part : common schedule & methodology of tests – 1st 18 months activities | 20 - Achieved | Oct – 2008 Achieved |
| 2.d.3 | Guide lines for tests | 22 | Dec - 2008 | Draft to be submitted to Core Group for contributions | D36 | Report on testing facilities survey | 23 | Jan- 2009 |

## WP2 work done during the 1st year

Specificities of the first year

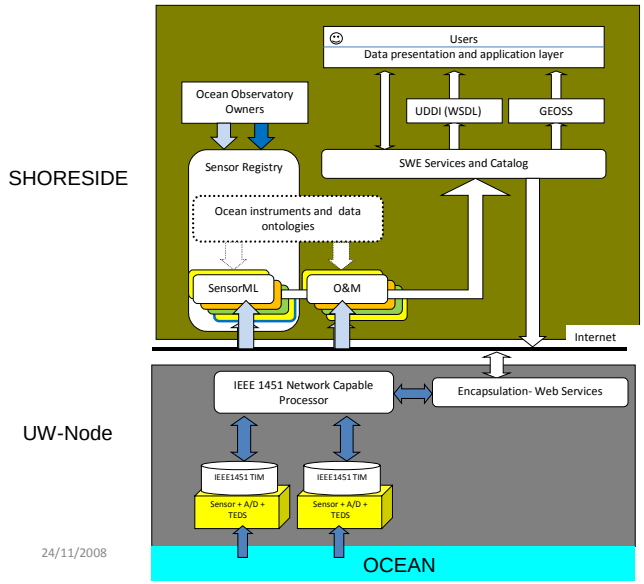
- Participation in GEOSS meetings (ADC, STC)
- Attendance of MARINEMETADATA and QUARTOD workshops
- OCEAN SENSORS Workshop, Warnemuende
- Organisation of Best Practices Workshop
- Organisation of EGU Session

## WP2: work done during the 1st year

Participation in an OGC Interoperability Experiment, OCT 22nd, 2008

- Test of IEEE 1451
- 4 participating institutions- MBARI, UPC, University of Kiel, MARUM

New goals to be defined for 2nd Experiment




24/11/2008

## WP2: programme until september 2009

New WP Structure

- Task a) sensors and scientific packages.
- Task b) quality assurance / quality control.
- Task c) underwater intervention.
- Task d) Sharing testing facilities
- Task e) Contribution to GEOSS standardisation and implementation activities
- Task f) Organisation of the second Best Practices Workshop

## WP2: programme until september 2009

Activities « Sensors and scientific packages »

- Specification report for demonstration action-sensor interface
- Contribution to Esonet sensor registry: standardised hardware implementation concepts
- Contribution to Esonet sensor registry: metadata description
- Generic functional diagram of an ocean observatory

## WP2: programme until september 2009

Activities « quality assurance / quality control »

- Identification of important quality aspects for generic sensor packages
- Publication of draft reports for approval during the 2nd Best Practices Workshop
- Specification report for demonstration action –Quality assurance

## WP2: programme until september 2009

Activities « underwater intervention »

- Facilitation of the shared use of underwater facilities
- Qualification of procedures and recommendations

## WP2: programme until september 2009

***Activities*** « Sharing testing facilities »

- ***Activity 2d1:*** A first version of the **testing facilities database** will be made available on the Esonet website (Month 18)
- ***Activity 2d2:*** Information on **Metri-2** will be integrated to the Esonet website (Month 14). The constitution of the "**Core group for testing**" will be set up (Month 18)
- ***Activity 2d3:*** The guidelines for developing a common test schedule and methodology will be set up (Month 22)
- ***Activity 2d4:*** A first version of a registry of relevant testing and calibration best practices and procedures will be made available on the Esonet website (Month 28)
- ***Activity 2d5*** The items related to "Sharing facilities" will be presented for discussion and recommendations at the "Second Best Practice Workshop" (Month 30)
- ***Activity 2d4***6Intercomparison of different underwater acoustic modem systems

## WP2: programme until september 2009

Activities « Contribution to GEOSS standardisation and implementation activities »

- Activity 2e1: Evaluation of GEO task in regard to standardisation and interoperability aspects
- Activity 2e2: Participation in GEOSS workshops and contribution to working groups created by GEOSS supporting organisations
- Activity 2e3: Dissemination of GEOSS concepts within ESONET and other workshops (Best Practices Workshop). Invitation to designate technical and/or strategic representatives from each ESONET node
- Activity 2e4: Creation of an ESONET/GEO forum in order to discuss GEOSS architecture and data interoperability issues. Organisation of periodic/side teleconferences to discuss generic/technical aspects
- Activity 2e5: Surveying ESONET node software/hardware architects on standards and GEOSS

## WP2: programme until september 2009

**Activities «** Organisation of the second Best Practices Workshop **«**

- Organisation of the second Best Practices Workshop (Month 30)

Location IFREMER, Lead MARUM

# WP2: programme until september 2009

**Milestones and expected results**

| Del date(month) | Name | task ref |
|---|---|---|
| 20 | Common test procedures | 2d |
| 24 | Sensor standardisation group: preliminary report | 2a |
| 24 | Quality assurance group: preliminary report | 2b |
| 24 | Underwater intervention group: preliminary report | 2c |
| 29 | Link with GEO committees and OGC | 2e |
| 30 | Second Best Practices Workshop | 2f |

# WP2: programme until september 2009

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **D-8** | Prototype implementation of example standardised sensor system | | **KDM** | | **Report** | **Restricted to other programme participants** | **Month 25** |
| **D-25** | Specification report for demonstration actions -- sensor interface | | **KDM** | | **Report** | **Public** | **Month 23** |
| **D-26** | Specification report for demonstration actions -- quality assurance | | **University of Aberdeen** | | **Report** | **Public** | **Month 23** |
| **D-27** | Specification report for demonstration actions -- subsea intervention | | **IFREMER** | | **Report** | **Public** | **Month 23** |
| **D-35** | Recommendations for ESONET registration in GEOSS | | **IFREMER** | | **Report** | **Public** | **Month 23** |
| **D-36** | Report of testing facilities survey | | **IFREMER** | | **Report** | **Public** | **Month 23** |

# WP2: programme until september 2009

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **D-39** | Prototype quality management manual | | **UniAbdn** | | **Report** | **Public** | **Month 25** |
| **D-41** | Result and analysis of GEOSS and standards survey in ESONET | | **dBScale** | | **Report** | **Public** | **Month 29** |
| **D-50** | Report on Second Best Practices Workshop | | **KDM** | | **Report** | **Public** | **Month 32** |
| **D-51** | Training and simulation manual | | **IFREMER** | | **Report** | **Public** | **Month 32** |
| **D-52** | Report on the contribution to international standardisation initiatives | | **dBScale** | | **Report** | **Public** | **Month 32** |

# WP2: programme until september 2009

Next steps

- Conclusions from Interoperability experiment
- Preparation of recommendations for demo missions
- Introduction of GEOSS principles



WP3
Science Objectives & Observatory Design

WP leader: H. Ruhl
NOCS
h.ruhl@noc.soton.ac.uk

**Participants:** **Johannes Karstensen & Olaf Pfannkuche, KDM**
**Jens Greinert & Tjeerd van Weering, NIOZ**
**Louis Geli & Yves Auffret, Ifremer**
**Laura Beranzoli, INGV**
**& other partners**

Esonet General Assembly, 22-23 oct. 2008, Faro, Portugal

## WP3 objectives

- Will take inputs from other work package activities to define the requirements for observatories
- Will also be supported by input from other EU projects, e.g. MARBEF, HERMES, MERSEA, EUROCEANS, DAMOCLES and NEAREST
- Will address the development of the optimal means by which the various sensors will be associated to address the scientific objectives
- Will closely coordinate with WP2 (for the generic technology package) and with WP4 (for the demonstrated disciplinary scientific packages)
- Along with WP4 and WP5 (which will ensure site assessment), WP3 will contribute to: definition of criteria for proposal evaluation of the demonstration missions, and evaluation of proposals for demonstration missions by assessing their scientific relevance and technical feasibility
- Building bridges between the different actors (scientific and engineering) and between the different work
- Will organize inter-disciplinary workshops which, by meeting scientific questions and technical solutions, will lead to concrete and well-founded proposals for optimally designed observatories

## WP3 objectives

The main objective of this work package is to provide the NoE scientific needs related to the make use of a long-term observatory.

- **Task a) Science objectives**
  - The main objective of this task is to align the technological specifications of future deep sea observatories with the scientific objectives
- **Task b) Generic science modules**
  - Scientific generic packages have to be defined in order to address the best methodology, scientific packages, instruments and underwater components to be applied in long-term cabled observatories.
- **Task c) Specific science modules**
  - In parallel to the definition of the generic science modules commonly used in the observatory network, some science modules will be more specific to a site or a research field. We will define these modules. This work package thus contributes to further structuring and definition of the design of an underwater

## WP3: work done during the 1st year

Specifics of the first year…

- D1, Definition of preliminary science priorities & co-authoring of text for 1st DM Call
  - Constituted group of experts
  - Define preliminary scientific priorities
  - Call for proposals made
  - Established proposal review committee
  - First DMs have been selected and are underway

## WP3: work done during the 1st year

Specifics of the first year…

- D1 & D7, All regions meeting in Barcelona 2007
  - Four sessions outlined broad science areas
    - Geohazards – *Mienert*
    - Dynamics of fluied controled ecosystems – *Serrazin* & *Berndt*
    - Evolution of Benthic Ecosystems and Halieutic Resources – *Priede* and *Santos*
    - Global Change – *Sigray* & *Larkin*
    - Provied initial feedback to WP3 & WP4 from the community.

## WP3: work done during the 1st year

Specifics of the first year…

- D6, Best Practices Proceedings with WP3 input on standard sensor recomendations
  - Based on recomendations at first GA, plans to outline a potential Standard Sensor Package were discussed.
  - An online survey was suggested as an objective way to gather input on the measuremnts to include in a Standard Sensor Package.
  - Yves Auffret & H. Ruhl put survey together, quireid the SC for comments on the survey, and opened the survey in early Sep.
  - The survey got reasonable input on scientific objectives, but negligable input on techinical or design informaton.

## WP3: work done during the 1st year

Update on web survey results – (Yves Auffret)

- What were the results and successes of the survey?
- What will need to be done to recover the remainder of the needed input?

- http://www.esonet-emso.org

## WP3: work done during the 1st year

Key parameters from Standard Sensor Package list in D6:

- Conductivity
- Temperature
- Pressure
- Turbidity
- Currents ADCP
- Passive acoustics
- Active bioacoustic imaging
- Chemical sensing: nutrients, $O_2$, $CO_2$, $CH_4$, pH & Chl-a
- Camera systems (still, pan/tilt HD video, infra-red)
- Geomagnetism
- Gravity
- Seismic motion

## Science Objectives and Design Reporting

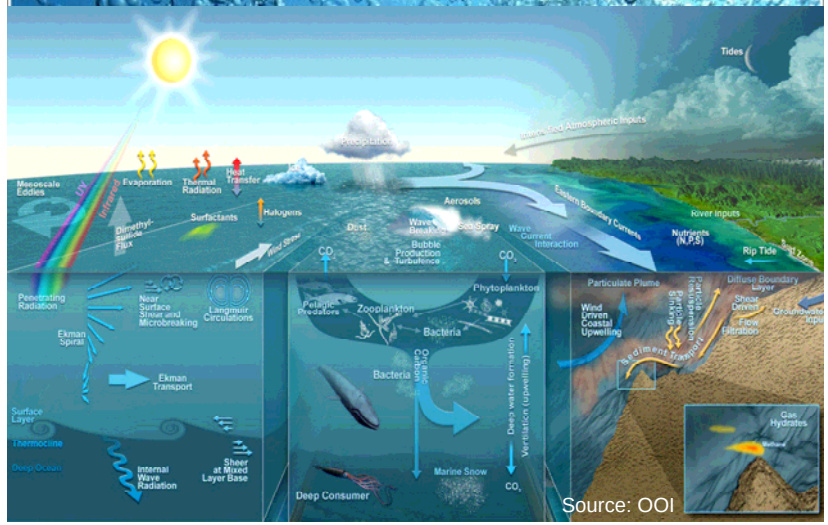
Science Objectives

- Geoscience
- Physical Oceanography
- Biogeochemistry
- Marine Ecology

Sections still in development

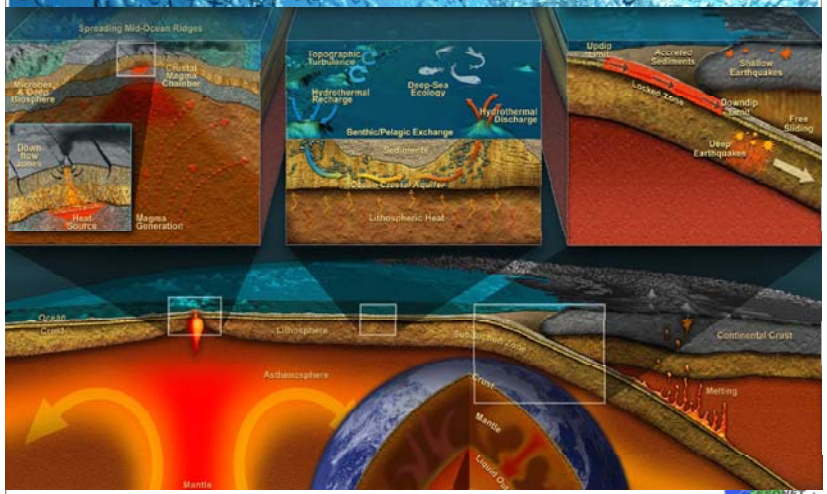
- Observatory Design
  - Measurement Requirements
    - Focus on generic requirements and standard sensors, but will also discuss specific
  - Measurement Location requirements
  - Discussion

## Science Objectives and Design Reporting



Source: OOI

## Science Objectives and Design Reporting



Source: OOI

## Science Objectives and Design Reporting

*Key questions in geosciences and understanding and monitoring of geophysics*:

**G-1 How can monitoring of factors such as seismic activity, fluid pore chemistry and pressure, and long wave propagation improve seismic, slope failure, and tsunami warning?**

G-2 What is the importance of oversteepening, storm and tide wave loading, sedimentation loading, gas charging, gas-hydrate dissociation, and fluid seepage in slope instability and failures?

G-3 Are there unidentified offshore areas of important seismic activity, faults, or plate separations and subunits?

G-4 What are the feedbacks between volcanism, deformation, and seismic and hydrothermal activity?

G-5 How does the presence of fluid within marine faults change their dynamics relative to terrestrial fault zones?

G-6 What are the physical and chemical fluxes at hydrothermal vents and other regions of seabed fluid and chemical energy flow?

G-7 How rapidly can gas hydrate or other hydrocarbon reservoirs release large amounts of carbon into the atmosphere to potentially influence global climate or regional safety?

G-8 What are the dynamics of hydrocarbon and mineral resource formation?

G-9 How might any changes in terrestrial hydrology lead to changes in marine sediment transport and deposition?

G-10 To what extent do seabed and deep-Earth processes influence ocean circulation, biogeochemistry, and marine ecosystems?

# Science Objectives and Design Reporting

*Key questions in geosciences and understanding and monitoring of geophysics*:

G-1 **How can monitoring of factors such as seismic activity, fluid pore chemistry and pressure, and long wave propagation improve seismic, slope failure, and tsunami warning?**

| Question ID | Measruement Requirement | Instrument | Infrastructure Requirement | Zone | Habitat |
|---|---|---|---|---|---|
| G-1 | Pore water conductivty | CTD | Sensor string | Sub-seafloor | Sediment |
| | Pore water temperture | CTD | Sensor string | Sub-seafloor | Sediment |
| | Pore water pressures | CTD | Sensor string | Sub-seafloor | Sediment |
| | Pore water $CH_4$ | ISUS, SPR, | Sensor string | Sub-seafloor | Sediment |
| | Broadband motion | OBS | Stationary Platform | Seafloor | Benthic |
| | Long-period motion | OBS, or other seismometer | Stationary Platform | Seafloor | Benthic |
| | Vent-fluid temperature | High temperture probe | Stationary Platform | Seafloor | Benthic |
| | Vent-fluid chemistry | ISUS, SPR | Stationary Platform | Seafloor | Benthic |
| | Vent-fluid flow | ADCP | Stationary Platform | Seafloor | Benthic |
| | Benthic water pressure sensor | Pressure transducer | Stationary Platform | Seafloor | Benthic |
| | Passive acoustics | Acuustic transducer | Stationary Platform | Seafloor | Benthic |
| | Photo surveys | Camera and strobe system | AUV - Terrain following | Seafloor | Benthic |
| | High resolution bathymetry | Pencil and multibeam sonar | Terrain following AUV | Seafloor | Benthic |
| | Wide-area bathymetry | Multibeam sonar | Long-range bathymetric survey | Seafloor | Benthic |

# Science Objectives and Design Reporting

- Research question
- Depth zone
- Habitat
- Biogeograhic region
- Proposed ESONET site(s)
- Manufacturer and model(s)
- Development status (e.g. off-the-shelf, prototype)
- Power requirements (peak and mean load)
- Bandwidth (peak and mean load)
- Time synchronization requirements
- Physical and digital interface (connectors, communication)
- Biofouling sensitivity
- Corrosion sensitivity (material, cathodic protection,
- Cost (instrumentation, maintenance, calibration)
- Software (software upgradable, protection, interoperability)
- Operability (autonomous, interactive)
- Data reporting (real-time, near-real-time, internal logging)
- Depth rating
- Physical description (dimensions, water and air weight)
- Autonomy (batteries, memory, metrology)
- Calibration (procedure, frequency)
- Precision, range, sensitivity
- Interference (acoustic noise,
- Other sensors included in with unit
- Feedback (on reliability, other?)
- Special deployment needs (needs undisturbed sediment)

# Science Objectives and Design Reporting

Sub-seafloor via sensor strings (*sensu* CORK)
- Pore water conductivity
- Pore water temperature
- Pore water pressures
- Pore water CH4

Seafloor via stationary platforms
- Broadband motion
- Long-period motion
- Vent-fluid temperature
- Vent-fluid chemistry
- Vent-fluid flow
- Benthic water pressure sensor
- Active bioacoustic imaging
- High-resolution time-lapse images (of several square meters seafloor that remains undisturbed by other seabed activity)
- Currents
- Passive acoustics (for marine life and geologic activity)

# Science Objectives and Design Reporting

Seafloor via lander systems
- Sediment community oxygen consumption (SCOC)
- Pulse-chase experiments using tracers or other methods
- Oxygen utilization compensating respiration measurements

Seafloor via terrain following AUV
- Geological and biological photo surveys
- Very High resolution bathymetry
- Conductivity
- Temperature
- Pressure

Seafloor via long range bathymetric survey AUV
- Wide-area bathymetry
- Conductivity
- Temperature
- Pressure

## Science Objectives and Design Reporting

Seafloor via Benthic rover systems (either with dock, tethered, or autonomous)
- High-resolution sediment community oxygen consumption
- Currents
- Line-transect photos

Seafloor to euphotic zone measurements via wire crawler
- Conductivity
- Temperature
- Pressure
- Acoustic current meter
- Turbidity
- O2
- pCO2
- pH
- Chl-a

## Science Objectives and Design Reporting

Euphotic zone measurements (via winch or wire crawler)
- Conductivity
- Temperature
- Pressure
- Passive acoustics
- Turbidity
- O2
- pCO2
- pH
- Chl-a
- CDOM
- Nitrate
- Phosphate
- Silicate
- Currents
- Photosynthetically active radiation (first 150-1000 m only)
- Spectrophotometer (first 150-1000 m only)

## Science Objectives and Design Reporting

Seafloor to near-surface (via fixed mooring(s))
- Particulate mass
- Particulate organic carbon
- Particulate total nitrogen
- Particulate carbonate
- Particulate silica
- Constituent pigments
- Constituent amino acids
- Constituent lipids
- Elemental tracers
- Passive acoustics

## Science Objectives and Design Reporting

Water column measurements (via glider AUV)
- Conductivity
- Temperature
- Pressure
- Turbidity
- O2
- pCO2
- pH
- Chl-a
- Nitrate
- CDOM
- Passive acoustics

## Science Objectives and Design Reporting

Water column measurements via propelled AUV with seafloor dock

- Conductivity
- Temperature
- Pressure
- Nitrite
- Nitrate
- Phosphate
- Silicate

## Science Objectives and Design Reporting

- *Key questions in physical dynamics and impacts from anthropogenic change*:

**P-1 What is the variability in the MOC, NADW and MIW ventilation, and what is the fate of these water motions and how might anthropogenic change alter these processes?**

P-2 What is the influence of climate on upper-ocean circulation and nutrient supply and how might anthropogenic change alter that circulation?

P-3 How can eddies, fronts, and other smaller-scale features be better resolved and included in larger scale assessments?

P-4 How rapidly do natural and anthropogenic changes in surface ocean conditions influence deep-sea water masses, and what are the possible impacts of shifts in deep-water mass character?

P-5 What is the importance of precipitation, river run-off, storms, tides and internal waves and other circulation features in benthic storms resuspension and transport of sediment and its biogeochemical constituents?

P-6 How can better understanding of longer term processes like planetary waves be used to clarify the often time-lagged connections between climate and physical oceanographic processes?

P-7 How will projected changes in the extent of Arctic sea ice, or ocean circulation influence regional and global climate, ocean circulation, and biogeochemistry?

P-8 How do regional and local circulation processes interact with global to regional climate variation?

P-9 How can improved time-series observations be merged with the greater availability of detailed bathymetric data to improve circulation estimates?

P-10 How can the assimilation of ESONET observatory and ancillary data improve model predictive skill?

## Science Objectives and Design Reporting

- *Key questions in biogeochemical dynamics and impacts from anthropogenic change*:

B-1 What are oceanic carbon and greenhouse gas uptake and storage dynamics and how might anthropogenic change alter the efficiency of the biological pump?

**B-2 What aspects of biogeochemical cycling will be most sensitive to climate change?**

B-3 How will changes in atmospheric dust deposition rates influence ocean biogeochemistry?

B-4 What are the biochemical implications of local and regional oxygen minimum zone intensification and hypoxia development including changes in oxidation potential and oxygen starvation in marine life?

B-5 What quantities of nutrients and/or organic material are transported with sediment in deep currents and turbidity flows and how does this transport vary in space and time?

B-6 Are observed deficits in organic carbon input vs. respiration linked to timescales of observation, basin selectivity, or to lateral transports of organic particles?

B-7 To what degree are terrestrial coastal and slope regions influencing open ocean biogeochemical quantities including potentially harmful contaminants?

B-8 How do seasonal and longer term variation and anthropogenic change influence the efficiency of the biological pump?

B-9 How is transported organic material transformed as it moves through, for example, seafloor canyon systems?

B-10 What is the relative importance of chromophoric dissolved organic matter (CDOM), chl-a, and other pigments in determining ocean color?

B-11 What will the intensity and distribution of ocean acidification be and how will changes in acidity affect the bioavailability of trace metals important to primary production, marine life, and biogeochemical cycling?

B-12 What will the important feedbacks of potential ecological change be on biogeochemical cycles?

## Science Objectives and Design Reporting

- *Key questions in marine ecology dynamics and impacts from anthropogenic change*:

E-1 What is the distribution and abundance of life in the deep-biosphere and how does such life fix carbon and interact with other ocean systems?

E-2 How do seismic and other geologic variations influence environment and resource availability on chemosynthetic organisms, and community dynamics more broadly?

E-3 What is the importance of biodiversity and what are the capacities for biological adaptations and thus limits in biological function?

E-4 What quantities of nutrients and organic carbon are transported laterally and made available to pelagic and benthic communities?

**E-5 How does the abundance and distribution of marine life change seasonally to decadally and what will the influence of anthropogenic change be?**

E-6 How do the variation in environment conditions and resource availability interact with differential utilization of resources, competition, and other factors to drive community change?

E-7 What communities are most influential in biogeochemical cycling and particularly sensitive to anthropogenic change?

E-7 To what extent are changes in productivity, diversity, community structure, and ecosystem function related, and what processes alter or maintain them?

E-8 What are vertical and horizontal mobility and range extent limits from the individual to species level?

E-8 How do community and ecosystem function changes throughout the water column influence sinking particle fluxes and feedbacks across trophic levels?

## Science Objectives and Design Reporting

- *Key questions in marine ecology dynamics and impacts from anthropogenic change*:

E-9 What is the importance of more spatially aggregated and under sampled sinking food supplies in benthic food supplies and meeting observed metabolic demand?

E-10 What is the distribution and abundance of deep-sea corals and carbonate mounds and what factors control their growth?

E-11 What are the pelagic and benthic impacts of hydrocarbon, mineral resource, and marine natural products exploration and exploitation and how can they be minimized in future efforts?

E-12 What are the most influential taxa within various functional groups and which might be used as indicators of community wide change?

E-13 How can modeling efforts better incorporate biological complexity related to trophic structure, ecosystem function, sensitivities of key rates such as POC flux or metabolism to climate change?

## Science Objectives and Design Reporting

- **Task a) Science objectives**
- Activity 3a1: Update of scientific objectives
  - Preliminary report now circulated to experts for review
- Activity 3a2: Workshop with HERMES, MERSEA EUROCEANS
  - ESONET Science Objectives Workshop

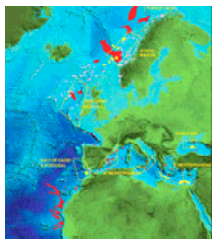
Attendees include:

HERMES & HERMIONE
MERSEA
Eur-OCEANS
GEO-GOOS
EuroSITES
CARBOOCEAN
IMBER
CoralFISH
DELOS

inputs also being sought from:

DAMOCLES
Kopernikus (GMES)
MARBEF
eurodeep
NEAREST & NEAMTWS

## Science Objectives Workshop



HERMIONE Areas


EuroSITES Locations


NEAMTWS Infrastructures

## Friday's main workshop goals:

1) have representatives from recent and current programs discuss their objectives and, in particular, how they relate to the science objectives of ESONET
2) present the proposed ESONET science objectives with integrated discussions of the preceding external inputs, w/ discussion leaders
   - Geophysics – L. Geli
   - Physical Oceanography – J. Karstensen
   - Biogeochemistry – R. Lampitt
   - Marine Ecology – A. Colaço
3) make recommendations and decisions about the scope and detail of ESONET science objectives.

Key questions:

- Is there consensus on the ESONET-wide science objectives?
- How are the current and proposed ESONET Demonstration Missions already making links with other programs?
- What are the needs for additional follow up discussions?
- What more agreements for cooperation are needed?

# Remaining Tasks, Activities, and Deliverables

How will the remaining tasks, activities, and deliverables will be handled?

- **Task b) Generic science modules**
  - Activity 3a1: Update of the generic parameters list
  - Activity 3a2: Link between generic technology and scientific needs
- **Task c) Specific science modules**
  - Activity 3c1: definition of specific science modules and link with technology.

**Deliverables**

*D11 Report on scientific background and objectives.* *WP3 NOCS 18*
*D13 Report on science modules.* *WP3 NOCS 24*

| Delivery date | Task | ref# |
|---|---|---|
| 18 | Scientific objectives | 3a |
| 18 | Preliminary report on generic science modules | 3b |
| 24 | Preliminary report on specific science modules | 3c |

"This enormous task can only be reached by durable integration and a serious commitment of all partners is needed towards building a common organizational and technical structure."

Major progress needed soon

# ESONET Marmara DM Project

**Objective:** to contribute to the establishment of optimized permanent seafloor observatories for monitoring of earthquake and related hazards in the Sea of Marmara, as part of ESONET NoE.

**Partner Institutions :**

- Istanbul Technical University, Turkey
- Dokuz Eylul University, Izmit, Turkey
- Ifremer, France
- CNRRS, France
- ISMAR, Bologna, Italy
- INGV, Italy

Other collaborating institutions

- Tubitak-MRC
- KOERI
- Scripps Institution of Oceanography
- Lamont-Doherty Earth Observatory

MARMARA-DM - Faro EsoNet Meeting 21-24 October 2008

# Marmara DM : Specific objectives

- To characterize the temporal and spatial relations between fluids and seismic activity in the Sea of Marmara (SoM)
- To test and determine the most suitable parameters and sites for an innovative monitoring of earthquake related hazards
- To propose the technological option (cable, buoys, etc) that is the most suitable for the SoM
- To involve the local authorities in Turkey; public outreach, education and fund raising.
- Integration of existing resources at national and EU level for deployment permanent seafloor observatories in the SOM

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# Summary status of WPs in the MARMARA-DM project

**WP 1 : Analysis of the available time series data and in-situ samples from the Marnaut cruise – mostly completed**

**WP 2: Marine operations - In preparation; cruises planned for 2009.**

**WP 3: Integration of land and seafloor seismological data - land data being acquired from collaborating Turkish institutions (TUBITAK and KOERI).**

**WP 4: Data integration and modeling – started with MarNaut data and will continue after 2009 cruises)**

**WP 5: Comparative study and project feasibility - in Progress**

**WP 6: Public and education outreach, coordination at national (Turkish) level and fund raising - in progress (coordination with TPAO, MTA, KOERI; paper presentations, TV interviews and articles in science magazines )**

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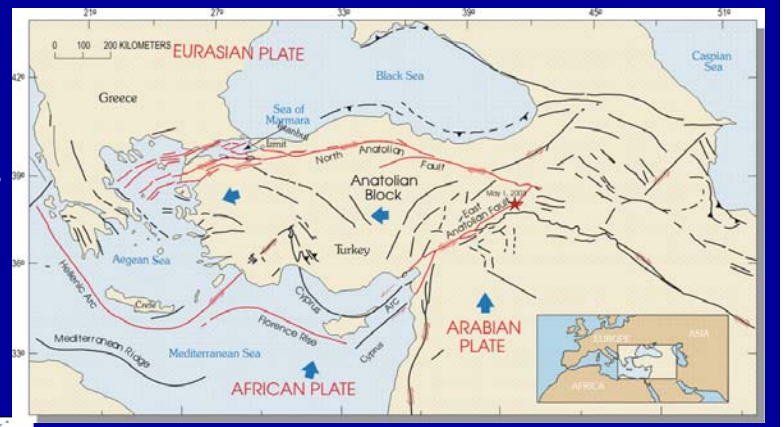
# Seismotectonic setting




Fast deformation rates: 25 mm/a
25 M people under high earthquake risk; societal urgency
Oceanographic setting

# Progress in the last 5 months:

**1st workshop and Kick off meeting**
**Istanbul , 16-18 June 2008**

- **Presentation of results of the MarNaut Cruise (2007): 17 papers presented and discussed in two-days workshop (WP1 : Analysis of time series data and in-situ samples collected during Marnaut cruise in 2007 and WP:3 Data integration and modelling, two papers already published in EPSL)**
- **Kick-off meeting: Discussion on plans for future activities for the Marmara-DM project (WP2 : Marine Operations, Site Surveys; WP 3: Integration of land seismo. data; WP6:Public outreach, education and fund raising)**

**Wide media coverage of "Istanbul workshop" in Turkish TV channels, newspapers via interviews and articles (WP 6: Public outreach)**

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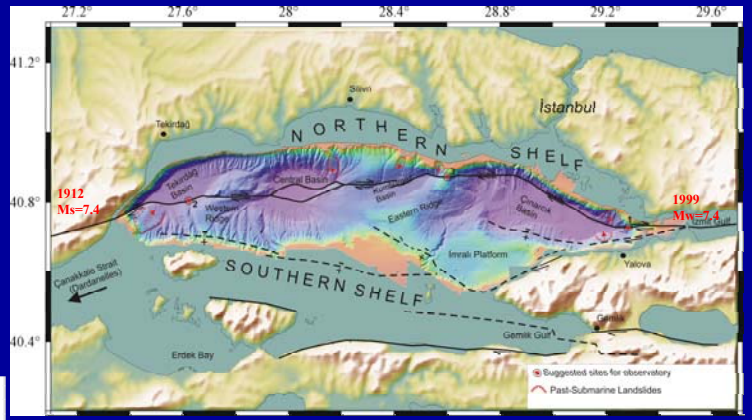
## Bathymetry and morphotectonics

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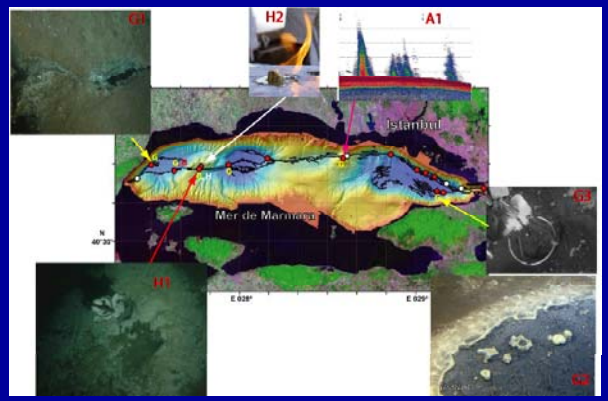
## WP 1 Status :
## Analysis of the data from the Marnaut cruise
## => WP almost achieved




*Location of Nautile dive sites during the Marnaut Cruise (May 12 - June 12, 2007). Red dots indicate sites where cold seeps were found ; at white dots, no cold seep was found. G and H stand for, respectively, gas bubble emissions and gas hydrates sites. G1 : gas bubble from tensional faults cutting the north-western escarpment of the Tekirdag basin. G2 : Black patch of reduced sediment with polychete tubes (3 cm length) and sulfide oxydizing bacterial colonies. G3 : in-situ gas sampling of the bubbles escaping from the black patch shown in G2. A1 : example of acoustic anomaly detected on the Eastern Ridge using the 38 kHz, SIMRAD EK-60 echo-sounder. H1 : Sediment corer pushed into bacterial mat on the Western Ridge, where hydrocarbon traces and gas hydrates (H2) were found at unexpected water depth (666 m).*

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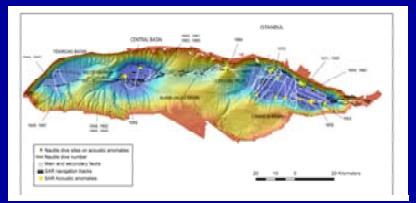
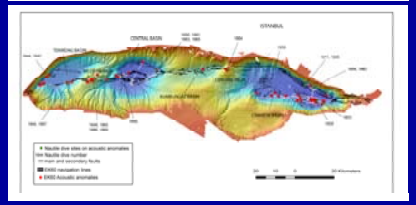
## Result 1 (WP1) : Relation between active tectonics and gas emissions



Sept. 2000
Deep towed SSS
180 kHz



May-June 2007
38 kHz

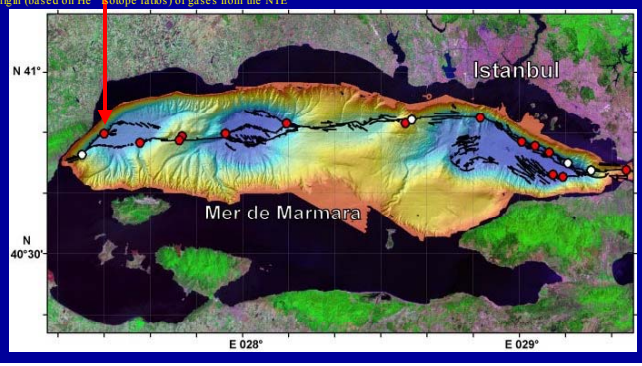
- **Systematic relation between gas emissions and active faults**
- **All active gas venting sites found in 2000 after the 1999 earthquake were still active in 2007**
- **The only segment without any gas emissions from the fault is located south of Istanbul. That segment represents a seismic gap and has not ruptured since 1766**

# Result 2 (WP1) : Origin of the fluids


Mantle origin (based on He isotope ratios) of gases from the NTE

**Fluids of deep origin in the west:**
- the Northern Tekirdag Escarpment (NTE)
- Western High (thermal methne)

**Shallow (biogenic) gases from the east-central Cinarcik Basin**

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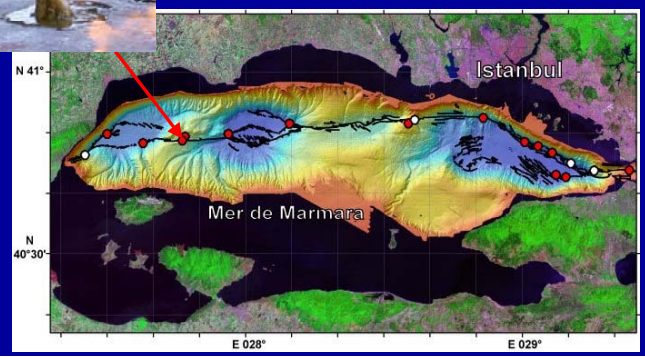
# Result 3 (WP1) : Oil, gas and gas hydrates

- Discovery of hydrocarbons and gas hydrates on the Western High
- Geochemical signatures from the Thrace Basin gas field

=> Fluids rising through the fault provide a window into the deep (seismogenic ?) zone

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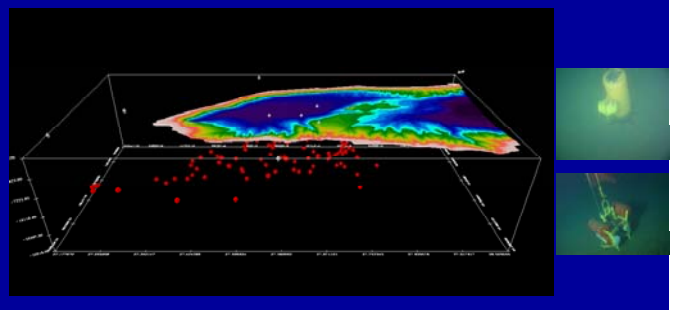
# Result 4 (WP1) : Analysis of time series

- 4 OBSs and 1 piezometer deployed for 4 months
- 7 flowmeters / osmosamplers for 1 year (still not analyzed)
- 1 Ph. D. Thesis (JB Tary) on time series interpretation

**OBS improve :**
- detection threshold compared to land data, from M=2.5 to M=0.8
- Detection accuracy
- Event characterization

**Piezometer indicate unexpected, previously undocumented relations between pore pressure measurements and seismicity**







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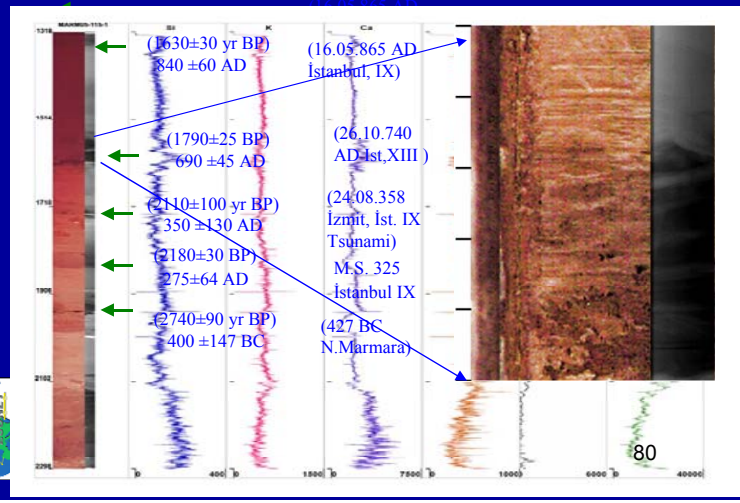
# Result 5: Identification of the past earthquake records in the Sea of Marmara: important for seismic risk assessment along the different segments of the NAF Çağatay et al., 2008).

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Results from WP-1 support our belief that the further work under MARMARA-DM could help test the following hypotheses :

**H1: Physical properties, amount and chemistry of the fluids change systematically during an earthquake cycle. Some of these changes, or their consequences, can be recorded at the seafloor.**

**H2: Strain rate variations induce pore pressure variations in surface sediments**

**H3: Fluids from the seismogenic depth reach (locally and episodically) the seafloor**



## WP2: Cruise planning and site surveys

1) R/V Le Suroît cruise for Marmesonet (40 days) funded by IFREMER, scheduled for July/Aug. 2009. The cruise proposal is available at: http://www.edf.u-3mrs.fr/~henry/marmara/public/MARMESONET.pdf

The cruise will comprise three parts:
Part 1 (21 days): EM 300 for the detection of bubble emissions.
AUV for micro-bathymetry, chirp and EK-60: bubble detection
Part 2 (14 days): High resolution seismics: 3D survey on Western H.
Part 3 (5 days): Instrument deployments

2) R/V Piri Reis (DEU): 10 days of survey will be funded by MarmaraDM in 2009, carry out HR resolution seismics and bathymetrymy in the east Çınarcık Basin.



**Three additional cruises/site surveys:**

1) R/V Urania (a proposal submitted to CNR by ISMAR) for site survey and equipment deployment in east Çınarcık Basin.

2) R/V Piri Reis: A proposal will be submitted to TUBITAK in January 2009 for extra site suveys in Central High and Çınarcık areas.

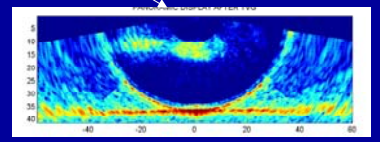
3) R/V Yunus (İU Fisheries): one week of survey with the Medusa system to decide the best location for SN4 deployment in east Çınarcık Basin. This cruise could be funded by MarmaraDM (estimated cost is 1500 €/day).

A series of HR profiles were shot in August 2008 in collaboration between Lamont-Doherty Earth Observatory and Dokuz Eylül University. The data are available for Marmara DM project.

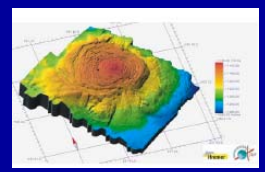


## WP2 Status : MarmEsoNet Cruise of R/V LE Suroit, July/Aug. 2009, Leg I :

**Objective 1 : Systematic detection of gas emissions using**
- **AUV at observatory sites**
- **shipboard EM300 over the Sea of Marmara**



**Objective 2 : High Res bathymetry of deformation zone (AUV)**



Courtesy Antje Boetius

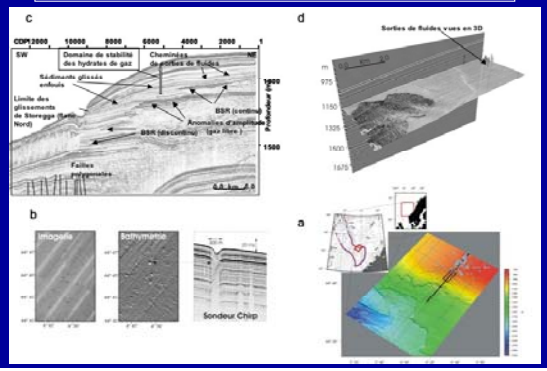
## WP2 Status : MarmEsoNet Cruise of R/V Le Suroit, July/Aug. 2009, Leg II :

**Objective :**

**High Res, 3D seismic imaging in western SoM of:**

- **Fluid conduits**
- **Deformed structures**
- **Correlation with paleo-seismicity**

**Note : Two other sites to be covered with R/V Piri Reis (DEU)**






## WP2 Status : MarmEsonet cruise: Instrument deployment for *In-situ* monitoring at selected sites

Simultaneous recording within the fault zone for 1 year of seismicity with:

- pore pressure (piezometers)
- micro-seismicity (OBS, SN-4)
- gas bubble emissions
- hydrochemical sensors (e.g., CH4: SN-4)
- radon sensor
- Cameras



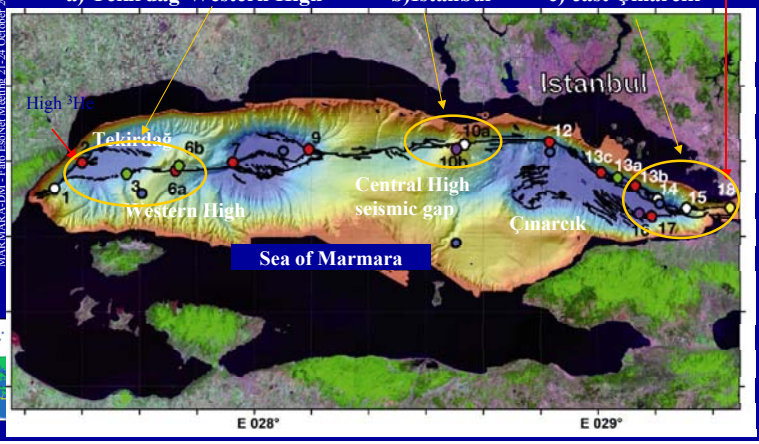
## Location of observatory sites

**Red, green and white dots: sites explored with the Nautile submersible during Marnaut**
**Green: instrumented during Marnaut (3-12 months)**
**Purple: should be instrumentd during MARMESONET in 1999**
**Blue: Planned Koeri stations**

**SN-4**
**Radon probe**

### Three observatory areas

**a) Tekirdağ-Western High** **b)İstanbul** **c) east Çınarcık**






## A preliminary observatory layout proposed based on the discussions:

**1) East çınarcık observatory (sites 13, 16, 18)**
- **6 OBSs with flowmeters + 2 OBSs without flowmeters**
- **Piezometers at sites 13b and 16**
- **Acoustic monitoring station at site 16**
- **SN4 and Rn probe at site 18**

**2) Istanbul Observatory (sites 10a,b)**
- **-6 OBSs + 3 flowmeters**
- **-Piezometers at 10a and 10b**

**3) Tekirdag-Western High observatory (sites 2, 3, 6a,b)**
- **6 OBSs + 3 flowmeters**
- **Hydrophones at Site 2**
- **Time-lapse camera at Sites 2 and 3.**
- **Piezometers at 6a and 6b**

## Available instrumets for Marmara-DM

- 20 OBSs (12 from Ifremer, 8 OBS from Scripps I.O.).
- 6 Piezometers (Ifremer)
- 8 Flowmeters-osmometers: (Scripps; 6 to be integrated into the base of OBSs)
- One SN4 Station with seismometer, CTD and chemical sensors (INGV, Rome)
- Radon station (HCMR)
- An acoustic bubble emission monitoring system (Ifremer; based on a scanning sonar with a range of about 100 m. It is currently under development at Ifremer. A prototype should be available in 2009).

Koeri instruments:
KOERI plans to deploy 5 cabled seafloor seismological stations in 2009; each equipped with broadband seismometer, a 3-component accelerometer, current meter and a T-sensor.



## Additional instruments needed:

- **Hydrophones**: Monitoring of bubble emissions with hydrophone is a technique which may be tried at strong bubble emission sites such as sites 2 (Tekirdağ) , 3 (Western High), 10b (the Central High).
- **Hydrochemical sensors**. Hydrochemical sensor stations are currently only available for one site through the SN4 deployment. At least two others (one per observatory) would be needed.
- **Lapse cameras** would be a useful tool to monitor the most active gas seeps as well as brackish water seeps (sites 2, 3, 16) for growth of carbonate chimneys and biological activity.

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## WP 3 Status
## " Integration of land and seafloor seismological data"

- **OBS data from MarNaut cruise and feature cruises**
- **Land stations data from KOERI and Tubitak-MRC**

**Work on this WP already started through Ph. D. thesis of JB Tary for data from May to August 2007**

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## WP 4: Data integration and modeling

**In progress with MarNaut data**
**Will continue after 2009 cruises**

MARMARA-DM - Faro EsoNet Meeting 21-24 October 2008

## WP 5 Status : Comparative study and project feasibility for

**Objectives :**

- **Compare the different technological options (cable vs regularly serviced vs sea-surface buoy) for permanent seafloor observatories**
- **Propose a set up that is the most suitable for the Sea of Marmara**

**Work in progress in ESONET WP5 and Ifremer; discussions with KOERI and GURALP for possible collaboration**



## WP 6 Status : Public and education outreach, coordination at national (Turkish) level and fund raising

- **At present efforts for coordination between different institutions, such as TPAO, TUBITAK and MTA (Geological Suvey), for permanent seafloor observartories in the Sea of Marmara are in progress.**
- **KOERI's Project for cabled seafloor seismological observatories funded by Turkish authorities independently of ESONET. Talks are in progress with KOERI and GURALP regarding collaboration with multidisciplinary ESONET observatories.**
  - **ESONET and EMSO reprsentatives met with KOERI/ESONET on March 28th, 2008**
  - **Kick-off meeting with participation of KOERI, TPAO and MTA : June, 16- 17, 2008, Istanbul**
  - **2nd Marmara-DM meeting with participation of KOERI and GURALP: October, 29-30, 2008 in Brest**

MARMARA-DM - Faro EsoNet Meeting 21-24 October 2008

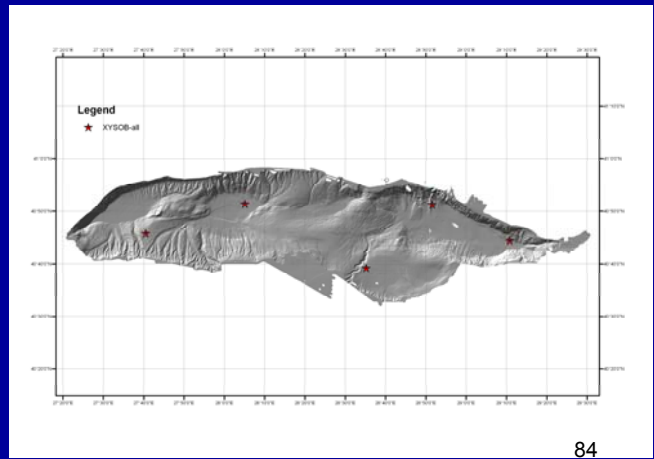
## Other Activities related to WP6

- **A special Marmara session was held in the *Geological Congress of Turkey* in Ankara during 23-27 March 2008**
- **Two papers published**
- **Public outreach: Recent project web-site in ITU: www. esonet-marmara-dm.itu.edu.tr**

Thank you

MARMARA-DM - Faro EsoNet Meeting 21-24 October 2008

**Location of future KOERI seafloor 5 cabled seismological stations equipped with 3 component accelerometers and broadband seismometers.**



## Integration of resources

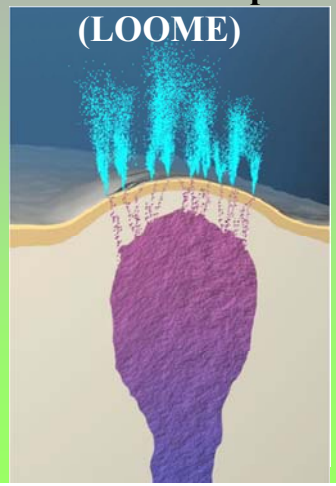
Total Operating costs = 3 714 000 €

EC ESONET Contribution = 500 000 €

**This has been possible only by integration of available resources from different partner institutions**

Thank you

## ESONET demonstration mission: Long-term Observatory On Mud-volcano Eruptions (LOOME)



MPI-MM

AWI

marum

IFM-GEOMAR
Leibniz-Institut für Meereswissenschaften an der Universität Kiel

UNIVERSITE PIERRE & MARIE CURIE
SCIENCE A PARIS

Ifremer

UNIVERSITETET I TROMSØ

## Observatory Target site: Håkon Mosby Mud Volcano

-Norwegian margin, 1250 m depth

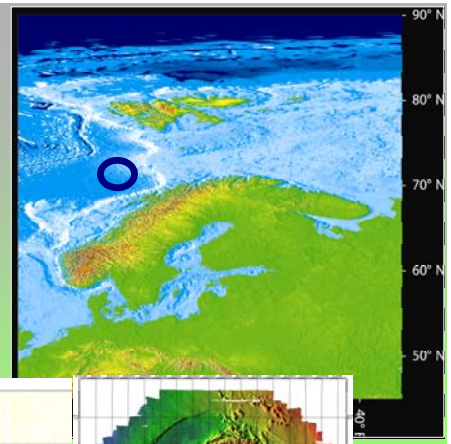
-methane emitting geostructure

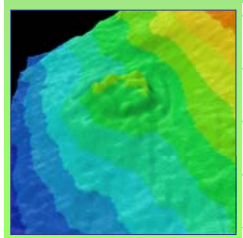
-hydrate reservoir

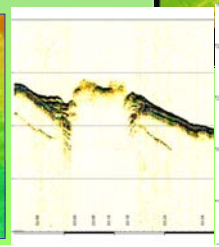
-chemosynthetic ecosystem

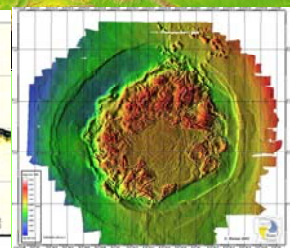
-polar bottom water

The big flare of the HMMV is still there indicating an constantly active system.







**HMMV is a target site of HERMES, MARBEF and ESONET, and this is the first proposal for an interdisciplinary observatory there.**


**LOOME partners**:

- Ifremer
- University of Pierre and Marie Curie
- University in Tromsø
- Norges Geotekniske Institutt
- KDM
  - Marum
  - AWI
  - IfM-Geomar
  - Max-Planck-Institute for Marine Microbiology

HERMES

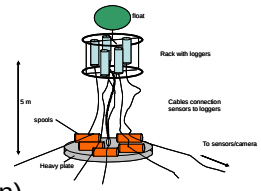
## Scientific Aims of LOOME observatory

1) Document phenomena of eruptions

2) Study their effects on the ecosystem

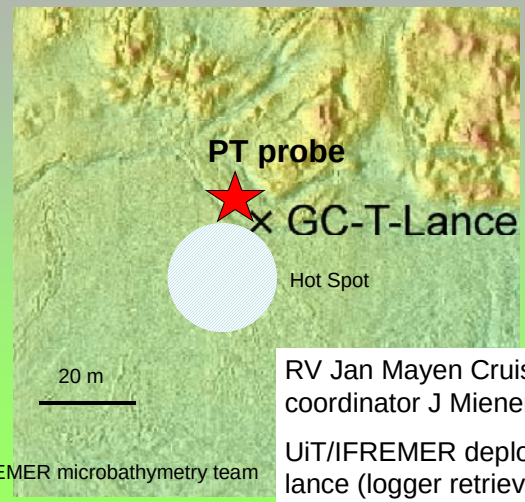
3) Quantify variability in fluid flow, gas emission and habitat cover

# Long-term Observatory On Mud-volcano Eruptions (LOOME)




- Deployment for 1- 1.5 year
- Integration of sensors:
  - Seismometers (deep mud and fluid motion)
  - Subsurface temperature and pore pressure lance
  - Surface Temperature and Chemistry (pH, redox, $H_2S$, $O_2$)
  - Imaging gasflares by sonar, ADCP, camera
  - Water column: methane sensor, CTD
- Monitor changes of the seafloor topography, benthic life, larval colonization and sediment geochemistry by ROV

# Phase I: Mooring of subsurface pressure / temperature probe and a piezometer

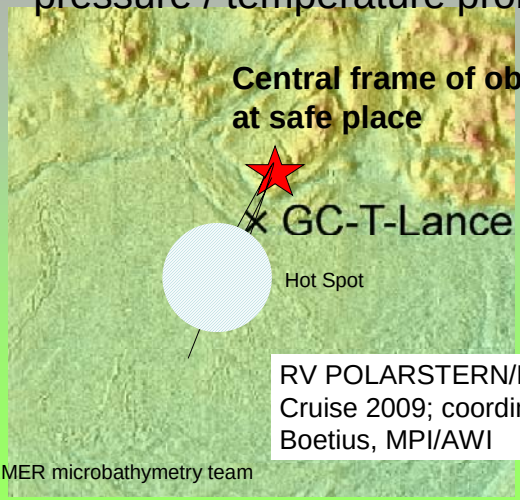



Data by IFREMER microbathymetry team

RV Jan Mayen Cruise 2008; coordinator J Mienert UiT

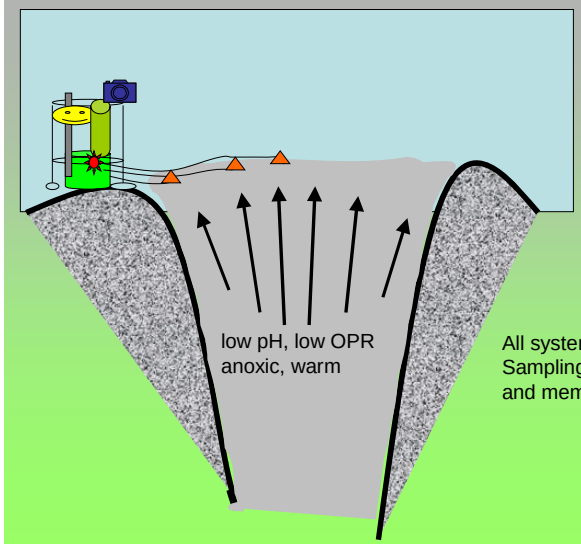
UiT/IFREMER deployment of PT lance (logger retrieval 2009)

# Phase II: Mooring of subsurface pressure / temperature probe

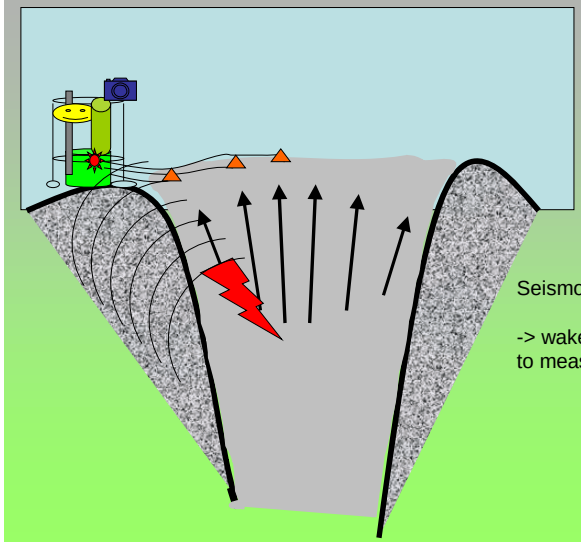



RV POLARSTERN/ROV QUEST Cruise 2009; coordinator A Boetius, MPI/AWI

Data by IFREMER microbathymetry team

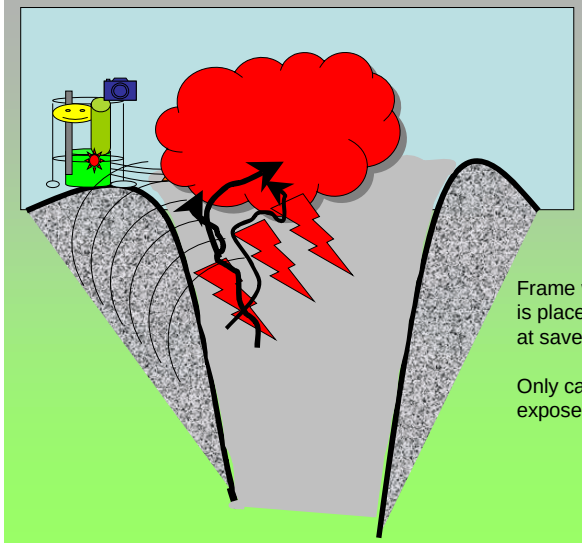



All systems record at low Sampling rates, to save battery and memory



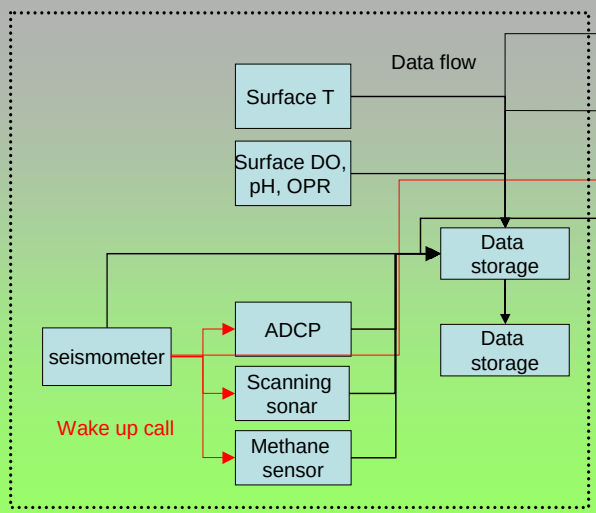
Seismometer registers activity

-> wake up sonar, ADCP, camera to measure in high frequency



Frame with electronics is placed outside hot spot at save place

Only cabled sensors are exposed.




All units have own power and memory, data storage units can be released

# Technological Aims of LOOME observatory

- Define best parameters for further long term observation of mud volcanism
- Develop and optimize integrated ways of underwater data storage and retrieval
- Develop operation pricinples for power demanding instruments

## Integration with other scientific projects

- Share cruise platforms and data: geophysical, hydrological, geological, geochemical, biological studies
- Cooperation with HERMES I+II
- Cooperation with ESF EuroDiversity CHEMECO
- Cooperation with CoML CHESS and ICOMM

## LOOME data integration and management

•The underwater communication will be by optical fiber

•Data from all units mirrored on separate storage device

•Storage device can be released and retrieved from any ship

•Loome is interdisciplinary, producing large amounts of data in various formats (video, photo, tracks, digital data, maps, biological data etc)

• use the database chosen by HERMES (PANGAEA), most data pipelines are established

# WP5
# Implementation Strategies

Led by: Mick Gillooly/Fiona Grant (MI)
Juanjo Dañobeitia (CSIC)

**Participants:**
**Jaume Piera (CSIC)**
**Olaf Pfannkuche (IFM-Geomar)**
**Michel André (UPC)**
**Jean François Rolin (Ifremer)**
**Gael André (Altran)**
**Nick O'Neill (CSA)**
**& Others**

Esonet General Assembly, 22-23 October 2008, Faro, Portugal

## WP5 Objectives and Main Milestones

Work Package 5 – Implementation Strategies

Economic
Technological
Legal
Ethical
Environmental

aspects of implementation are addressed

## WP5 Objectives and Main Milestones

| Task 5a | Generic Cable Site WG<br>Jaume Piera | Standalone Site WG<br>Olaf Pfannkuche |
|---|---|---|
| **Science**<br>**Month 24** | **Activity 5a1:** Update Scientific Report on Network Functions and Customers from ESONIM project. | **Activity 5a2:** Develop Scientific Report on Network Functions and Customers using the ESONIM template as appropriate. |
| **Engineering**<br>**Month 24** | **Activity 5a3:** Update Engineering Report on Observatory Architecture Manual from ESONIM project. | **Activity 5a4:** Develop Engineering Report on the technical architecture of a Standalone Site. |
| **Business Plan & Financial Model**<br>**Month 24** | **Activity 5a5:** Update Business Model and cash flow forecast from ESONIM project. | **Activity 5a6:** Develop Business Model and cash flow forecast using the ESONIM financial model as a template. |

## WP5 Objectives and Main Milestones

| Task 5b | Generic Cable Site WG<br>**Michel André**<br>**Altran** | Standalone Site WG<br>**Michel André**<br>**Altran** |
|---|---|---|
| **Legal, Ethical & Environmental**<br>**Month 30** | Assemble synthesis of relevant legal and best practice documents (International, EU, national, local)<br><br>Provide an homogeneous atlas describing the ESONET sites on all parameters needed for environmental assessment and permits. | |

## WP5 Objectives and Main Milestones

Task 5c - Comparative Work (Months 24-30)

- Compare the over-arching specification of user needs and the scientific justification for a cabled observatory versus a standalone site
- Compare the technical specifications of a cabled observatory versus a standalone site
- Compare the business model and cash flow forecast for a cabled observatory versus a standalone site
- Compare the legal, ethical and environmental implications of developing a cabled observatory versus a standalone site

## WP5 Objectives and Main Milestones

| Task 5c | Generic Cable Site WG | Standalone Site WG |
|---|---|---|
| Month 30 | Update the implementation model for a generic cabled observatory using the outputs from the ESONIM project as a template. | Develop an implementation model for a generic standalone site using the outputs from the ESONIM project as a template. |

The implementation model should include an assessment of all ESONET sites and identify whether a cabled observatory or standalone site is most appropriate given the outputs from all the tasks within WP5.

## WP5 Objectives and Main Milestones

Task 5d - Reporting to EMSO and mobilising the network of excellence on long term strategy funding plan

A report will be prepared for EMSO PP on the Implementation Model being developed in WP5 of ESONET NoE (Month 28)

Given that the projects will run concurrently, it is important that the scope of work in each project does not overlap and that the deliverables contribute to the overall development of both bodies of work.

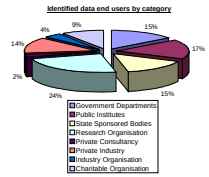
It will be important to monitor the funding developments throughout the lifetime of the ESONET NoE project. The Strategic Committee will be closely associated with this task as it will require very high-level co-operation between institutions and countries.

## WP5: Task 5a1 – Update of ESONIM End Users and Potential Customers for Ocean Observatories

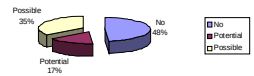
The budget requirement for ocean observation services is difficult to predict. As part of WP5, a number of companies and bodies are being studied.

**Example - Fugro Oceanor Case Study**

- Fugro Oceanor is a high technology company specialising in the design, manufacture, technological development, installation and support of public sector environmental monitoring, ocean observing and forecasting systems.
- The average annual turnover for 2005 was approximately MNOK 90 (€10.7m)
- Analysis of a range of industries through review of economic reports, questionnaires etc. suggests that the current market for oceanographic observations as proposed by ESONET could be less than €10m per annum.




Commercial Customers of a Cabled Observatory Offshore Ireland (ESONET End Users)



## WP5: Task 5a5 – Review of Funding Mechanisms

Practical Guide to EU funding

Synergies in funding opportunities between:

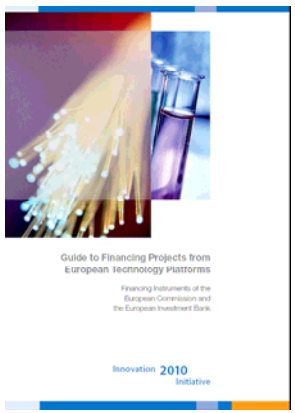
- 7th Framework Programme for Research
- Competitiveness & Innovation Programme
- Structural Funds


## WP5: Task 5a5 – Review of Funding Mechanisms

Practical Guide to EU funding

- Among the many areas supported by the Structural Funds are R&D and innovation.
- The allocation of funds in a given Member State or region varies according to its level of development.
- Most regions will have funding available from the Structural Funds in support of RTDI.
- Structural Funds for innovation and research in the period 2007-2013 will be above € 99 billion.
- For the poorer regions the co-financing and the access to innovative experience facilitated by the governance system characteristic of cohesion policy is crucial for this purpose.


## WP5: Task 5a5 – Review of Funding Mechanisms




European Investment Bank

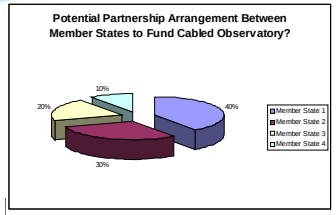
**Objective of the Risk Sharing Finance Facility (RSFF)**

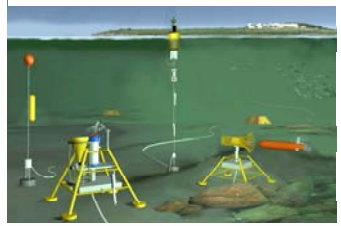
"an (EIB) instrument aimed at fostering investment for Europe in research, technological development and demonstration, as well as innovation, in particular in the private sector"

**Objective of the EC financial contribution**

"pursuant to the FP7, the EC, in addition to providing direct financial support to participants in RTD Projects, has resolved to **improve** their **access to debt finance** through the RSFF. In accordance with the FP7 Rules, the EC financial contribution will allow for a larger volume of EIB lending and guarantees for a certain level of risk, and the financing of riskier European RTD Projects than would be possible without such Community support"

## WP5: Task 5a5 – Review of Funding Mechanisms



Should the STRAC be advised of new funding mechanisms to facilitate proposal development between Member States?

## WP5: Task 5a5 Costings for all Sites

Costings from ESONET CA

↓

ESONIM costing for Celtnet

↓

ESONIM estimates for all sites

↓

Revised costings through ESONET NoE

## WP5: Task 5a5 Costings for all Sites

### Costings developed in ESONET CA

Table 6.1. Lengths of Cables and Estimates of Costs for the Subsea (wet) segment of ESONET

| | | | Estimate 1 | | Estimate 2 | |
|---|---|---|---|---|---|---|
| | Region | km | US $ | Euro | US $ | Euro |
| 1 | Arctic | 319 | 15,235,269 | 10,657,016 | 26,100,000 | 21,750,000 |
| 2 | Norwegian Margin | 614 | 29,324,312 | 20,512,249 | 32,650,000 | 27,208,333 |
| 3 | Nordic Seas | 301 | 14,375,599 | 10,055,679 | 25,800,000 | 21,500,000 |
| 4 | Porcupine Seabight | 1343 | 64,140,962 | 44,866,370 | 57,900,000 | 48,250,000 |
| 5 | Azores | 392 | 18,721,710 | 13,095,768 | 17,800,000 | 14,833,333 |
| 6 | Iberian | 127 | 6,065,452 | 4,242,762 | 13,100,000 | 10,916,667 |
| 7 | Ligurian Sea | 180 | 8,596,704 | 6,013,363 | 17,700,000 | 14,750,000 |
| 8 | East Sicily | 26 | 1,241,746 | 868,597 | 0 | 0 |
| 9 | Hellenic | 221 | 10,554,842 | 7,383,073 | 24,350,000 | 20,291,667 |
| 10 | Black Sea | 518 | 24,739,403 | 17,305,122 | 40,500,000 | 33,750,000 |
| | **Total** | **4041** | **192,996,000** | **135,000,000** | **255,900,000** | **213,250,000** |

It is likely this is an underestimate. An alternative approach is a provisional estimate provide by a supplier based on a combination of comparison with Neptune and analysis of the complexity of each of the ESONET regional networks. (East Sicily was excluded since this has already been installed in early 2005) The assumption is individual installation of each regional network. This gives a total of €213,250,000 (estimate 2).

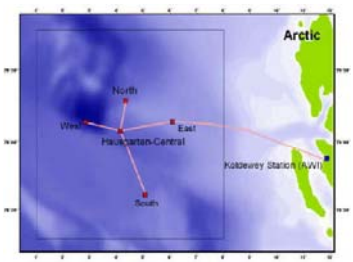
## WP5: Task 5a5 Costings for all Sites

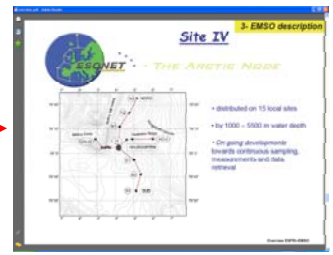
### ESONIM estimates for all sites – based on ESONET CA configuration

| | 100% Grant Aid Available | | 0% Grant Aid Available | |
|---|---|---|---|---|
| ESONET Site | Cable cost @ €25k/km | Cable cost @ €35k/km | Cable cost @ €25k/km | Cable cost @ €35k/km |
| Arctic | €69.3 | €73.2 | €74.0 | €78.1 |
| Norwegian Margin | €65.4 | €72.8 | €70.3 | €78.4 |
| Nordic Seas | €97.7 | €101.4 | €104.3 | €108.2 |
| Porcupine | €104.8 | €104.8 | €112.4 | €112.4 |
| Iberian | €43.1 | €44.7 | €46.2 | €47.9 |
| Ligurian Seas | €48.2 | €50.4 | €51.5 | €53.9 |
| East Sicily | * | * | * | * |
| Hellenic | €50.3 | €52.9 | €53.9 | €56.8 |
| Blacksea | €89.9 | €96.1 | €95.7 | €102.5 |
| | | | | |
| **Totals** | €568.7 | €596.4 | €608.3 | €638.2 |

## WP5: Task 5a5 - Review CAPEX v1

### Example – Arctic Node

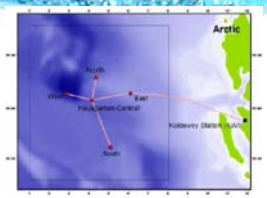


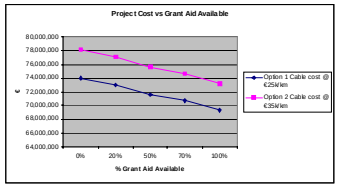



## WP5: Task 5a5 - Review CAPEX v1

Review CAPEX Arctic Node

- Estimated CAPEX in October 2007 €69-€78M
- Costings were based on ESONET CA configuration
- 319km cable & 5 nodes
- Some of the nodes were in waters exceeding 3500m
- Require deep water vessel to deploy and maintain them



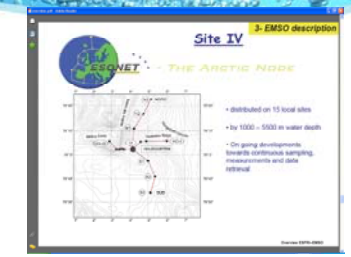

## WP5: Task 5a5 - Review CAPEX v1

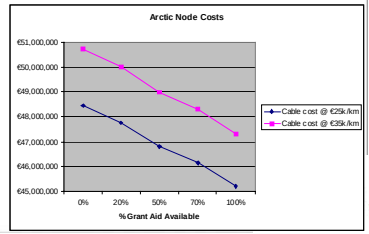
Review CAPEX Arctic Node

- Downward revised CAPEX of €45-€50M
- 170km cable & only 2 nodes are cabled
- Neither of the cabled nodes are in deep water
- Assumed that Arctic site qualifies as an ERI => VAT exemption of 17.5%

Elements to be updated:

- Costings for standalone nodes
- O&M costs for revised configuration




## WP5: Task 5a5 - Review OPEX v1

Estimates of Operational Costs required to Service a Node

| MINIMUM ESTIMATE | | |
|---|---|---|
| **Technical vessel personnel** | **number** | **cost per day** |
| Technician I | 2 | €151.81 |
| Technician II | 3 | €318.76 |
| Technician III | 1 | €174.78 |
| **Technical Personnel Vessel Costs** | **6** | **€5,808.08** |
| | **Personnel** | |
| **Cruise Personnel Costs** | 16 | **€38,523.12** |
| | **Personnel** | |
| **Victor 6000 @ €10k per day** | 10 | **€90,000.00** |
| **Navigation Costs to Site** | Assumed 500nm offshore | **€22,122.67** |
| **Dynamic Positioning cost** | DP at Site (30 hours) | **€4,384.68** |
| | **Total personnel** | |
| **Personnel maintenance** | **32** | **€249.60** |
| | **Total** | **€160,838.55** |
| | **Total / day** | **€17,870.95** |

Assumptions:

Installation at harbour = 4 days
Demob at harbour = 2 days
Operations at Sea = 3 days
**Total = 9 days**

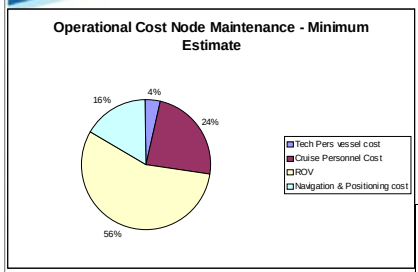
Operation hours at site = 30 hours

Personnel and technician costs
ROV hire & ROV pilots/technicians

Distance to nodes & navigation speed are also cost factors

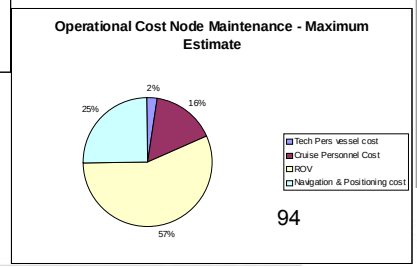
Estimate €17k-€27k per day

## WP5: Task 5a5 - Review OPEX v1

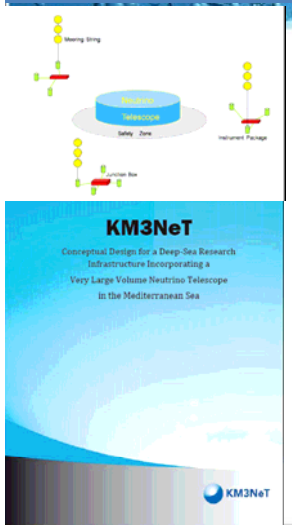



€17k per day for 9 days
500nm from shore
Travelling at ~10 knots
ROV estimated at €10k per day

€27k per day for 9 days
710nm from shore
Travelling at ~12 knots
ROV estimated at €15k per day



## WP5: Task 5a5 – Review of KM3NET CAPEX




- KM3NeT estimated at ~€180 - €190M
- Largest cost element is for the Detection & Calibration Units @ ~€104M
- Seabed Infrastructure @ ~€61M
- Shore Infrastructure @ €14M
- Sea Operations @ €9.3M

No OPEX estimates
No financing estimates/inflation estimates

## WP5: Task 5b – Proposed EU Legal Framework for ERIs


Stakeholders workshop in Brussels in March 2008 on the most appropriate legal instruments

The workshop identified the lack of an *adequate legal framework* allowing the creation of appropriate partnerships with partners from different countries

## WP5: Task 5b – Proposed EU Legal Framework for ERIs

To provide an easy-to-use legal instrument adapted to European infrastructures, an ERI should:

- have a legal personality recognized in all MS
- have a spirit of a truly European venture
- be flexible enough to adapt to the requirements of specific infrastructures
- provide some of those privileges and exemptions allowed at a national level for intergovernmental organizations (e.g. VAT exemption).

The regulation should provide a faster and more cost efficient process than existing legal forms


## WP5: Task 5b – LEE Database

This LEE Database combines different information in terms of the legal, ethical and environmental aspects of interest for ESONET Sites. The worldwide cetacean distribution and existing regulations in MPAs complete the entries.

## WP5: Task 5b – LEE Database

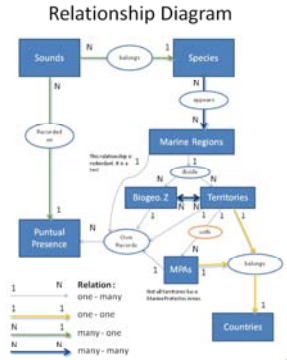
The Geographic information of the distribution and the presence or absence of species was compiled from different public sources, like GBIF (Global Biodiversity Information Facility) and elaborated to give them all the same comparable format of *Google Earth* archives, that can easily be opened “on one click”.

The hierarchical world seas division that was adopted in the MS Access Database was the 18 Marine Regions division of the IUCN, the “FAO Statistical Areas” and the “Large Marine Ecosystems” developed under United Nations Programs

## WP5: Task 5b – LEE Database

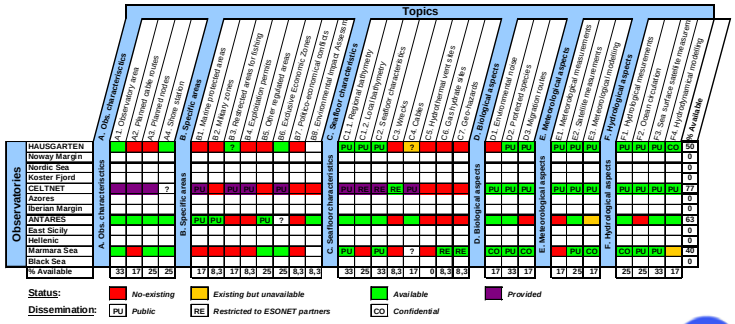
The information in the database is divided into 5 sections:

1. Species
2. Geographical data
3. Legal Aspects
4. Conservation and Management
5. ESONET Observatories




## WP5: Task 5b – ESONET Atlas

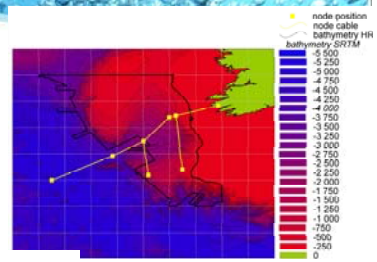
Activity 1a3: Data Mining – distribution of a questionnaire to gather information on existing and available site survey data

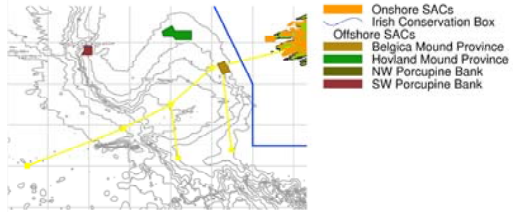



## WP5: Task 5b – ESONET Atlas

**Task 5b:** Observatory site assessment and permits.

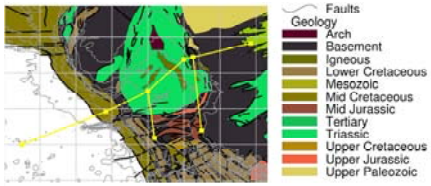
- Gathering Legal, Ethical and Environmental data to provide an homogeneous Atlas describing ESONET sites
- Legal context, environmental conditions and financial estimations



## WP5: Task 5b – ESONET Atlas

**Geology**




**Data Mining:** Still waiting for filled questionnaire about information on site survey data

**Atlas:** Gathering available data, if possible in shape file format or other usable numerical format.

- Where will these data be stored?
- Who is responsible?
- In case of storage, who will sign the data use terms agreements (ESONET contract with all data providers)?

## WP5: Task 5d - Initial Report to EMSO on Implementation Plans in ESONET NoE

**Conclusions/Recommendations**

- There do not appear to be any significant overlaps in the work plans of ESONET NoE and EMSO PP but this will need to be assessed as the projects progress.
- It is recommended that prioritisation of the sites for business plans be progressed as soon as possible to ensure that ESONET NoE and EMSO PP deliver the best value for money with the time and resources available.
- Legal and financial consultants are expensive and the budget for WP3 and WP5 will be exhausted within a short timeframe, even with limited external consultation. It is suggested that the Steering Committee consider optimisation of consultation through various mechanisms.

## WP5: Task 5d - Initial Report to EMSO on Implementation Plans

**Conclusions/Recommendations**

- WP5 leaders advise that before any work is started in EMSO, the observatory locations and node configurations should be audited. The list of contact points and 'owners' of the infrastructures should be revised and confirmed (underway in ESONET NoE WP1 and WP6) and that the contact points provide the data required on nodes, locations requirements etc. Regional nodes that are unable to identify such owners should be discussed at Steering Committee level.
- It is important that initiatives outside the scope of ESONET and EMSO are monitored. The legal framework for ERIs being developed at EU level should be closely monitored to ensure that the framework is appropriate for European deep sea observatory infrastructures which have multiple owners and a dispersed geographical locations.

## WP5: Decommissioning

The NoE will also support decommissioning plans in accordance with the requirements of OSPAR Decision 98/3 on the Disposal of Disused Offshore Installations. WP5 will also address technical and engineering aspects of disposal, timing, safety, marine environmental impacts and other consequences to the physical environment that may be expected to result.

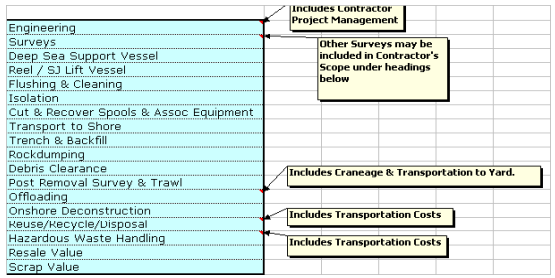
•Subsea Cable Decommissioning - A Limited Environmental Appraisal – Commissioned by British Telecommunications plc, Cable & Wireless, AT&T

•Decommissioning of Offshore Wind farms – experience gained

•UK Oil and Gas - Decommissioning Working Group. Total costs involved in decommissioning the UKCS are estimated at £15-20 billion; the wide range reflecting the uncertainties on technology, project costs and timing.

## WP5: Decommissioning

**Case Study from the UK Oil and Gas - Decommissioning Working Group**

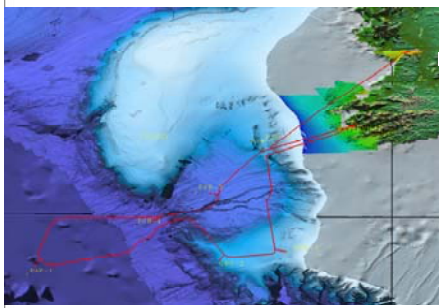



## WP5: Task 5b - COWRIE EMF fields

Collaborative Offshore Wind Research into the Environment (COWRIE)

- COWRIE is a registered Charity set up to advance and improve understanding and knowledge of the potential environmental impacts of offshore wind farm development in UK waters
- COWRIE Steering Group develops projects in relation to potential impacts on birds, underwater noise on marine mammals and electromagnetic fields from power cables
- COWRIE 1.5 Electromagnetic Fields Review – recommended further studies were required
- COWRIE 2.0 Electromagnetic Fields (EMF) Phase 2 – report due shortly

## WP5: Task 5d - Making the Case for Seafloor Observatories

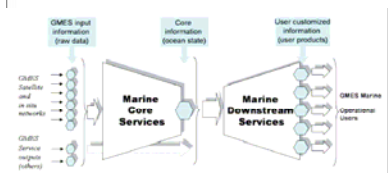


Must advocate for the development of a coherent case based on sound scientific and societal needs:

- R&D
- Operational Forecasting
- Geohazards – tsunamis, seismic events etc
- Technological innovation
- Global change
- Bioacoustics and Noise Pollution
- Marine Resources
- Oil & Gas Environmental Monitoring

## WP5: Task 5d - Making the Case for Seafloor Observatories

Links to GMES/Kopernikus




WP5 leaders are recommending the production of a synthesis report, making the case for seafloor observatories.

The report can be published and used as a basis for advancing the arguments for the development of seafloor observatories as advocated by the ESONET NoE STRAC in 2007.

## WP5: Programme until September 2009

There is an urgent need for engagement by partners to meet the deliverables and maintain momentum

- From Barcelona meeting we developed two Working Groups – Generic Cabled Site and Generic Standalone Site
- Welcome the inputs from any partner who can contribute to tasks
- Require updates to site configurations through Altran questionnaire
- Key deadlines are Month 24 for Initial Implementation Plans and Month 30 for Final Report on Best Practise, Guidelines for LEE issues and Implementation Plans
- Recommend that we convene a meeting to encourage stakeholder engagement (Member State, Commission, Private Sector, Research Community, Public Interest)

Thank You

# WP6
# Socio-Economic Users

Lead by: J M Miranda
University of Lisbon
Email: jmiranda@fc.ul.pt

**Participants:**

**J M Miranda, University of Lisbon**
**Jean François Rolin, IFREMER**
**Nick O'Neill, CSA**



## WP6 objectives and main milestones

The objectives of this work package are the promotion **of the need of subsea observatories**, disseminating the results of ESONET NoE and establishing permanent links to socio-economic users. These objectives ask for the development of stronger links between the present and future stakeholders of ESONET, disseminate to the large public the state-of-the-art of the network and promoting the harmonious development of the different regional infrastructures vis-à-vis the different user communities, with an emphasis on the connection between ESONET and the private sector and searching beyond the marine sector for new partnerships.

## WP6 objectives and main milestones

**Subtasks**
Task 6a: Core services stakeholders
Task 6b: Regional services stakeholders
Task 6c1: ESONEWS
Task 6c2: Promotion and SME policy

**Milestones**
**Month**
6.a. Meeting w stakeholders of core services 24
6.b. Formal Regional Nodes Meetings 30
6.c. SME yellow pages

## WP6: work done during the 1st year

**Task 6a - Core services stakeholders**

ESONET developed contact with GEOSS:
-Presentation at Cape Town Meeting in November 2007.
-Another Meeting was organized in ISPRA, JRC, between ESONET and GEO user interface committee
-Special task in WP2 (DbScale)

Links with GMES/Kopernikus are on the way.

## WP6: work done during the 1st year

**Task 6b - Regional services stakeholders**
**6b1: Updated state of the art from previous EC projects**

Based on the ESONET CA and ESONIM SSA outputs, a report called "REPORT ON REGIONAL OBSERVATORY STAKEHOLDERS" was prepared, updating the information concerning ESONET future nodes, their basic design, institutions involved in their development or in the data that will be available in the near future.

## WP6: work done during the 1st year

**Task 6b - Regional services stakeholders**
**6b2: first circle of potential users of each regional network**

In the preparation phase of the Demonstration Missions new progresses were observed in what concerns the organization of the Azores Node, Sicily node, Gulf of Cadiz node, Norwegian node and Marmara Node.
The Celtic (Porcupine node) was the center of an intense cooperation and promotion towards regional stakeholders in Ireland and abroad (ESONIM SSA).

## WP6: work done during the 1st year

**Task 6b - Regional services stakeholders**
**6b2: first circle of potential users of each regional network**

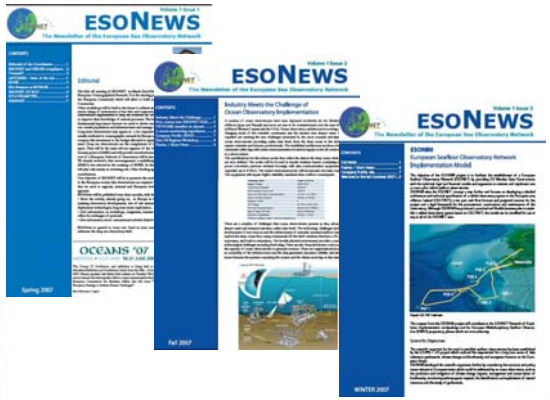
Meetings of KM3Net design study project established the link with ESONET for the Ligurian, Sicily and Hellenic sites.
The Norwegian site has been better defined thanks to a workshop and several meetings with Norwegian authorities and led to the constitution of the NOON (Norwegian Ocean Observatory Network).

## WP6: work done during the 1st year

**Task 6c - Promotion and SME policy**
**6c1: Initiating communication policy with Esonet News**

ESONET Newsletter is devoted to the dissemination of (i) the importance of scientific issues, (ii) the mastering of the technology and business plan, (iii) the role of political support for underwater observatories, (iv) the partnership with successful implementations in North America and Japan, and (v) complementary role of ESONET in situ observation with satellite, coastal surface and subsurface ocean layer data collection.

## WP6: work done during the 1st year




## WP6: work done during the 1st year

**Task 6c2**
**Promotion and SME policy**

In order to make contact with potential suppliers of equipment and services to ESONET was promoted at conferences like Oceans 07 Aberdeen. In addition all of the stands in the exhibition hall were visited and introduced to ESONET and the advantages of becoming members of PESOS (Group of Providers of Equipment and Services for Observatory Systems). Twenty five companies expressed an interest and were identified as potential members of PESOS.

## WP6: programme until September 2009

## WP6: programme until september 2009

Task 6a
**Core services stakeholders**

Core service services will be stabilized in month 18 in the report D16. A meeting with the stakeholders of the core services will be organized.

## WP6: programme until september 2009

Task 6b
**Regional services stakeholders**

In the sequence of D17, formal meetings of all ESONET nodes stakeholders will be organized based on the preliminary MoU concerning infrastructure and basic scientific plans and/or the regional legal entities designed within WP1.

In what concerns financial aspects of each regional node, cooperation with WP5 will be done, to stabilize a coherent economic approach.

## WP6: programme until september 2009

Task 6c
**Promotion and SME policy**

The involvement of SMES will be fostered by (i) better circulation of information concerning their role as suppliers/value added services in Demo missions; (ii) "**yellow pages**" to be linked with ESONET webpage. Establishment of a secretariat to foster participation and management of small funds.

## WP6: programme until september 2009

**Task 6c1**

During 2008 a major re-design was done and the first number in now released in the new format.


## WP6: programme until september 2009

**Task 6c2**
Promotion and SME policy

**PESOS statuts**

A first version of PESOS statuts was prepared. The document is under discussion.

## WP6: programme until september 2009

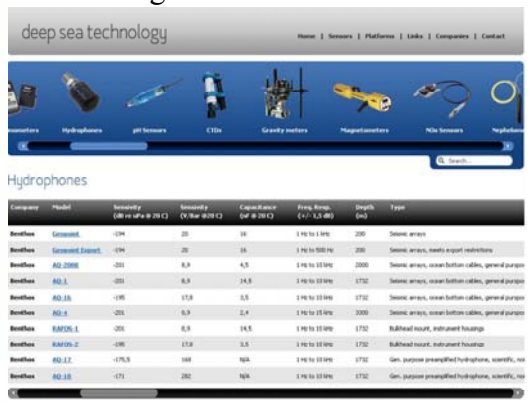
**Task 6c3**
**Yellow Pages**

The yellow pages are developed in HTML, Javascript and CSS. The database is structured in MySQL.

> Centered on “products” (e.g. sensors);
> Compatible with standardization procedures;
> Modular and possible to integrate;

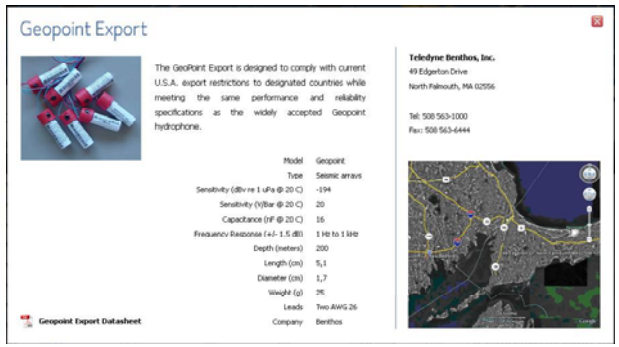
## WP6: programme until september 2009

**Task 6c3**
Yellow Pages




## WP6: programme until september 2009

**Task 6c3**
Yellow Pages




Thanks!

**WP7 – Education and Outreach**

**Brief overview on behalf of Laurenz Thomsen**

**WP7 – Education and Outreach**

**I will mostly discuss outreach website – current state and future developments…**

**…firstly, current deliverables and milestones**

## WP7 – Education and Outreach - Deliverables

| Deliverable | Name | Due (mth) | Status |
|---|---|---|---|
| D18 | Publishing initial draft ESONET portal | 20 | Done |
| D30 | Installation of computer terminals (and cameras) | 20 | 1/3 |
| D32 | Introduction to demo missions | 22 | Done? changes required? |
| D38 | Finish games and quiz section | 24 | Ongoing |
| D40 | Report on second Training Workshop | 26 | Not Done |
| D49 | Fully established outreach website | 30 | Ongoing |

**WP7 – Education and Outreach - Milestones and expected results**

| Deliverable Date (month) | Name | Task ref | Done ???? |
|---|---|---|---|
| 22 | Web-portal open: better insight into current ESONET activities | 7a | Ongoing (input please!) |
| 25 | Second training workshop held for better integration of ESONET partners | 7c | Planning. Ideas? More practical work? |
| 30 | Outreach webpage fully established to inform the public on ESONET | 7b | Ongoing |

# WP8
# ESONET Coordination

Lead by: R. Person & I. Puillat
IFREMER
Esonet-coordinator@ifremer.fr



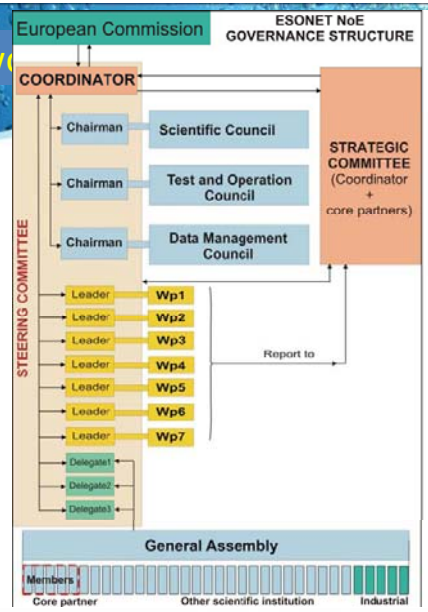
## WP8 main tasks

- Coordination of the consortium
  - SC, STRAC, 3 Councils, GA
- Coordination of Activities between WPs
- Contract amendments
- Reporting for EC: Deliverables and yearly reports (March)
- Financial management

## WP8: work done until now

- Coordination of the Consortium
  - Consortium organization: a reminder

## WP8: w



## WP8: work done until now

- Coordination of the Consortium
  - SC meetings
    - Brest: 23 Mar07, Aberdeen: 21 Jun07, Barcelona: 07 Sep07, Roma: 25-26 Nov07, Paris CDG: 14 Jan08, Issy les Moulineaux: 15 May08, Faro: 20 Oct 08 + virtual meetings (Visio, Audio, EMail)
  - STRAC meetings: Barcelona Sept. 07, Faro Oct08
  - Councils' meetings: tomorrow
  - GA meeting: now , APPROVAL needed

General Assembly, 22-23 October 2008, FARO, Portugal

**APPROVAL FORM (ONE BY INSTITUTION)**

| Meeting | General Assembly |
|---|---|
| Date/time | Thursday 23 October – 10H00/13H00 |
| Place | University of Algarve – FARO - Portugal<br>*Room* |

| *LEGAL REPRESENTATIVE NAME (please fill in):* ..... | *INSTITUTION NAME (please fill in):* ..... | | FOR YOUR APPROVAL | |
|---|---|---|---|---|
| Decision #1 | Approval new Joint Programme Activities including – JPA – (including list of deliverables) | see file ga2008-decision1 (to be provided later) | Yes ☐ | No ☐ |
| Decision #2 | New workpackage 3 leader:<br>Henry Ruhl is replacing Christian Berndt as WP3 leader. He arrived at NOCS in July 2008 | | Yes ☐ | No ☐ |
| Decision #3 | New members of Esonet Councils | | Yes ☐ | No ☐ |
| Decision #4 | Amendments of the Esonet contract – special clausea 23 and 39 | see file ga2008decision4 | Yes ☐ | No ☐ |
| Decision #5 | New Esonet members presentation: CNRS affiliate, CSIC affiliate | see file ga2008decision5 | | |
| Decision #6 | Presentation of Esonet associated partners status and of the associated agreement contract (annex of Consortium Agreement) | see file ga2008decision6 (to be provided later) | | |
| Decision #7 | Cancellation of SIS participation | see file ga2008decision7 | Yes ☐ | No ☐ |
| Decision #8 | Modification of the PESOS group representative member | | Yes ☐ | No ☐ |
| Decision #9 | New Esonet logo | | | |

Only
1 representative
by institution

## WP8: work done until now

- Coordination of the Consortium
  - New WP3 (« Observatory design related to Scientific objectives ») leader : Henry Ruhl (NOCS) coming from MBARI is replacing C. Berndt who left the NOCS
  - New chairman of the data management council is proposed: G. Maudire (IFREMER) instead of S. Pouliquen (IFREMER) who resigned from the DM council

A2 →

A3 →

## WP8: work done until now

- Coordination of the Consortium
  - 49 contractors, representing 54 partners until now (KDM, CNRS,CSIC = representative of several member institutions/ special clause 23 )
  - Of which 2 news members
    - UPC represented by CSIC
    - LMGEM represented by CNRS

    = no NEW contractor!!!

A5 →

## WP8: work done until now

- Coordination of the Consortium
  - New member of CSIC: UPC
    - Polytechnical University of Catalogna
    - Michel André, coordinator of LIDO
    - Antoni Manuel, involved in WP2 &WP1 (ESONET sensor Registry)

See attached documents of your GA book: contract amendement request for SP clause23

## WP8: work done until now

- Coordination of the Consortium
  - New member of CNRS: LMGEM
    - Laboratory of Microbiology, Geochimistry and Marine Ecology
    - Dominique Lefèvre, involved in the Var-Ligurian sea node
    - Christian Tamburini, involved in the Var-Ligurian sea node

See attached documents of your GA book: contract amendement request for SP clause23

## WP8: work done until now

- Coordination of the Consortium
  - Exclusion of SIS partner n°43, agreed in SC meeting

A7

    - No activity report
    - No financial report, no form C
    - No answer to Emails even after a phone discussion from Germany
    - No answer to 2 official postal mails

See attached documents of your book

## WP8: work done until now

- Coordination of the Consortium
  - Meeting preparation and/or contribution
    - Kick off meeting, Best practices workshop, training workshop, All regions workshop, this GA week
  - Preparation of associated partners agreements for institutions wishing to be involved in ESONET NoE but without EU funding… (petroleum cies for instance)
    - See the draft attached to your book

## WP8: work done until now

- Coordination of the Consortium
  - PESOS group (WP6), an Association of SMEs from several member states, partner of ESONET- group of Providers of Equipment and Services for Observatory Systems

A8

New representative: SEND replacing ALCATEL

Klaus Schleisiek

## WP8: work done until now

- Coordination between WPs and in WPs

For instance:

- WP1: promotion of Esonet at International level to discuss about an international association (Canada, Japan, USA and Europe), Exchange of personnel (job offers and new call)
- WP3: implication of GMES and GEO/GEOSS
- WP4: referees reports tracking, grant agreements
- WP7: new main web site that links to the Educational web site : www.esonet-emso.org

## WP8: work done until now

- Contract amendments:
  - For Special Clause 23… done in previous slides!
  - For Special Clause 39: giving the possibility to not ask for an audit certificate for partners resquesting less than 150 000 € to the EC for one or more reporting periods

A4

  - For new version of the DoW (annex 1 of the contract) after the yearly reports

## WP8: work done until now

- Reporting to the EC

## WP8: work done until now

- Reporting to the EC
  - Deliverables : request, tracking and reading then transfer to the EC
  - Yearly reporting process:
    - Activities report = WPs activities reports
    - Management report = activity reports of EACH partner: work done on each WP + justification of main costs and the so famous FORMs C!!!!
    - New programme of Activities for the next 18 months

## WP8: work done until now

- Reporting to the EC : main problems met
  - The request of reports started in January 08
  - Most of the Partners waited until the last 2 weeks to think about their report (beginning of April)
  - Consequence: a lot a of questions at the last days x 54 partners
    - Impossible to manage the Emails flow
    - Impossible to give a correct answer in due time
    - Information received by ECT = wrong
    - A bad report was delivered the 15th of April to the EC

## WP8: work done until now

- Report to the EC, solutions proposed:

1/ A meeting will be organised for the reporting in Jan-Feb 09

2/ An online system with several steps:

- Step 1: 1-15th feb09: EACH partner
  - activity description + estimated men months for each WP + intention for next 18 months
  - = PART 1 of the Management report
- STEP 2: 16-28th feb09: Each WP
  - Activity report gathering infos from partners
  - = Main Activity report
  - Programme for the next 18 months

## WP8: work done until now

- Reporting to EC, solution proposed:
  - Step 3: 1-21st Mar09: EACH partner= drafted cost statements
    - Actual men months
    - Actual eligible costs splitted per categories
    - Form C not signed by email
  - Step 4: 21-3rd Apr09 : EACH partner= Final cost statements, final Form C + 2 signatures
  - Step 5: 3-15th Apr09: Coordinator: consolidation of all cost statements + verification of Form C

## WP8: work done until now

- Reporting to the EC: solution proposed

3/ Cost statement not received in due time

= ZERO euro for the next year

Why?

Because NoEs are funded on a

reimbursement basis

No cost justified= no fund attributed by the EC

## WP8: work done until now

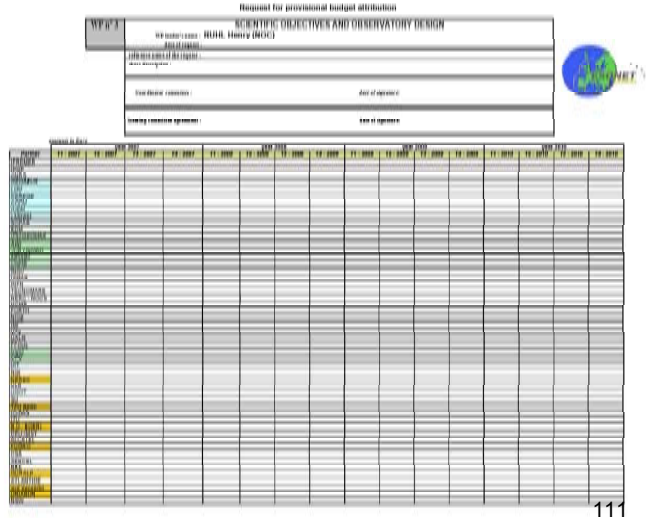
- Financial management

€

## WP8: work done until now

- Financial Management
  - Fund requests through WPs activities
    - Contact your WPs leaders
    - Propose your activities
    - Propose a requested contribution : excel sheet
    - Vote in SC meeting
    - Transfer or not transfer

## W



## WP8: work done until now

- NoEs: Reminder
  - No clear budgeted eligible cost per partner= one difficulty for reporting
  - Eligible costs for NoE:
    - Personel costs:
      - FC & FCF cost models: permanent and non permanent staff
      - AC cost model: only not permanent staff
    - Travels and accommodations
    - Indirect costs (20% for FCF and AC)
    - Subcontracting costs if according to FP6 rules
    - Consumable and Equipment for NoE integration activities: NO research equipment!!!

## WP8: work done until now

- Financial Management
  - Christophe DESBOIS, IFREMER
    - Follow up of the EC grand budget
    - Fund transfer order

    …

# WP8: ESONET Financial Management

C. Desbois
IFREMER
Esonet-coordinator@ifremer.fr

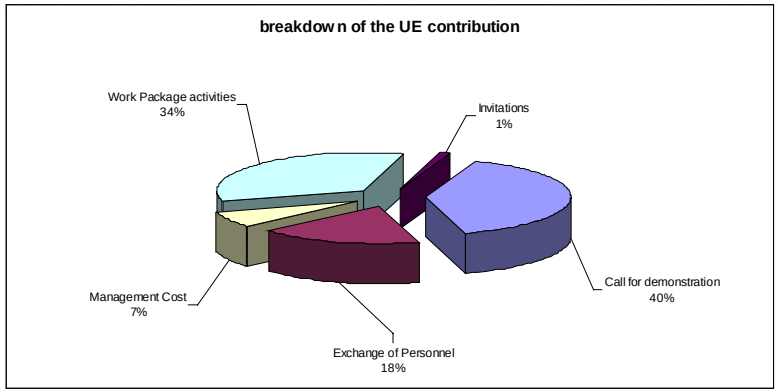


## Budget / summary

- 1 – OVERVIEW OF THE FINANCIAL PLAN
  BREAKDOWN OF THE UE CONTRIBUTION
- 2 – DISPATCHING OF THE UE GRANT detailed on JPA, DM, coordination…
  A) FOR THE FIRST YEAR
  B) UNTIL TODAY
- 3 - FIRST YEAR REPORTING TO THE UE COMMISSION
  A) TOTAL ELGIBILE COSTS
  B) REQUESTED CONTRIBUTION PERIOD 1
- 4 - FINANCIAL PLAN FOR PERIOD 2
  A) TOTAL ELGIBILE COSTS
  B) REQUESTED CONTRIBUTION PERIOD 2

> CONCLUSION

## 1/OVERVIEW OF THE FINANCIAL PLAN




## 1/OVERVIEW OF THE FINANCIAL PLAN

- BREAKDOWN OF THE UE CONTRIBUTION

| RC UE | | 7 000 000 € |
|---|---|---|
| Call for demonstration | 0,4 | 2800000 |
| Exchange of Personnel | 0,18 | 1260000 |
| Management Cost | 0,07 | 490000 |
| Work Package activities | 0,34 | 2380000 |
| Invitations | 0,01 | 70000 |
| | | 7 000 000,00 € |

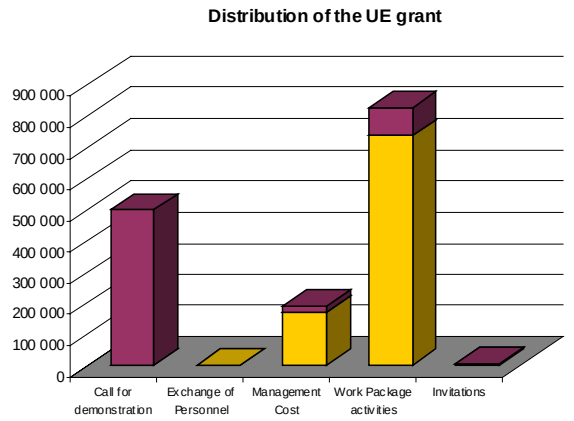
## EC grant distribution, end of Mar08

Received for the 1st 18 months: 2,50 M€

Total distributed: 952,8 k€

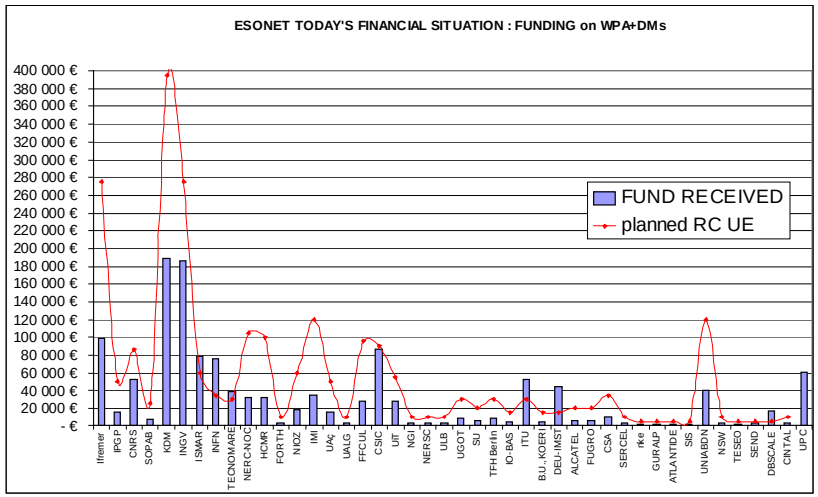
- WP activities first advance: 706 k€
- Management: 170 k€
- Complement for specific activities 59 k€
  - All regions workshop: 32,6 k€
  - Best practices Workshop: 15,7 k€
  - Invitations: 4 k€
  - Other 26,5 k€

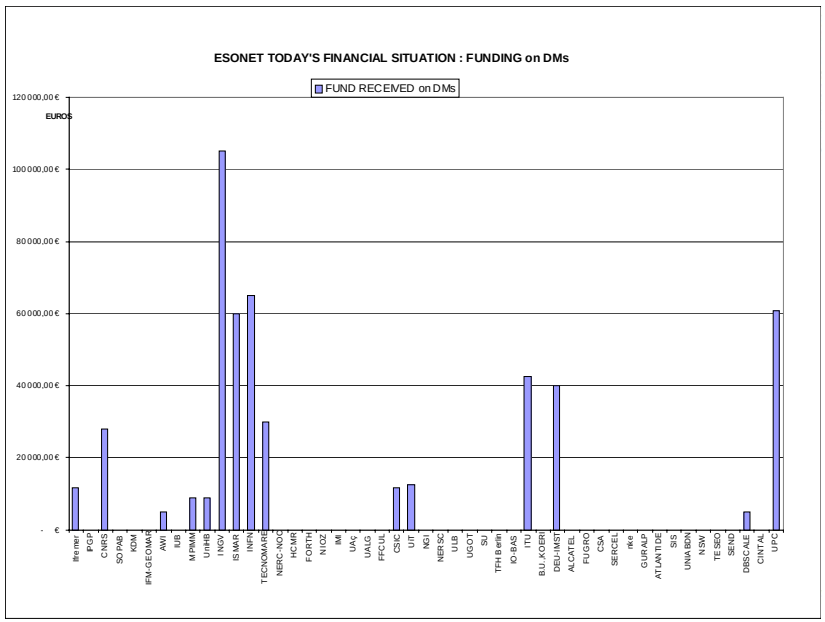
## 2 /DISTRIBUTION OF the EC grant




UE GRANT: 2,5 M€

TOTAL DISTRIBUTED : 1 512 756,35 €




# FUNDING on DMs

- DM funding :

Voted = 1 800 k€

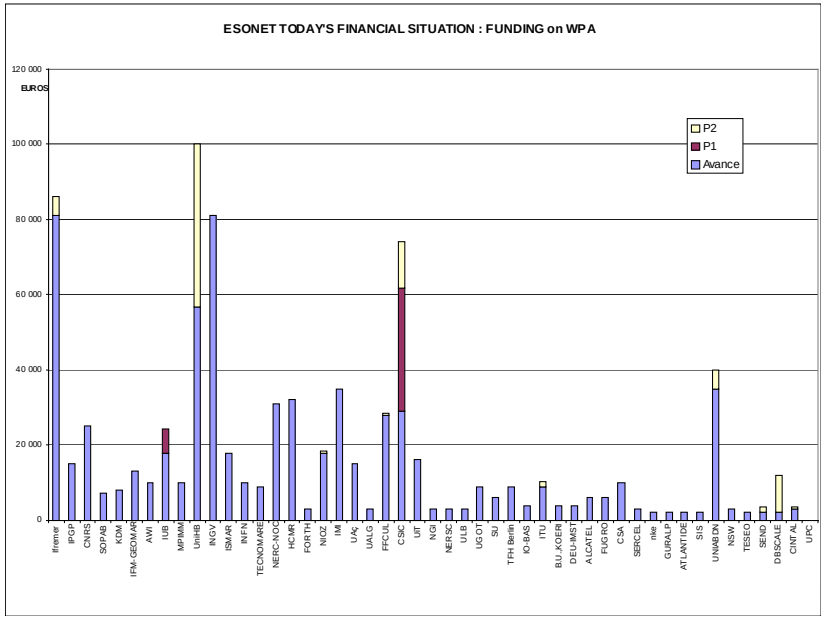
distributed = 496 k€

| | Voted (SC) | Distributed T2 - 2008 | Distributed T3 - 2008 |
|---|---|---|---|
| MOMAR | ***500 000*** | | |
| MARMARA | ***500 000*** | 125 000 | 77 500 |
| LIDO | ***500 000*** | | 248 000 |
| LOOME | ***300 000*** | 23 500 | 22 000 |

# FUNDING on WPA

- TOTAL funding : 824 415,13 €

| | |
|---|---|
| All region workshop : | 32,6 k€ |
| Best practices workshop : | 15,7 K€ |
| Invitations : | 4,3 k€ |




# FUNDING on WP8 Coordination

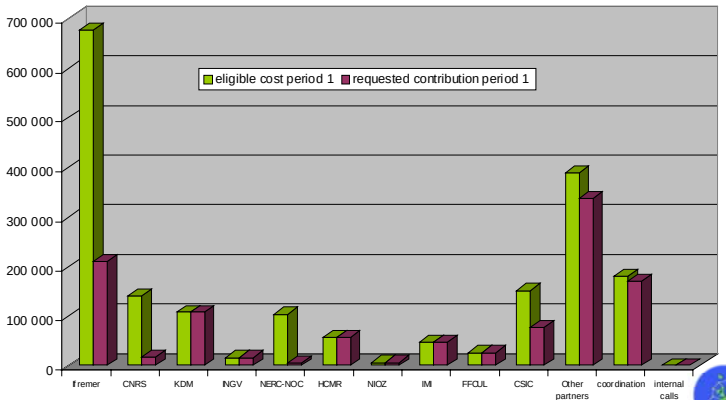
- WP8 funding : 188 k€

| | *P1* | *P2* |
|---|---|---|
| IFREMER | 170 000,00 € | |
| UGOT | | 6 000,00 € |
| ITU | | 6 000,00 € |
| ALCATEL | | 6 000,00 € |
| | 170 000,00 € | 18 000,00 € |

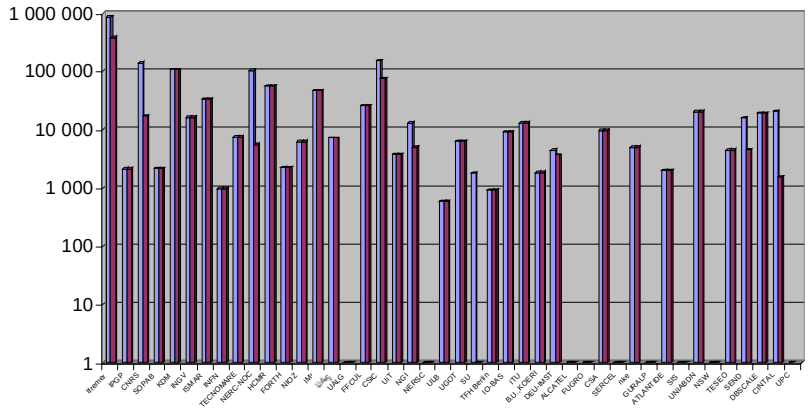
- 170 k€ : IFREMER for Coordination TASKS as voted in CA
- UGOT ITU ALCATEL : 6000 € each for integration SC in march 08

# FIRST YEAR REPORTING
## TO THE UE COMMISSION

TOTAL OF ELIGIBLE COSTS : 1 719 130,18 €  Total of the requested contribution : 903 695 € (52,5 %)




**REPORTING PERIOD 1**



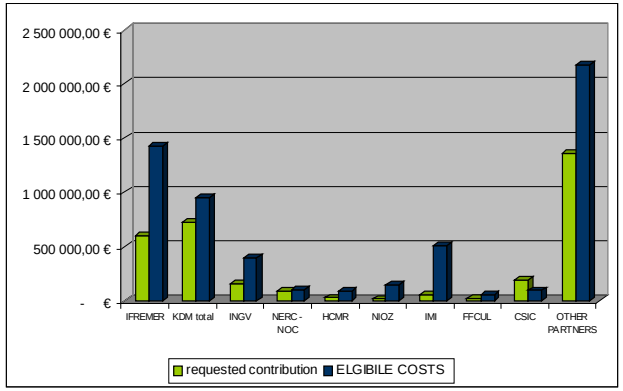
Received for the 1st 18 months: 2,50 M€

Total distributed: 952,8 k€

- WP activities first advance: 706 k€
- Management: 170 k€
- Complement for specific activities 59 k€
  - All regions workshop: 32,6 k€
  - Best practices Workshop: 15,7 k€
  - Invitations: 4 k€
  - Other 26,5 k€

## FINANCIAL PLAN Period 2

• TOTAL ELGIBILE COSTS & REQUESTED CONTRIBUTION

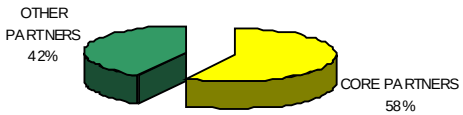



## FINANCIAL PLAN Period 2

• TOTAL ELIGIBLE COSTS :

| requested contribution | ELIGIBLE COSTS | |
|---|---|---|
| 1 861 956,99 € | 3 758 872,12 € | CORE PARTNERS |
| 1 358 039,91 € | 2 172 370,00 € | OTHER PARTNERS |
| 3 219 996,90 € | 5 931 242,12 € | TOTAL |

• REQUESTED CONTRIBUTION




## FINANCIAL PLAN Period 2

• Internal calls

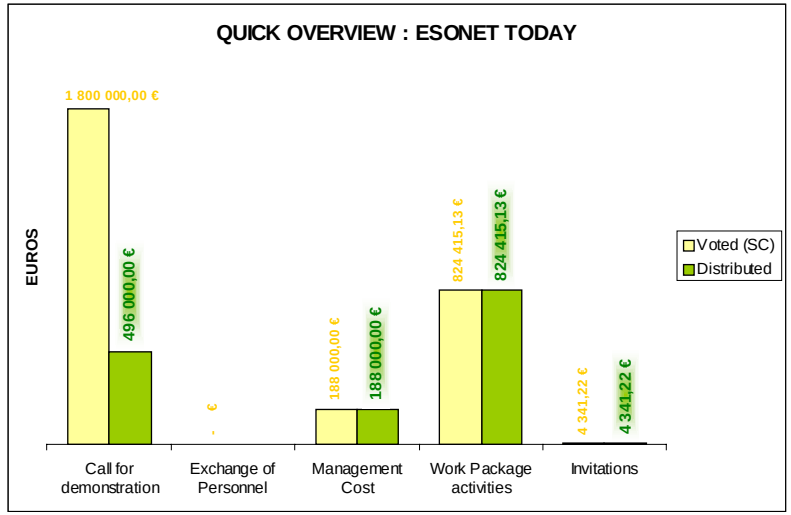
- voted in January 2008 : 1,8 M€
- distributed during P2 : 1 644 000 €
- remind : 496 000 € already distributed
- BALANCE : 1 M€ to be voted for next internal calls

# CONCLUSION

MAIN CONCLUSION :

CONGRATULATIONS :
NO DEFICIT
CASH BALANCE is > 0 !

Financial scheme is corresponding to budget estimates relating to the DoW with a drift for DMs and Exchange of personnel (linked to the DMs real development)




# Next fund transfers: SC meeting of Monday

Decision 1: Partners with small EC grant, that have justified Zero € or less than the grant received are requested to increase their activity in order to fully justify their first advance attribution before the second reporting.

Decision 2: remaining budget for those who did not spent their 1st advance grant will be deduced from the second period paiment.

Information: A complementary fund attribution for activies until end of 2008 is in decision in SC for a total of 80% x 1,06 M€ =0,85 M€

# Approvals

- A1: JPA
- A2: done
- A3: Done
- A4: done
- A7: SIS
- A8: PESOS/SEND

- Discussions: A6 and A9

Many Many Thanks!!!!

# ANNEX A2
# Amendments of the ESONET Contract

EUROPEAN COMMISSION
RESEARCH DIRECTORATE-GENERAL
Directorate I Environment
**Director**

Brussels, D/597116 13 -01- 2009

INSTITUT FRANCAIS DE RECHERCHE
POUR L'EXPLOITATION DE LA MER 155
rue Jean Jacques Rousseau ISSY-LES-
MOULINEAUX 92138 FRANCE

**REGISTERED WITH ACKNOWLEDGEMENT OF RECEIPT**

**Subject: Amendment N° 2 to Contract N° GOCE-036851 Project "European Seas Observatory NETwork" (ESONET)**
Your letters requesting amendment dated 10/09/2008 and 10/10/2008
Reference: 07/1216510/BF

Dear Mr. Person,

With reference to the above letters, this is to inform you that the Commission agrees to your request to modify the contract as follows:

***Transfer of contractual rights and obligations***

**ALTRAN TECHNOLOGIES,** established in 58 BOULEVARD Gouvion Saint-Cyr, PARIS, France represented by Yves DE CHAISEMARTIN, CEO, and/or Gwenael RENARD, or their authorised representative has taken over the rights and obligations of **ALTLANTIDE SAS** as of 29th December 2006.
Any reference in the contract, including Annex I and the table of the estimated breakdown of costs, to **ALTLANTIDE SAS** shall be deemed to be a reference to **ALTRAN TECHNOLOGIES** therefore **ALTRAN TECHNOLOGIES** is a member of the consortium identified in Article 1.2.

Notwithstanding the transfer referred to above, the Commission and/or the Court of Auditors of the European Communities and their authorised representatives shall continue to enjoy the rights referred to in Article 29 of Annex II to the contract in respect of work undertaken by **ALTLANTIDE SAS** which shall continue to be bound by all these provisions of the contract and its Annexes relevant to the effective exercise of these rights.

***Addition or removal of one or more special clauses***

The special clause set out in Article 9 is **modified** as follows:

| No | Text of Special Clause |
|---|---|
| 23 | Special clause 23.<br><br>1. The *contractor* CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE represents also the following members of GEOSCIENCES AZUR UMR 6526 (referred to in this special clause as "*member(s)*")<br><br>- UNIVERSITE DE NICE SOPHIA ANTIPOLIS - UNIVERSITE PIERRE ET MARIE CURIE PARIS VI - INSTITUT DE RECHERCHE POUR LE DEVELOPPEMENT (IRD).<br><br>The *contractor* CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE represents also the following members of LABORATOIRE D'OCEANOGRAPHIE DE VILLEFRANCHE UMR 7093 (referred to in this special clause as "*member(s)*")<br><br>- UNIVERSITE PIERRE ET MARIE CURIE PARIS VI.<br><br>The *contractor* CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE represents also the following members of CENTRE DE PHYSIQUE DES PARTICULES DE MARSEILLE (CPPM) UMR 6550 (referred to in this special clause as "*member(s)*")<br><br>- UNIVERSITE DE LA MEDITERRANEE AIX-MARSEILLE 2.<br><br>The *contractor* CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE represents also the following members of INSTITUT UNIVERSITAIRE EUROPEEN DE LA MER (IUEM) FR 2195 (referred to in this special clause as "*member(s)*")<br><br>- UNIVERSITE DE BRETAGNE OCCIDENTALE DE BREST.<br><br>The *contractor* CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE represents also the following members of CENTRE EUROPEEN DE RECHERCHE ET D'ENSEIGNEMENT DE GEOSCIENCES DE L'ENVIRONNEMENT (CEREGE) UMR 6635 (referred to in this special clause as "*member(s)*")<br><br>- UNIVERSITE PAUL CEZANNE AIX-MARSEILLE 3 - UNIVERSITE DE PROVENCE AIX-MARSEILLE 1 - INSTITUT DE RECHERCHE POUR LE DEVELOPPEMENT (IRD).<br><br>The *contractor* CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE represents also the following members of LABORATOIRE DE MICROBIOLOGIE, GEOCHIMIE ET ECOLOGIE MARINES (LMGEM) UMR 6117 (referred to in this special clause as "*member(s)*")<br><br>- UNIVERSITE DE LA MEDITERRANEE AIX-MARSEILLE 2.<br><br>The *contractor* KONSORTIUM DEUTSCHE MEERESFORSCHUNG e.V. represents also its *members* (referred to in this special clause as "*members*")<br><br>The *contractor* CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS represents also its *members* (referred to in this special clause as "*members*")<br><br>2. The *contractor* may charge costs incurred by the *members* in carrying out |

| | |
|---|---|
| | the project, in accordance with the provisions of the *contract*. These costs shall not be considered as receipts of the *project*.<br><br>The *members* shall identify the costs to the *project* in accordance with the provisions of part B of the *contract*. Each *member* shall apply a cost reporting model in accordance with the principles established in articles II.19, II.20 and II.21. The *contractor* shall provide to the *Commission* :<br><br>- an individual financial statement from each *member* in the format specified in Form C. These costs shall not be included in the *contractor's* Form C<br><br>- an audit certificate from each *member* in accordance with the relevant provisions of this *contract*<br><br>- a summary financial report consolidating the sum of the eligible costs borne by each *member* and the *contractor*, as stated in their individual financial statements, shall be appended to the *contractor's* Form C.<br><br>When submitting reports referred to in Article II.7, the *consortium* shall identify work performed and resources deployed by each *member*.<br><br>3. The eligibility of the *member*'s costs charged by the *contractor* is subject to controls and audits of the members, in accordance with Article II.29.<br><br>4. The *contractor* shall retain sole responsibility toward the *Community* and the other *contractors* for its *members*. The *contractor* shall ensure that the *members* abide by the provisions of the *contract*. |

as from 01/03/2007.

***Modification of Annex I***

The revised Annex I dated 9th October 2008 attached to your letter requesting the amendment referred to in the subject line replaces any former version.

All other provisions of the contract and its annexes remain unchanged.

The amendment comes into force upon the date of acceptance by the Commission of the modifications with effect from that date unless otherwise specified in each of the individual modification requested.

Please acknowledge receipt and inform your partners of the contents of this letter.

Yours sincerely,

12 -01- 2009

M. Soares

COMMISSION DES COMMUNAUTES EUROPEENNES - Direction Générale de la Recherche

Cc: Maria Di Francesco CDMA 3/077; Eduardo Carqueijero CDMA 3/171

EUROPEAN COMMISSION
RESEARCH DIRECTORATE-GENERAL

Directorate I Environment
**Director**

Brussels, 14 -04- 2008

D/525160

IFREMER
155, Rue Jean Jacques Rousseau
Att. Monsieur Jacques Serris

F-92138 ISSY-les-MOULINEAUX (France)



**REGISTERED WITH ACKNOWLEDGEMENT OF RECEIPT**

**Subject:** Amendment N° 1 to Contract N° GOCE-036851
Project "European Seas Observatory NETwork" (ESONET)
Your letter requesting amendment dated 20 March 2008
Ref. 07/1216510/BF

Dear Mr. Serris,

With reference to the above letter, this is to inform you that the Commission agrees to your request to modify the contract as follows:

***Addition or removal of one or more special clauses***

The special clause

| No | Text of Special Clause |
|---|---|
| 39 | Special clause 39.<br><br>Notwithstanding the provisions of Article 7.2 of this contract, contractors requesting a Community financial contribution for one or more reporting periods of less than 150,000 EUR, need not submit an audit certificate, until the cumulative request for Community financial contribution is equal to or exceeds 150,000 EUR for the reporting periods for which an audit certificate has not yet been submitted. In all cases an audit certificate shall be submitted at the latest 45 days after the final reporting period. This final audit certificate shall cover all period/s for which an audit certificate has not been previously submitted. |

is added to Article 9 of this contract.

All other provisions of the contract and its annexes remain unchanged.



Commission européenne, B-1049 Bruxelles / Europese Commissie, B-1049 Brussel - Belgium. Telephone: +32 (0) 2 299 11 11
Financial Officer Tel. +3222998964

The amendment comes into force upon the date of acceptance by the Commission of the modifications with effect from that date unless otherwise specified in each of the individual modification requested.

Please acknowledge receipt and inform your partners of the contents of this letter.

Yours sincerely,

14 -04- 2008

M. Soares

COMMISSION DES COMMUNAUTÉS EUROPÉENNES - Direction Générale de la Recherche

Cc: Pascal Le Grand, CDMA 03/173 , Maria Di Francesco, CDMA 03/77

# ANNEX A3
# Cancellation of SIS

Roland Person
ESONET NoE Coordinator
Ifremer
TSI (Technologie des Systèmes Instrumentaux)
BP 70 29280 Plouzané
France
fax:+33.2.98.22.46.50
esonet-coordinator@ifremer.fr

Mr Rainer Maassen
SiS Sensoren Instrumente System GmbH
Mühlenkoppel 12
D-24222 Schwentinental
Germany

Brest, Friday 29th August 2008

Dear Rainer,

We sent you an e-mail on June 3rd 2008 requesting to validate the annual report and the table 5 for SIS that we prepared with elements we had. Without answer from you, we included these two contributions in the yearly management report.

We asked you also to fill in and sign the form C and suggested you to fill it in with all the costs to zero euros if it was easier for you in this recovery period, knowing that your costs could be reported on the next year. Despite a new phone contact with Ingrid Puillat in June, where you promised to send us the form C within two days, we received nothing.
The European Commission is requiring again this form C.

If we did not receive the signed form C within the next ten days, we will be obliged to notify the European Commission of your failure and to exclude you from the project.

I hope you recovered a good health and to see you at the General Assembly next October.

Best regards,

Roland Person
ESONET NoE Coordinator

Roland Person
ESONET NoE Coordinator
Ifremer
TSI (Technologie des Systèmes Instrumentaux)
BP 70 29280 Plouzané
France
fax:+33.2.98.22.46.50
esonet-coordinator@ifremer.fr

Mr Rainer Maassen
SiS Sensoren Instrumente System GmbH
Mühlenkoppel 12
D-24222 Schwentinental
Germany

Brest, Thursday 18th September 2008

Dear Sir,

You received on September 1st, by UPS, a letter asking you to provide us, before September 10th, with missing documents, in particular signed form C, for justification to the European Commission of your participation in ESONET during the first year of the contract.

At this day, we received no answer to this inquiry.

Accordingly, as indicated in the letter you received on September 1st , we pass to the European Commission a request for canceling your participation to ESONET. This request will be approved by the Steering Committee of ESONET.

Yours Sincerely,

Roland Person
ESONET NoE Coordinator

Copy: European Commission – Pascal LE GRAND

## APPROVAL RESULTS

| | |
|---|---|
| **Meeting** | **General Assembly** |
| **Date/time** | **Thursday 23 October – 10H00/13H00** |
| **Place** | **University of Algarve – FARO - Portugal**<br>**Amphitheatre T. Gamito** |

| | | | **Unanimously approved** |
|---|---|---|---|
| **Approval #1** | Approval new Joint Programme Activities including – JPA – (including list of deliverables) | *See DoW on www.esonet-emso.org* | Yes |
| **Approval #2** | Henry Rulh is replacing Christian Berndt as WP3 leader. He arrived at NOCS in July 2008 | | Yes |
| **Approval #3** | S. Pouliquen (IFREMER) is replaced with G. Maudire (IFREMER) as new chairperson of the data management council (DMC) | | Yes |
| **Approval #4** | Amendments of the ESONET contract – special clauses 23 and 39 | | Yes |
| **Approval #7** | Cancellation of SIS participation | | Yes |
| **Approval #8** | Alcatel is replaced with SEND as new representative member of the PESOS group | | Yes |

Roland Person
ESONET NoE Coordinator
Ifremer
BP 70 29280 Plouzané
France
Tel : +33.2.98.22.40.96
Fax : +33.2.98.22.46.50
Esonet-coordinator@ifremer.fr

Mr Rainer Maassen
SIS Sensoren Instrumente System GmbH
Mühlenkoppel 12
D-24222 Schwentinental
Germany

Brest, Monday 26th January 2009

Dear Rainer

We are contacting you regarding our letters dated 29 August 2008 and 18 September 2008 in which we asked you to provide us some missing documents. At this day, as no reports were sent to us nor to the European Commission, this matter was at the agenda of the General Assembly. The cancellation of your company from the ESONET Project participation was unanimously approved by the General Assembly which was held in 22-23 October 2008 at Faro in Portugal.

Your Sincerely,

Roland Person
ESONET NoE Coordinator


ESONET Council Meetings

# IV. ESONET Council Meetings

# ESONET Council Meetings
# Friday October 24th, 2008, Faro - Portugal

## 1. Introduction- Executive summaries

| | Recommendations by DMC | Actions |
|---|---|---|
| 1 | A document on the cooperation between EuroSites, SeaDataNet and ESONET (about 1 or 2 pages long and including one figure) must be written.<br>It is suggested to organise a meeting in spring 2009, maybe jointly with the Steering Committee, to progress on these two documents. | |
| | **Recommendations by TOC** | |
| 2 | It is decided to get information on the test and operation aspects by all the (running and future) DMs (safety and marine operation procedures, and test and calibration procedures before and after going to sea).<br>For the running ones, Laura Beranzoli can collect information on the sea operation for the TOC through submission of a plan and land tests and marine procedures by the DM coordinators, as part of the implementation plan. For the future DMs, Laura Beranzoli suggests to include a compulsory deliverable for the 2nd call to document these procedures. | INGV<br>Laura Beranzoli |
| 3 | It is suggested that the TOC Chairman should send an official letter to the DM coordinators urging them to write test and marine procedures. | TOC Chairman |
| 4 | It is suggested to test the concepts of interoperability and sensor standardisation aspects with Mbari and NEPTUNE Canada. | |
| 5 | The TOC council recommends all partners to answer the call to fill the facility register in order to have a vision of our networking capability on practical technical aspects involving metrology.<br>TOC recommends building up procedures that are not too heavy. | All partners |
| 6 | There is a need to establish and enlarge the collaboration between the ESONET community and other non-European observatory initiatives. TOC wants to be informed of MoUs or co-operations that are ongoing or in preparation. | All partners |
| | **Recommendations by SC** | |
| 7 | It was recommended that projects complementary to existing demonstrations should be promoted for all disciplines to be represented in the demonstration mission portfolio. | |
| 8 | It was agreed it would be advantageous to continuously update and revise the report on Science Objectives each | |

| | | |
|---|---|---|
| | year. | |
| 9 | The strategy of identifying scientific opportunities using both cabled and non-cabled systems was commended. | |
| 10 | It was agreed that the standard list of instruments presented at the meeting and comprising more than 12 sensors was not what was required. It was agreed that this list should be reduced to *circa* 5 key measurements with good reliable sensors (CTD plus). It was noted that this should be similar to the Oceansites minimal list of sensors. | |
| 11 | It was suggested that rather than producing global surveys, ESONET should maybe solicit small proposals for experiments or sensor packages, more like IODP drilling proposals.<br>It was commented that in many proposals the technical requirements were not explicit (sensors, data rates, power, etc). Therefore it is not possible to assess the feasibility of the science. | |

Reference documents are in Appendices B.

## 2. Data Management Council meeting minutes

| | |
|---|---|
| MEETING | DATA AND MANAGEMENT COUNCIL (DMC) |
| DATE/TIME | THURSDAY 23 OCTOBER 2008 – 14H00/16H00 |

| AGENDA |
|---|
| JOINT MEETING ON DATA MANAGEMENT INVOLVING ESONET, EUROSITES, SEADATANET PROJECTS |
| 1. Presentation of projects |
| 2. Status after Bremen workshop |
| 3. Specific discussions<br>SENSOR ML<br>SOS protocol<br>Data policy<br>Quality control<br>Data portal |
| 4. Expected results<br>Joint programme of activities<br>Agenda of action |
| 5. Exchange of Personnel for Data Management |
| **Data Management Council** |
| 1. Debriefing of running demonstration missions |
| 2. Next call for demonstration missions |
| 3. Recommendations for the next year and participations |

This meeting was extended to non-DMC members, with the invitation of EuroSites and SeadataNet representatives. Indeed, one of the meeting objectives was to build collaborations between the 3 projects, on common topics.
Consequently the list of attendees differs from the DMC members list:

| LIST OF ATTENDEES | |
|---|---|
| **Name** | **Institute** |
| Stéphane Pesant | CNRS/LOV |
| Christian Curtil | CNRS/CPPM |
| Luis Matias | CGUL/IDL |
| Michel André | CSIC/UPC |
| Ingrid Puillat | IFREMER |
| Giudita Marinaro | INGV |
| Gilbert Maudire | IFREMER |
| Maureen Pagnani | NOCS |
| Anne Holfort | UNIABDN |
| Michael Diepenbroek | UNIHB |

### 2.1 Linkage to Demonstration Sites

*EuroSites*
Data access restriction is a real topic. Is a moratorium necessary for EuroSites data? At least, user registration for analysis of usage (usage accountings) will be strongly encouraged because it is necessary for reporting to the EU Commission, which funds the project.
Data access is done via Coriolis in "OceanSite" format, which is delimited text. IFREMER is setting up SOS standardised web services and corresponding functionalities (planned for mid-2009, please refer to figure 2).

*LIDO (Catania)*
The Sensor Web Enablement (SWE) concept (please refer to Fig. 1) and related standards will be considered during the Demo Mission. Data have been analysed on samples recorded in previous deployment, and the analysis codes developed accordingly. The codes will be ready in spring 2009. Once the observatory is deployed, raw data will be streamed from four channels to local servers for RT analysis: sea noise will be discarded (except for low frequency components which would be of use in oceanography) and the resulting acoustic events will be RT classified into different categories (Biological, e.g. dolphins, whales, etc.; Natural, e.g. seismic events, etc.; Artificial, e.g. shipping, etc.), stored locally and made available to third parties (registered users only).
Raw data from one channel will be compressed and stored.
One channel will also be dedicated to real-time public access in mp3 format. A sound library will allow the public to go back in time to stored events with interesting acoustic information.
Statistical analyses will be extracted from time series and made immediately available to the public. The development of the RT acoustic data management is modular, allowing its adaptation and implementation in other interested observatories, thus aiming at the standardisation of the analysis and comparison of time series.
Tools might be propagated for wider usage in ESONET geophysics.
Seismometer, pressure sensor, hydrophones data are integrated in the Italian centre for earthquakes (INGV). It could be useful as complementary data for multivariate analysis, etc…

*Marmara*
Some data might be shifted to IFREMER, most of it remaining in Turkey. Nevertheless, no interfacing with ESONET has been planned so far.
New sensors are under development. Due to these new developments, the quality of data is not known up to now and data inspection is necessary prior to its dissemination to a wider public.

### 2.2 Sensor registry

Metadata will be recorded as SensorML via Sensor registry. Tests are done for Eurosites, LIDO, Antares within the ESOReg project. Some Demonstration Missions and Eurosites have been involved in the design. Sensor registry provides the following functionalities: new records, editing, downloading records…

### 2.3 QA/QC

Frequent praxis, development of sensors and QA/QC have to be developed with the operation of the sensor. Different levels of development are required. Procedures for "certified" (ESONET label) sensors need to be related to sensor registry records. Scientists need to be included in the elaboration of QA/QC. Sampling flagging of quality on single data values (Argo 1-9 scale) should be applied to as many data types as possible. Some newer sensors are supplying routines for crosschecking. This must be recorded in the sensor registry (part of the QA/QC procedures applied).

### 2.4 Next steps

A data management protocol and moratorium should be established for ESONET. A document on the cooperation between EuroSites, SeaDataNet and ESONET (about 1 or 2 pages long and including one figure) must also be written.
It is suggested to organise a meeting in spring 2009, maybe jointly with the Steering Committee, to progress on these two documents. Moreover, it is necessary to keep close to the work that has to be done in Demonstration Missions and EuroSites and SeaDataNet. It was suggested that the modular development of the acoustic data management in LIDO could be implemented in other observatories.
The progressive implementation of international standards (ISO metadata, SensorML, SWE (O&M, SOS)) must be planned (please refer to figure 3 for a provisional agenda).

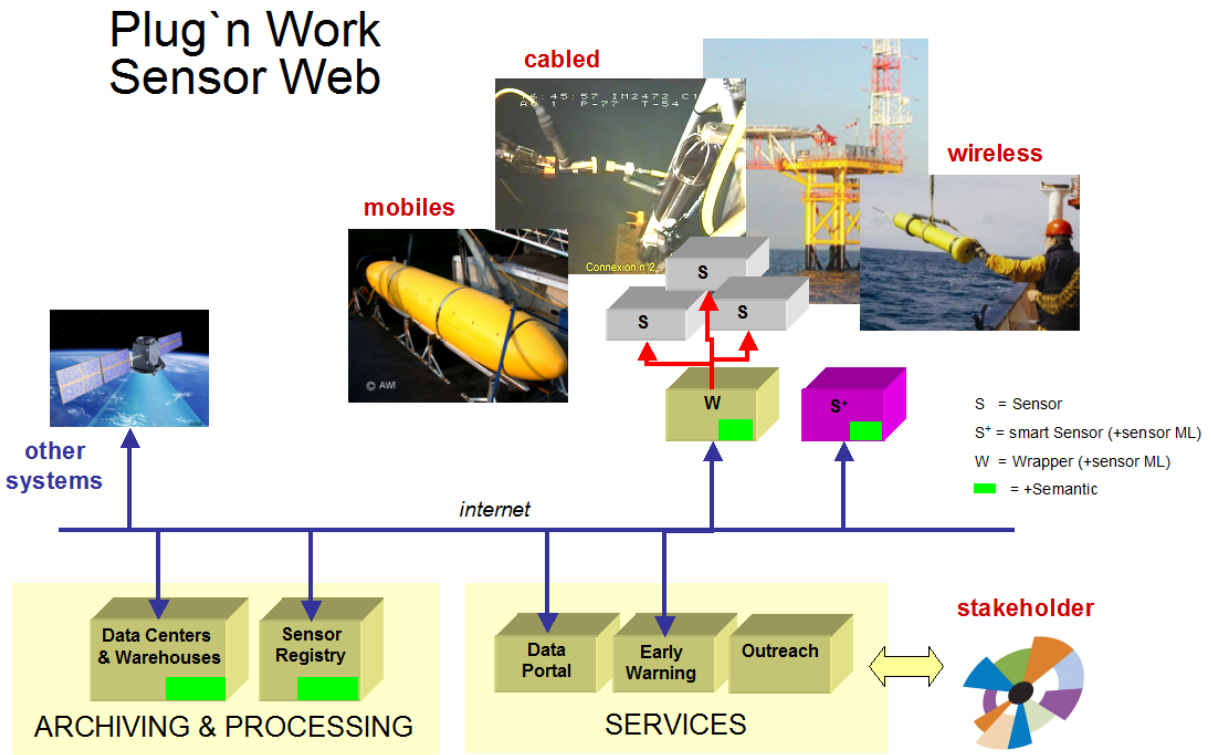



Figure 1: Plug'n Work Sensor Web

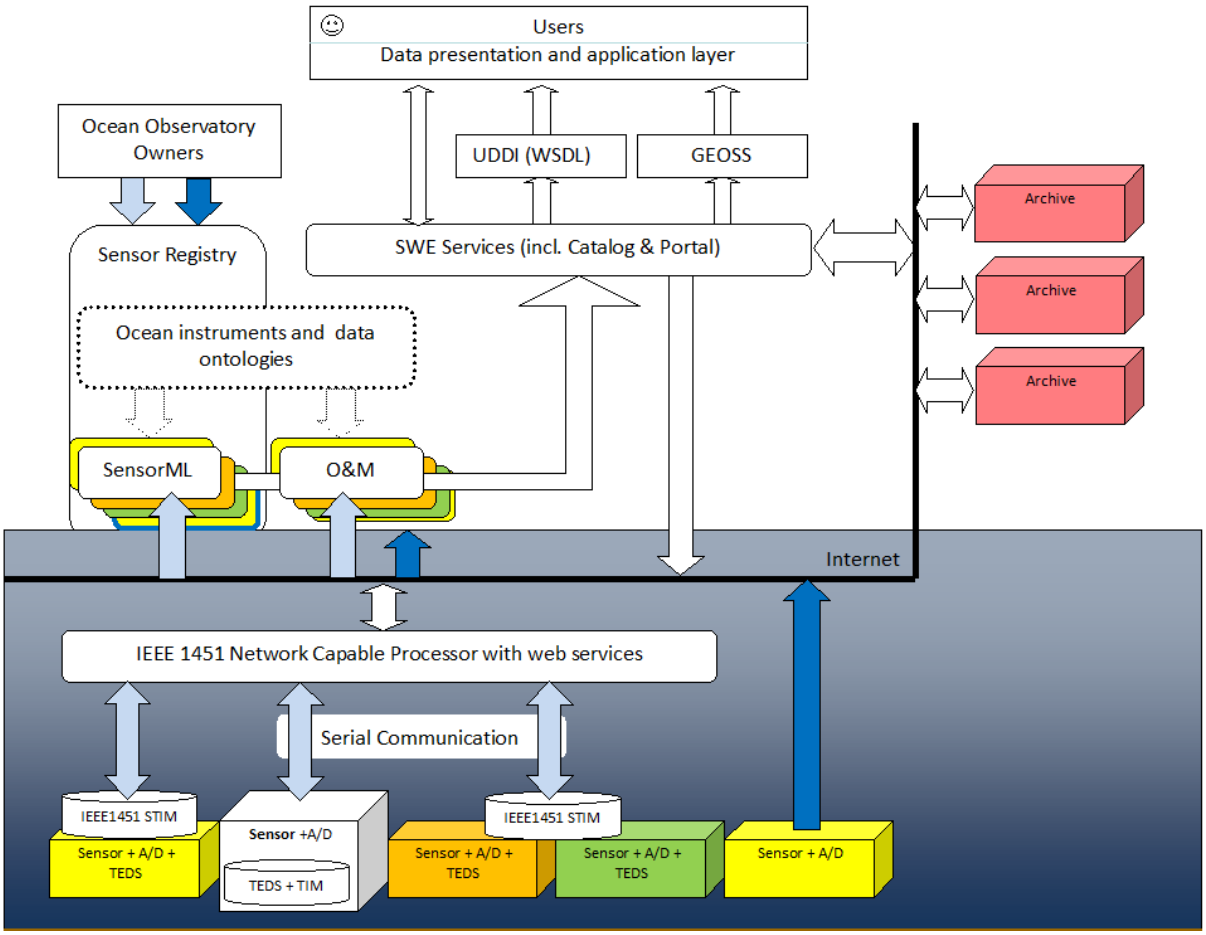



Figure 2: Planned architecture of Eurosites data management at IFREMER

| **Targeted schedule for routine work** | **From sensor to data centre** | **Data discovery** | **Data visualisation** | **Data access** |
|---|---|---|---|---|
| **Up to now** | **ISO 19115** family: description of cruises (CSR), of networks of permanent observatories (EDIOS), …Common vocabularies (SKOS) | **ISO 19115** family: description of databases and data sets Common vocabularies (SKOS) | Non standard except for observation locations where **OGC – WMS** is used | **Data download: ftp, http** using standardised file format (ODV, NetCDF)except for interpolated data where **OpenDap** is used |
| **2008-2009** | | Interoperability between THREDDS and ISO 19115 family (for operational oceanography) | Extension of **OpenDap** to in-situ data (with data model from Dapper and/or Unidata and/or CSML) | Extension of **OpenDap** to in-situ data (with data model from Dapper and/or Unidata and/or CSML) |
| **2010-2011 (prototypes end of 2009)** | SensorML | | OGC-O&M models served by OGC SOS | OGC-O&M models served by OGC SOS OGC-WCS for massive interpolated data sets |

Figure 3: Planned implementation of standards

## 3. 1st Test and Operation Council (TOC) meeting minutes

| MEETING | TEST AND OPERATION COUNCIL (TOC) |
|---|---|
| DATE/TIME | THURSDAY 23 OCTOBER 2008 – 14H00/16H00 |
| AGENDA | |
| 1. Debriefing of running Demonstration Missions | |
| 2. Post-Bremen workshop | |
| 3. Underwater interventions | |
| 4. Sharing testing facilities | |
| 5. Collaboration with non-European observatory initiatives | |
| 6. Recommendations for the next year | |

The first meeting of TOC was held at the University of Algarve in Faro on October 23rd, 2008 (2:00-4:00 p.m.).

The composition of the TOC is the following:

| Test and Operation Council | |
|---|---|
| Chairperson | |
| Paolo Favali | INGV (IT) |
| **TOC Members** | |
| Phil Bagley | Univ. Aberdeen (UK) |
| Laura Beranzoli | INGV (IT) |
| Mathilde Cannat | IPGP (FR) |
| Jean-François Drogou | IFREMER (FR) |
| Hans Gerber | TFH Berlin (DE) |
| Per Hall | UGOT (SE) |
| Peter Linke | KDM (DE) |
| Antoni Manuel | UPC-CSIC (ES) |
| Jean Marvaldi | IFREMER (FR) |
| Glen Nolan | IMI (IE) |
| Christoph Waldmann | KDM (DE) |

The following people attended this meeting:

- Paolo Favali (PF);
- Laura Beranzoli (LB);
- Mathilde Cannat (MC);
- Jean-François Rolin (on behalf of Jean-François Drogou) (JR);
- Johannes Karstensen (on behalf of Peter Linke) (JK);
- Juanjo Dañobeita (on behalf of Antoni Manuel) (JD);
- Jean Marvaldi (JM);
- Christoph Waldmann (CW);
- Olivier Pot (IPGP-CNRS, as observer) (OP).

ESONET EC Officer Pascal Le Grand attended the meeting partly.

### 3.1 Debriefing of running demonstration missions

Reference was made to the presentations given in the General Assembly.

### 3.2 Post-Bremen workshop

CW suggested testing the concepts of interoperability and sensor standardisation aspects with Mbari and NEPTUNE Canada. TOC supports this idea of testing new interoperability concepts.

### 3.3 Underwater interventions

TOC members decided to discuss point 1 and 3 of the Agenda together, given the strict relationships between the activities (on-land for testing, and marine) planned in the Demonstration Missions (DMs) and the capability of underwater interventions.

The discussion especially focused on one important point: how to get information on the test and deployment/recovery procedures, with an emphasis on safety aspects, by the running DMs and the future missions, once approved after the evaluation procedures.

LB referred to the fact that four DMs are currently running and were presented at the General Assembly by the coordinators (or people representing them) on the previous day. The new call for other DMs was planned to be published by the end of October (28th).

The discussion was continued on aspects such as the shared use of ships, ROVs and other deployment tools, and the exchange of ship time. The importance of building ties between TOC and the Ocean Facilities Exchange Group (OFEG) was also recognised. JD, as an OFEG member, offered to act in terms of information between TOC and OFEG, and can warn the TOC and ESONET coordinators when there are ship opportunities (using the internal web pages). All TOC members stressed the importance of fast information circulation.
In the running DMs, some aspects have to be considered regarding the use of ships. The URANIA calendar was to be published at the end of the year to determine when Marmara is allocated ship time. An agreement was already reached among the LIDO partners to use *Sarmiento da Gamboa* for the re-deployment of GEOSTAR in the gulf of Cadiz. For the SN-1 re-deployment off Sicily, different possibilities are considered: the use of a cable ship as part of the MECMA Consortium, or again the use of *Sarmiento da Gamboa* taking advantage of its possible cruise in Tyrrhenian the following autumn, but difficulties derive from the cuts in the total budget of each DM. MOMAR is facing a one-year delay on the cruise.

JM suggested the need to have a document on deployment methods by the DM coordinators, containing safety and marine operation procedures, and test and calibration procedures before and after going to sea. At the stage of a DM submission, this document cannot include detailed technical aspects. But at a second stage, a questionnaire could be submitted to the successful DMs in order to get information: “how do you proceed?”

The TOC decides to get information on test and operation aspects from all the (running and future) DMs. For the running ones, LB can collect information on sea operations for the TOC through the submission of a plan on land tests and marine procedures by the DM coordinators, as part of the implementation plan. For the future DMs, LB suggested to include a compulsory deliverable for the 2nd call to document these procedures.

PF stressed the fact that these procedures can constitute the basis of a common methodological approach useful to harmonise activities among different groups. JD commented that this is good for the constitution of a future community; JK said that having clear written procedures can help people to use the same method, as they did in ANIMATE.

MC suggested that the TOC Chairman should send an official letter to the DM coordinators, pushing them to write the test and marine procedures they intend to follow, and endorsing the TOC’s aim to experiment the process of helping them in testing and marine activities. TOC members agreed.

### 3.4 Sharing testing facilities

JM explained the initiative to build an on-line testing facility register aiming to have - as much as possible - a complete inventory of the available European facilities with information on the on-shore and off-shore (coastal and deep sea) test facilities. JM also explained the kind of contribution required from all partners to fill in the tables, including one reference person plus preferably an alternate for each partner with testing capacities. To date we got only four replies.

The TOC council recommends all partners to answer to the call to fill in the facility register in order to be able to view our networking capability on practical technical aspects involving metrology.

For test procedures, documents have to be prepared, according to ESONET vocabulary, and made available to all the partners. JD highlighted that calibration is a key point to allow an actual inter-comparison among measurements acquired in different sites.
The TOC recommended to build up procedures that are not too heavy.

### 3.5 Collaboration with non-European observatory initiatives

The TOC recognises the need to establish and extend the collaboration between the ESONET community and other non-European observatory initiatives, such as NEPTUNE in the USA and Canada or DONET, managed by JAMSTEC in Japan. A general MoU should be the solution. In this respect, the TOC is aware that, at this stage, ESONET cannot directly sign an official MoU. But an agreement can be signed by ESONET partners, for instance the MoU between IFREMER and NEPTUNE Canada, or the agreement almost finalised between INGV and JAMSTEC. The TOC wants to be informed of the MoUs or cooperations that are ongoing or in preparation.

### 3.6 Recommendations for the next year

The role of the council is to help the partners. There is a need to be in closer contact with the DMs and then to be useful in the specific items the TOC is in charge of.

The TOC meeting ended at 4:00 p.m.

## 4. Scientific Council meeting minutes

| MEETING | SCIENTIFIC COUNCIL (SC) |
|---|---|
| DATE/TIME | THURSDAY 23 OCTOBER 2008 – 14H00/16H00 |
| AGENDA | |
| 1. Debriefing of running demonstration missions | |
| 2. Next call for demonstration missions | |
| 3. Debriefing of WP3 reports (Scientific Objectives, scientific packages) WP3 report | |
| 4. Debriefing of ESONET standard instruments and scientific objectives survey | |
| 5. Preparation of the VISO workshop | |
| 6. Collaboration with other European observatory initiatives | |
| 7. Collaboration with non-European observatory initiatives | |
| 8. Recommendations for the next year and participations | |

The first meeting of the Scientific Council was held at the University of Algarve in Faro on October 23rd, 2008 (2:30-4:00 p.m.).

The composition of the Scientific Council is the following:

| Scientific Council | |
|---|---|
| Chairperson | |
| Monty Priede | University of Aberdeen |
| **Scientific Council Memberships** | |
| Antje Boetius | KDM (De) |
| Louis Geli | IFREMER (Fr) |
| Pierre Henri | CNRS (Cerege) (Fr) |
| Richard Lampitt | NOCS (GB) |
| Jorge Miguel Miranda | Univ Lisboa (PT) |
| Juergen Mienhert | Univ Tromsoe (NO) |
| Tjeerd Van Weering | NIOZ (NL) |
| Nevio Zitellini | ISMAR (IT) |
| Ana Colaco | Univ Azores (PT) |
| Albert Palauques | CSIC (ES) |
| Domenico Giardinia | ETH (ES) |

Antje Boetius, Juergen Mienert (deputy Benedicte Ferré) and Tjeerd Van Weering (deputy Jens Greinert NIOZ) were excused.

However there had been some confusion at the on-line registration, therefore the following participants had registered including non-members of the Scientific Council.

At this meeting the following people attended:

- Stéphane Pesant CNRS-LOV
- Juanjo Dabobeitia CSIC
- Luis Matias FFCUL
- Anastasios Tselepides HCMR
- Roland Person IFREMER
- Johannes Karstensen IFM-GEOMAR
- Namik Cagatay ITU
- Richard Lampitt NOCS *
- Klaus Scheisiek SEND
- Ana Colaço Uac *
- Benedicte Ferré UiT*
- Christoph Walmann UNIHB *

* Scientific Council members or deputies

In view of this, it was decided to invite all of those interested in attending the Council:

**Actual Attendees**

- **Monty Priede** **UNIABDN GB ***
- Jaume Piera CSIC ES
- Anastasios Tselepides U of Piraeus GR
- **Nevio Zitellini** **ISMAR-CNR IT ***
- Henry Ruhl NOCS GB
- Fiona Grant Marine Institute- Ireland
- Jens Greinert NIOZ – NL *
- **Ana Colaco** **Uac. PT***
- Benedicte Ferré UiT- NO *
- Vasilios Lykousis HCMR GR
- Namik Çagatay ITU TY
- **Louis Geli** **IFREMER FR***
- Ricardo Silva Jacinto IFREMER FR
- Dominique Lefevre CNRS LMGEM FR
- **Richard Lampitt** **NOCS GB ***

* Scientific Council members or deputies

**Definitive Scientific Council members are in bold**
Pascal Legrand from the European Commission attended part of the meeting.

### 4.1 Membership and function of the Council

The chairman pointed out that according to Appendix 1 of the ESONET Contract (Description Of Work):

(a) The Scientific Council (SC) consists of experts proposed by the Strategic Committee and approved by the General Assembly.

(b) The SC advises the Assembly, the Strategic Committee (through the Steering Committee), the Steering Committee and the coordinator of the network's scientific orientations and JPA implementation, especially for WP1, WP3 and WP4.

It was agreed that, as a temporary measure:

(a) Members can appoint substitutes or deputies
(a) Observers can attend at the discretion of the chairman and members.

The meeting therefore proceeded in the presence of 5 SC members, 2 deputies and 8 observers.

The next Strategic Committee should consider the composition of the Scientific Council and make suggestions at the next General Assembly. It is assumed that rules regarding deputies and observers should also be approved at the next General Assembly.

The Coordinator requested the following items to be considered by the SC.

### 4.2 Debriefing of running demonstration missions

The SC discussed the comments of the European Commission programme reviewers according to which the 4 approved demonstration missions are biased towards geosciences. There was a disagreement with this statement: LIDO, for example, is recording bio-acoustics; LOOME will image biological phenomena; and MOMAR will image vent organisms. However, it was acknowledged that no data related to photosynthetic biological production, or the fate of organic matter, is being recorded.

The discussion moved on to individual projects:

## LIDO - Listening to the Deep-Ocean Environment

The SC welcomed the fact that live data on acoustics are appearing on the website and are very well presented. However, it is disappointing that they are not provided in the ESONET NoE style and, as yet, are not accessible from the ESONET portal. The fact that two of ESONET sites - East Sicily & Cadiz - are to be instrumented is a strength. Some members commented that the science objectives and outputs are not yet clear. It is felt that this project has made a good start.

## LOOME (Long-Term Observations on Mud Volcano Eruptions)

The SC welcomed the fact that the first part of the equipment was deployed on the Haakon Mosby mud volcano. The experiment is well-designed and the SC looks forward to seeing the results. This and the LIDO installation were however achieved with no reference to ESONET NoE quality assurance or the sensor registry. There is concern that ESONET demonstration missions are ignoring the procedures we propose for the wider observatory community to put forward. Post-calibration when the equipment is recovered should be in accordance with ESONET NoE procedures.

This issue is not to be tackled by the SC and should be passed on to the Test and Operation Council and WP2.

## MOMAR-D (Monitoring the Mid-Atlantic Ridge)

The SC welcomed the fact that a sensor package is being tested in Canada on the VENUS junction box. There is concern that, due to ship time constraints, no equipment will be deployed at the MOMAR site before July 2010, therefore there will be a few months of operation before the end of the NoE. This will however allow the demonstration of ESONET NoE QA and sensor registration procedures.

## MARMARA-DM (Earthquake Monitoring in the Marmara Sea)

This project started quickly with a programme aiming at data analysis from recent cruises. There was concern regarding the fact that the deployment and operation of observatories only occurs later in the programme, thereby pertaining more to the geo-science programme than to the observatory demonstration mission. However, it was accepted that surveys would define sites for observatories and platforms would be deployed on the seafloor. This is highly commendable large-scale collaboration, and a new ESONET location.

### 4.3 Next call for demonstration missions

The question of whether there was too much geophysics in the first call for projects was further discussed, and it was noted that oceanography and mass movements are under-represented. Also, the need for focus on Kopernikus and GMES Core services was noted.

It was recommended that projects complementary to existing demonstrations should be promoted so that all disciplines be represented in the demonstration mission portfolio.

The announcement that 1.1 Meuro is available was welcomed.

### 4.4 Debriefing of WP3 reports (Scientific Objectives, scientific packages)

The appointment of Henry Ruhl at NOC was welcomed and it was agreed he made a good start with the report on Science Objectives, though he needs more input from the community.

It was agreed it would be advantageous to have a document that is continuously updated, or revised each year.

The strategy to identify scientific opportunities using both cabled and non-cabled systems was commented.

The Institute of Marine Research, Norway (Olav Rune Godø), introduced the concept of "ocean hubs" which provide opportunities for single point measurements representing processes at a regional scale. This is being exploited in a Statoil-sponsored HERMES platform off Norway. This could be developed more widely in ESONET.

The question of scales from global to micro was discussed, as well as the need for information on the availability of long-term sensors.

### 4.5 Debriefing of ESONET standard instruments and scientific objectives survey

A standard list of instruments was presented at the meeting, comprising more than 12 sensors. It was agreed that this was not what was required and that the standard instrument list should be reduced to *circa* 5 key measurements with good reliable sensors (CTD plus). It was noted that this should be similar to the Oceansites minimal list of sensors.

The Scientific Objectives survey was not a great success and more input from partners was requested. It was suggested that, rather than producing global surveys, ESONET should maybe solicit small proposals for experiments or sensor packages, more like IODP drilling proposals.

It was commented that in many proposals the technical requirements were not explicit (sensors, data rates, power, etc). It is therefore not possible to assess the feasibility of the science.

### 4.6 Preparation of the VISO workshop

Virtual Institute of scientific users of deep Sea Observatories (VISO).

There was extensive discussion about what VISO is. It is clearly described in Appendix 1 of the ESONET Contract (Description of Work), and will include new partners and ensure the durability of ESONET after the funding ends, i.e. VISO will be ESONET NoE in the future. ESONET VISO would have to run in parallel with EMSO.

A workshop is proposed in spring 2009, organised by the University of Tromsoe.

Legally, VISO could build on the ESONET NoE consortium agreement and outcomes from other NoEs EUROCEANS and MARBEF could serve as a model.

We were reminded that the formation of an effective VISO is obligatory.

### 4.7 Collaboration with other European observatory initiatives

EUROSITES - Initial difficulties were resolved and progress is being made.
One problem is the imperfect alignment between ESONET and EUROSITES locations, but collaboration is real.

KM3NeT - The Associated Sciences node of this neutrino telescope infrastructure was renamed as the Earth-Sea Sciences node. It is suggested that it takes the form of 3 junction boxes around the telescope array at whichever site ultimately chosen in the Mediterranean Sea.

The Portugal-Norway Condor project was welcomed.

It was noted that the Science meeting on 24 October would receive input from other European programmes, thus collaboration is well-established.

Also, a meeting was planned with oil industry representatives in Brussels on 26 Nov 2008.

### 4.8 Collaboration with non-European observatory initiatives

Collaboration with Canada was welcomed with at least two sensor packages installed on the VENUS junction box, the Jacobs University Bremen crawler and the MOMAR-IFREMER "tempo-mini" sensor package.

Contacts are also good with NEPTUNE Canada and MARS at Monterey California, with visits, meetings and technical exchanges.

In the USA, workers are awaiting the outcome of NSF decisions on the funding of the OOI Ocean Observatories Initiative.

The coordinator has contacts with DONET in Japan, MACHO in Taiwan and proposals in China.

The DELOS project off Angola sponsored by BP invited proposals for guest packages.

More contacts are needed with the southern hemisphere, Australia and New Zealand.

### 4.9 Recommendations for the next year and participations

It was agreed to meet again at the time of the next General Assembly in 18 months (2010).

In the meantime, the chair will be involved in the review process for the second round of demonstration missions.

There was much discussion on the proposal review methods. The chair of the Scientific Council read and collated the scientific comments and scoring of the reviewers, and conveyed them to the Project Steering Committee.

The composition of the SC membership should be resolved before the next meeting. The Strategic Committee should propose appropriate experts for ratification by the General Assembly.

Monty Priede 01 November 2008

## APPENDICES B

*APPENDIX B1: Demonstration missions*
*APPENDIX B2: Short Report for Councils on Demonstration Missions*
*APPENDIX B3: Sensor ML-Template Creation*
*APPENDIX B4: ANTARES data management*
*APPENDIX B5: Ongoing developments about data management procedures and protocols on behalf of IFREMER, SeaDataNet, MyOcean, EuroSites projects*

# ANNEX B1
# Demonstration Missions

# *I. Implementation plan of demonstration missions*

## I.1. MARMARA

## *Contact references*

| | |
|---|---|
| **Mission's acronym**: | MARMARA-DM |
| **Coordinator**<br>name + address, Email, telephone, fax | Géli, Louis<br>Ifremer, Marine Geosciences Department<br>BP 70, 29280, Plouzané, France<br>E-mail : geli@ifremer.fr<br>Tél : 33 2 98 22 42 27 – Fax : 33 2 98 22 45 49 |
| **ESONET site** | MARMARA SEA, Turkey |
| **Key words:**<br>(scientific topics, technology topics,) | Earthquake hazards monitoring, relations between fluids and seismicity, microbial processes at fluid controlled ecosystems, implementation strategy in the Marmara Sea |

| **Partner Num.** | **Partner Institution Name** | **Principal Investigator (PI) for the Demo Mission** | **PI coordinates (Address, Email, Telephone, fax..)** |
|---|---|---|---|
| 1. | IFREMER | Géli, Louis | IFREMER<br>Marine Geosciences Department<br>BP 70<br>29280 Plouzané, France<br>Tel : 33 (0) 2 98 22 42 27<br>Fax : 33 (0) 2 98 22 45 49<br>E-mail : geli@ifremer.fr |
| 2. | ITU | Çağatay, Namık | Istanbul Technical University<br>Faculty of Mines<br>Geology Department<br>Maslak 34469 Istanbul, Turkey<br>Tel: +90-2122856211<br>Fax: +90-2122856080<br>cagatay@itu.edu.tr |
| 3. | ISMAR | Gasperini, Luca | ISMAR (Istituto di Scienze Marine), Sezione di Geologia Marina, CNR, Via Gobetti, 101, Bologna, Bo 40129 Italy<br>Tel.: 041 2404761<br>Fax.: 041 5204126 :<br>luca.gasperini@bo.ismar.cnr.it |
| 4. | INGV | Favali, Paolo | Istituto Nazionale di Geofisica e Vulcanologia (INGV), Via di Vigna Murata, 605 - 00143 Roma (Italy)<br>Ph.: +39-06-51860-341 (secretary); +39-06-51860-428 (direct)<br>Fax: +39-06-51860-338<br>e-mail: geostar@ingv.it (secretary); paolofa@ingv.it (direct)<br>http://geostar.ingv.it |
| 5. | CNRS | Henry, Pierre | CNRS<br>CEREGE - College de France<br>Europole de l'Arbois, Bat Trocadero<br>BP 80, 13545 Aix en Provence Cedex 04<br>tel: 04 42 50 74 04<br>fax: 04 42 50 74 01 |

| | | | |
|---|---|---|---|
| | | | e-mail : henry@cdf.u-3mrs.fr<br>http://cdf.u-3mrs.fr/~henry |
| 6. | DEU/IMST | Çifçi, Günay | Prof.Dr. Günay Çifçi<br>Institute of Marine Sciences and Technology<br>Dokuz Eylul University<br>Izmir, 35340 Turkey<br>GSM: +90 - 532 513 59 16<br>Phone: +90 - 232 - 278 55 65 ext. 126<br>Fax: +90 - 232- 278 50 82 |

## Demonstration Mission Activities

| WP /Activity num. | WP/Activity name | Leader Institution (in bold) | Tasks short description | Related Deliverables |
|---|---|---|---|---|
| 1 | MarNaut data integration | **CNRS** | Integrate data collected during MarNaut cruise ; publish scientific results ; produce recommendations for the present demonstration mission | - D1.1 Paper on piezometer and OBS results<br>- D1.2 Paper on flowmeters /osmo-samplers<br>- D1.3 Paper on fluid analysis<br>- D1.4 Paper synthezing Marnaut results |
| 2 | Marine Operations | **Ifremer**/DEU/ITU | Preparation and completion of the following cruises :<br>- Marmesonet cruise with Le Suroit, with 2 legs for : i) acoustic mapping water column ; 2) high-res bathymetric survey using AUV at 3 sites ; 3) high-res seismic survey at site 1.<br>- DEU cruises with R/V Piri Reis : high-res seismics at sites 2 & 3 | - D2.1 Cruise reports for DEU cruises<br>- D2.2 cruise report for Ifremer cruise (Marmesonet)<br>- D2.3 1-year time series at 3 sites |
| 3 | Land and seabottom integration | **INGV**/ITU-TUBITAK | Integrate the marine and land seismological data in order to :<br>- assess the true benefit of deploying seafloor stations in the MS;<br>- assess the ambient noise in the Marmara Sea ;<br>- better identify the active segments of the MS Sea fault system | - D3.1 Report (including data base) combining marine and land seismological data in the Marmara Sea<br>- D3.2 Report on the ambient noise in the MS and recommendation for the implementation of permanent seabottom stations<br>- D3.3 High res seismic images at 3 sites |
| 4 | Data integration and modelling | **ISMAR**/CNRS/ITU-SIO | - Analyze, integrate and model all available data (seismology, geophysics and geochemistry of pore fluids, sedimentology, acoustics)<br>- Test the working hypothesis (according which some of the physical and chemical changes in the properties of the fluids within the fault zone change can be detected in surface sediments) by interpreting pore fluid pressure and chemistry variations.<br>- Validate the concept of seafloor observatories<br>- Select the best site for permanent seafloor monitoring | - D4.1 Report integrating all available data<br>- D4.2 GIS including all available data<br>- D4.3 Report validating the concept of seafloor observatories<br>- D4.4 Report on best site selection |
| 5 | Comparative feasibility study | **Ifremer**/ITU | - **Compare fiber optic cabled observatories vs permanent observatories linked to a sea-surface buoy equipped with energy supply and telecommunications systems** | - D5.1 Recommendations report for the preferred option<br>- D5.2 Cost estimation report |

| | | | | |
|---|---|---|---|---|
| | | | **energy supply and telecommunications systems.**<br>- **Provide approximate costs on investments, maintenance and personnel, based on the local situation.** | - D5.3 Implementation plan |
| 6 | Public outreach, education and fund raising | **ITU**-DEU | - Disseminate results among Turkish authorities and policy makers<br>- Propose a coordination structure and managing scheme for the implementation of the seafloor observatory.<br>- Disseminate results among the scientific community and the public (thorugh web site, training courses and public seminars) | - D6.1 Support agreement contract with Turkish authorities<br>- D6.2 Web Site<br>- D6.3 Training course |

| Deliverable Num. | Deliverable Name | Responsible Institution | Delivery Month[a] |
|---|---|---|---|
| D1.1 | Paper on piezometer and OBS results | Ifremer | T0 + 12 |
| D1.2 | Paper on flowmeters and osmo-samplers[b] | **ITU**-Scripps | T0 + 14 |
| D1.3 | Paper on fluid analysis | CNRS | T0+12 |
| D1.4 | Paper synthetizing Marnaut results | CNRS | T0+12 |
| D2.1 | Reports on the cruises completed by DEU (DEU1 and DUE2 cruises) | DEU | T0+14 |
| D2.2 | Report on the cruise completed by Ifremer (MarmesoNet) | Ifremer | T0+14 |
| D2.3 | 1-year time series at 3 sites | INGV | T0+23 |
| D3.1 | Report (including integrated database) combining marine and land seismological data in the Marmara Sea | **ITU**-Tubitak | T0+26 |
| D3.2 | Report on the ambient noise in the MS and recommendation for the implementation of permanent seabottom stations | INGV | T0+26 |
| D3.3 | High Res Seismic Images at the 3 sites | DEU | T0+18 |
| D4.1 | Integration of all available data (including sedimentology) | ISMAR | T0+24 |
| D4.2 | GIS including all available data | CNRS | T0+24 |
| D4.3 | Report to test working hypothesis and validate concept of seafloor observatories | CNRS | T0+24 |
| D4.4 | Report on best site selection | ISMAR | T0+28 |
| D5.1 | Recommendation Report on the preferred option | Ifremer | T0+28 |
| D5.2 | Cost estimation report | Ifremer | T0+28 |
| D5.3 | Implementation plan | INGV | T0+28 |
| D6.1 | Support agreement contract with Turkish authorities | ITU | T0+30 |
| D6.2 | Web Site | ITU | T0+18 |
| D6.3 | Training course | ITU | T0+24 |

[a]CAUTION : The planning indicated here above is based with a start on april, 2008, and on the hypothesis that the cruises will actually take place in may 2008. The exact dates of the Ifremer cruise (with Le Suroit) will be known in june 2008.

[b]Osmo-samplers and flowmeters deployed during the marNaut cruise (june 2007) will be recovered in may 2008. Scientific papers are expected on ~ june 2008.

| Milestone Num. | Main Milestone Description | Month |
|---|---|---|
| 1 | Kick-off meeting | T0+1 |
| 2 | Ifremer Cruise (Marmesonet) | T0+11 |
| 3 | DEU Cruises (High Res Seismics with R/V Piri Reis) | T0+12 |
| 4 | Training Course | T0+24 |
| 5 | Closure meeting with conclusions | T0+30 |

Demo WP/activity Time Schedule (please insert X)

Time schedule is based on the following hypotheses :
- start in april 2008

| | MONTHS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WP# | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 1 | X | X | X | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | | |
| 2 | | X | X | | | X | X | X | X | X | X | X | X | X | | | | | | | | X | X | | | | | | | |
| 3 | | | | | | | | | | | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | | X | X | X | X | X | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | | | X | X | X | X | X | | |
| 6 | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

| | | Year1 | | | | Year 2 | | | | Year 3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WP | Detailed Milestones | Tri 1 | Tri 2 | Tri 3 | Tri 4 | Tri 1 | Tri 2 | Tri 3 | Tri 4 | Tri 1 | Tri 2 | Tri 3 | Tri 4 |
| WP1 | | | | | | | | | | | | | |
| (MarNaut data integration) | data integration | | | | | | | | | | | | |
| | scientific papers | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| WP2 | | | | | | | | | | | | | |
| (Marine operations) | Equipment preparation | | | | | | | | | | | | |
| | Site Surveys | | | | | | | | | | | | |
| | Instrument deployment | | | | | | | | | | | | |
| | Reporting | | | | | | | | | | | | |
| | Recovery | | | | | | | | | | | | |
| WP3 | | | | | | | | | | | | | |
| (Land & Seabottom integration) | integration of MarNaut OBSs | | | | | | | | | | | | |
| | Analysis of land data | | | | | | | | | | | | |
| | Analysis of DM dat, integration | | | | | | | | | | | | |
| | Reporting | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| WP4 | | | | | | | | | | | | | |
| (Integration and modelling) | Integration & modelling | | | | | | | | | | | | |
| | Recommandations/conclusions | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| WP5 | | | | | | | | | | | | | |
| (Comparative study) | Compare technical options | | | | | | | | | | | | |
| | Costs estimation | | | | | | | | | | | | |
| | Recommendations | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| WP6 | | | | | | | | | | | | | |
| (Public outreach - fund rising) | Public outreach | | | | | | | | | | | | |
| | Education | | | | | | | | | | | | |
| | Fund raising | | | | | | | | | | | | |

**Link with Esonet Main activities**: please update the dates and contents of the foreseen activities

| Inputs from ESONET WPs : | Starting date: dd/mm/yy | Ending date: dd/mm/yy | Comments |
|---|---|---|---|
| ESONET-WP1 | Month 2 | Month 30 | exchange in personnel |

| Outputs to ESONET WPs : | Starting date: dd/mm/yy | Ending date: dd/mm/yy | Comments |
|---|---|---|---|
| Esonet-WP5 | Month 18 | Month 30 | implementation plan for the Marmara Sea |

## Sensors & data management plan

| Measured parameters | Water Depth | Sampling/storage/acquisition frequency | Access restriction / unrestriction (esonet partners, public, immediately or delayed, to raw data, processed data …) *please note that EC ask Esonet community to provide data in easy and free access* | comments |
|---|---|---|---|---|
| ground velocity (OBS+SN4) | 1000 m | sampling : 100 Hz<br>storage ~ 50 Gb/year<br>acquisition frequency : continuous | - raw and processed (SAC format files)<br>- unrestricted access on raw data<br>- 1 year deployment<br>- data availability only after instrument recovery | at 3 sites |
| seabottom water pressure (hydrophones) | - Idem - | sampling : 250 kHz<br>storage ~ 25 Gb/year<br>acquisition frequency : continuous | - Idem - | at 3 sites |
| seabottom water pressure | - Idem - | sampling : 1 sample/minute<br>storage ~ 0.4 Gb/year<br>acquisition frequency : continuous | - Idem - | at 3 sites |
| sediment pore pressure | - Idem - | sampling : 1 Hz<br>storage ~ 3 Gb/year<br>acquisition frequency : continuous | - Idem - | at 3 sites |
| sediment pore water temperature | - Idem - | sampling : 1 sample/minute<br>storage ~ 0.4 Gb/year<br>acquisition frequency : continuous | - Idem - | at 3 sites |
| CH4 concentration in seabottom water | - Idem - | sampling : 1 sample/minute<br>storage ~ 0.4 Gb/year<br>acquisition frequency : continuous | - Idem - | SN-4 at 1 site |
| sediment trap and collection of settling part.material | 1200 | 1 sample / month ; acquisition after one year | - raw data<br>- unrestricted access<br>- 1 year deployment<br>- data availability only after instrument recovery | sediment trap at 1site with funds permitting |
| Flowmeters | 600-1250 | Continuous, about 1 sample per month | - raw data<br>- unrestricted access<br>- 1 year deployment | flowmeters |

| | | | | |
|---|---|---|---|---|
| | | | - data availability only after instrument recovery and analysis | |
| Osmosamplers | 600-1250 | Continuous, about 1 sample per month | - raw data<br>- unrestricted access<br>- 1 year deployment<br>- data availability only after instrument recovery and analysis | osmo-samplers |
| bubbling activity using an acoustic detector of gas bubbles | | sampling : 1 sample/minute during 60 minutes<br>1 sample = 1 acoustic image<br>3 Mb per sample<br>storage ~ 65 Gb/year<br>acquisition frequency : 2 per day | | 1 site, funds permitting |

## Dissemination and outreach

| | |
|---|---|
| School material that would be available at the issue of the mission:<br>-photos, video, courses, …<br>-others | Short video movies on DVD; printed flyers to be prepared and distributed at schools and exhibitions.<br>Public lectures for schools and general public<br>With brochure distribution |
| Dissemination through collaborations with aquaria, museum, sciences centres, …? | Video movies, posters and brochures to be prepared and provided to the Science Museum and Natural History Museum in ITU and in MTA (Geological Survey) in Ankara |

## Financial issues: please update the financial budget according to the recently allocated ESONET allowance

1/ please compile the attached budget request form (split the budget to each involved partner on 3 months periods) (see annex 1)
comments:

2/ do you intend to sub contract any activity to some non Esonet partners? Y/N

- Partner 2 (ITU) will subcontract TUBITAK to provide and share data with the project partners from its network of 20 land seismometers, GPS stations, and radon monitoring stations around the Marmara Sea, which will be then integrated with the seafloor observatory data.by the partners (15 kEuro).
ITU will subcontract SIO to provide flowmeters and osmometers for fluid sampling at different sites for one year and .for the analysis of the fluids. (11 kEuro); The data will be integrated with other parameters, such as seismological, methane and CTD data.

- Partner 4 (INGV) will subcontract Tecnomare-ENI for seafloor observatory SN-4 refurbishment

- Partner 5 (CNRS) will subcontract SOACSY for deep tow and surface chirp sounder data processing and inversion (15 kE in 2008-2009).
(Data processing and inversion with SOACLOGS of chirp data acquired in Cinarcik basin during Marnaut and Marmarascarps were performed in 2007. Impedance variations determined by inversion of Chirp data could be correlated with impedance variations measured with MSCL-Geotek data on cores. On this basis, reliable correlations between sedimentary events in cores and THR seismic reflectors could be established at basin scale. Data from Tekirdag basin and Central basin will be processed in 2008. Similar processing will be required on

THR data acquired with Ifremer ship and DEU deep-tow during Marmara-DM cruises).

3/ is an exchange of personnel foreseen? or any collaborative work of an engineer/researcher/technician to an institute different from the origin institute? (implying travel + journey longer than 1 week) ?

YES. The following plan for exchange in personnel will be soon submitted to **ESONET-WP1** described in the original ESONET proposal **(Caution : ESONET-WP1 is NOT the WP1 described in the Marmara-DM proposal)** .

Exchange ITU / CNRS

- Sinan Ozeren (ITU) will 1 month at CNRS/CEREGE on may 2008 to work on MarNaut data (slope stability issues) and prepare 1 publication
- Namık Çağatay (ITU) will spend two weeks (2 trips) to visit College de France, Aix, to work with Pierre Henry on fluid chemistry and sedimentary earthquake record data
- Tiphaine Zitter and Pierre Henry (CNRS/CEREGE) will spend one week each at ITU to lecture on fluid/faulting interaction.

Exchange ITU / Ifremer

- Sinan Ozeren (ITU) will 1 month at Ifremer on september 2008 on the interpretation of the piezometer data collected during MarNaut
- JB Tary (Ph. D. Student, Ifremer) will stay 2 weeks in Istanbul to integrate the OBS data collected during the MarNaut cruise with the land seismological data (Trimester 4-2008)
- 2 Ifremer technicians will spend 2 weeks in Istanbul prior to the Marmesonet cruise for training ITU personnel to work on OBS and piezometer (Trimester 2-2009).
- Yves Auffret (engineer from Ifremer) will spend 2 weeks in Istanbul for training ITU personnel on instrument/cable interfacing (2009 or 2010)
- Louis Géli (Ifremer) will spend 4 weeks in Istanbul to work with Namik Cagatay (ITU) for the implementation of the seafloor observatory (2009 or 2010).
- Two weeks for engineer Dursun Acar to visit Ifremer for being trained on piezometer, sediment trap, sediment coring in 2008.
- Two trips (two weeks each) for Emre Damcı (PhD student) to visit Ifremer, Brest for working with with Lousi Geli on EK60 Echo Sounder and seismic reflection data.
- Two trips (1 week each) for Namık Çağatay to visit Ifremer, Brest for working with Louis Geli on the chemical data and for report writing.

Exchange DEU / Ifremer

- 1 engineer from Ifremer (Stéphane Ker or Yannick Thomas) will spend 2 weeks at DEU to work on High Resolution seismics in 2009/2010
- Two researchers from DEU will spend 2 weeks at Ifremer in order to learn for the Caraibes and discuss the details of the project in 2009/2010.

Exchange ISMAR-/ITU

- 1 Researcher (ISMAR) will spent 2 weeks in Istanbul for the integration of marine and land data
- 1 Technician (ISMAR) will spent 4 weeks in Istanbul for preliminary survey, deployment of observatory, and periodic checks
- Namık Çağatay will visit ISMAR Bologna (1 weekd) to work with Luca Gasperini and Alina Polonia on core and seismic data in the Izmit Gulf..

- Luca Gasperini (ISMAR) will spent 2 weeks in Istanbul for the project activities and to plan future activities to reinforce the cooperation beyond the time schedule of the demo

Exchange INGV/ITU

- Paolo Favali (INGV) will spend 2 weeks in Istanbul to work with Namik Cagatay (ITU) for the implementation of the seafloor observatory favouring the development of Marmara key-site.
- 1 Researcher (ITU) will spent 2 weeks at INGV to contribute to WP5-Comparative feasibility Study
- 1 Technologist (INGV) will spent 2 weeks in Istanbul to contribute to WP5-Comparative feasibility study

## I.2. LOOME

### ***Contact references***

| | |
|---|---|
| **Mission's acronym**: | LOOME |
| **Coordinator**<br>name + address, Email, telephone, fax | Dirk de Beer<br>Max-Planck-Institute for Marine Microbiology (MPI-MM, KDM partner)<br>Celsiusstrasse 1, 28359 Bremen, Germany,<br>tel. +494212028802<br>fax +494212028690 |
| **ESONET site** | Haakon Mosby Mud Volcano |
| **Key words:**<br>(scientific topics, technology topics,) | slope stabilities, sedimentary processes, fluids seeps and vents standardization, interoperability, data transmission systems and protocols, power supply |

| **Partner Num.** | **Partner Institution Name** | **Principal Investigator (PI) for the Demo Mission** | **PI coordinates (Address, Email, Telephone, faX..)** |
|---|---|---|---|
| 7. | Marum (KDMpartner) | Christoph Waldmann | Leobener Str.<br>D-28359 Bremen<br>waldmann@uni-bremen.de<br>tel. 0421 218 – 65606<br>Fax: 0421 218 – 65605 |
| 8. | AWI (KDMpartner) | Michael Schlueter | Am Handelshafen 12,<br>27570 Bremerhaven, Germany<br>mschlueter@awi-bremerhaven.de<br>Tel .+49 471 4831 1840<br>Fax:+49 471 4831 1425 |
| 9. | IfM Geomar (KDM partner) | Thomas Feseker | Wischhofstr. 1-3, 24148 Kiel, Germany<br>tfeseker@ifm-geomar.de<br>Tel. +49 431 6002321<br>Fax: +49 431 6002916 |
| 10. | Ifremer | Jean Paul Foucher | Technopole de Brest-Iroise<br>BP 70<br>29280 PLOUZANE, France<br>jean.paul.foucher@ifremer.fr<br>Tel: +33 (0)2 98 22 40 40<br>FAX: +33 (0)2 98 22 40 45 |
| 11. | UiT | Juergen Mienert | Dramsveien 201<br>N-9037 Tromsø, Norway<br>juergen.mienert@ig.uit.no<br>Telephone: (+47) 77 64 44 46<br>Fax: (+47) 77 64 56 00 |

## Demonstration Mission Activities

| WP /Activity num. | WP/Activity name | Leader Instituion | Tasks short description | Related Deliverables |
|---|---|---|---|---|
| 1 | Seismic detection of eruptive events | UiT | Early detection of mud movement by geophones | 1, 11 |
| 2 | Monitoring of fluid chemistry | MPI-MM | Measurements of redox, oxygen, pH, and sulfide at the sediment surface using sensor strings. | 2, 11 |
| 3 | Monitoring of physical sediment properties | IfM Geomar/Ifremer | Measurements of temperature dynamics at sediment surface using T-strings. Measurement of temperature and pore pressure inside the sediments with 12 m pole. | 3, 10 |
| 4 | Detection and quantification of gas flares | MARUM | Scanning Sonar and CTD | 4, 11 |
| 5 | Construction of the central frame/platform | MPI-MM | Design of sensor network and operation platform | 7 |
| 6 | Underwater communication | MARUM | Wake-Up call to activate the scanning sonar with the geophones | 9, 11 |
| 7 | Deployment frame | MARUM | Deployment by ROV and recovery procedures | 8, 11 |
| 8 | Standardization and interoperability | MARUM | Documentation of inter-operability and standardization | 14, 11 |
| 9 | LOOME management | MPI-MM | Progress and management reports | 15 |

| Deliverable Num. | Deliverable Name | Responsible Institution | Delivery Month |
|---|---|---|---|
| 1 | Long-term seismometer | UiT | 6 |
| 2 | Long-term chemical sensors (pH, O2, sulfide, redoX) | MPI-MM/Ifremer | 12 |
| 3 | Long-term temperature sensors on surface. Temperature and pore pressure in the subsurface seabed | IFREMER/IFM-GEOMAR | 6 |
| 4 | Scanning sonar for gas flares detection | MARUM | 9 |
| 5 | Design of sensor network and operation platform | MPI | 6 |
| 6 | Deployment and recovery procedures for instruments and data | Marum | 12 |
| 7 | Design of underwater communication | MARUM/Ifremer/UiT | 6 |
| 8 | Documentation of inter-operability and standardization | MARUM | 24 |
| 9 | Cruise report Polarstern 2009Jan Mayen 2008 | MPI/UiT/Ifremer | 24 |
| 10 | Scientific reports | all partners | 36 |

| Miliestone Num. | Milestone Description | Month |
|---|---|---|
| 1 | All partner meeting | 2 |
| 2 | LOOME website | 5 |
| 3 | Jan Mayen eXpedition, deployment PTlance | 8 |
| 4 | Integration of all components | 9 |
| 5 | Adjustments frame | 11 |
| 6 | test in MARUM tank | 12 |
| 7 | final adjustment sensor modules | 14 |
| 8 | deployment cruise | 18 |
| 9 | recovery | 32 |
| 10 | final meeting | 36 |

Demo WP/activity Time Schedule (please insert X)

| | **Months** | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WP# | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 30 | 31 | 32 | 33 | 34 | 35 |
| 1 | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | |
| 2 | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | |
| 3 | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | |
| 4 | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | | |
| 5 | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | | |
| 6 | | | | | X | X | X | X | X | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | X | | | | | | | | | | | | |
| 8 | | | | | | | | | | X | X | | | | | | | | | X | X | X | | |
| 9 | | | | | | X | | | | | | X | | | | | | | | X | | | | X |
| Milestones | | 1 | | | 2 | | | 3 | 4 | | 5 | 6 | | 7 | | | | 8 | 9 | | | | | 10 |

Between deployment M18 and recovery M30 no activities planned.

## Sensors & data management plan

| Measured parameters | Depth | Sampling/storage/acquisition frequency (min) | Access restriction / unrestriction (esonet partners, public, immediately or delayed, to raw data, processed data …) *please note that EC ask Esonet community to provide data in easy and free access* | comments |
|---|---|---|---|---|
| $O_2$/pH/redoX/sulfide | 1200 | 30 | Immediate access raw and processed data unrestricted for ESONET partners, immediate access of processed data for public. | |
| Geoacoustics | 1200 | 10 | same | |
| T | 1200 | 10 | same | |
| P | 1200 | 10 | same | |
| sonar scan | 1200 | 240 | same | |

## Dissemination and outreach

| | |
|---|---|
| School material that would be available at the issue of the mission:<br>-photos, video, courses, …<br>-others | not planned, but can be made available on request. |
| Dissemination through collaborations with aquaria, museum, sciences centres, …? | not planned, but can be made available on request. |

## Financial issues: please update the financial budget according to the recently allocated ESONET allowance

| |
|---|
| 1/ please compile the attached budget request form (split the budget to each involved partner on 3 months periods) (see annex 1)<br>comments:<br>As the grant was significantly less than the original budget, we had to reduce the project. |
| 2/ do you intend to sub contract any activity to some non Esonet partners? N<br><br>-if yes please describe the activities of the sub contractor and the amount foreseen (Euros) |
| 3/ is an exchange of personnel foreseen? or any collaborative work of an engineer/researcher/technician to an institute different from the origin institute? (implying travel + journey longer than 1 week) ? Y<br><br>- if yes please explain and specify institutes involved, duration<br>Ifremer engineers will visit MPIMM for wake up call and integration sulfide sensor<br>UiT engineers will visit MPIMM for data exchange<br>UiT and Ifremer will visit MARUM for standardization of procedures, software and hardware. |

## I.3. LIDO

### *Contact references*

| | |
|---|---|
| **Mission's acronym**: | LIDO |
| **Coordinator**<br>name + address, Email, telephone, fax | Michel André<br>Centre Tecnològic de Vilanova i la Geltrú<br>Universitat Politècnica de, Catalonia<br>Rambla Exposició s/n,<br>08800 Vilanova i la Geltrú, Barcelona,<br>**Spain**<br>e-mail : michel.andre@upc.edu<br>Ph. : +34-896 7200<br>Fax :+34-896 7201 |
| **ESONET site** | 1. East Sicily site (NEMO-SN1)<br>2. Gulf of Cadiz (GEOSTAR configured for NEAREST pilot experiment) |
| **Key words:**<br>(scientific topics, technology topics,) | Geohazards<br>Bioacostics |

| Partner Num. | Partner Institution Name | Principal Investigator (PI) for the Demo Mission | PI coordinates (Address, Email, Telephone, fax..) |
|---|---|---|---|
| 12. | UPC<br>Universitat Politècnica de Catalunya | Michel André | Michel.Andre@upc.edu |
| 13. | UB*<br>University of Bremen (Marum) | Christoph Waldmann | waldmann@marum.de |
| 14. | FFCUL/ CGUL*<br>Fundação da Faculdade de Ciências da<br>Universidade de Lisboa Centro de Geofísica<br>da Universidade de Lisboa | Jorge Miguel Miranda | jmiranda@fc.ul.pt |
| 15. | INGV<br>Istituto Nazionale di Geofisica e Vulcanologia | Paolo Favali | paolofa@ingv.it |
| 16. | ISMAR<br>Consiglio Nazionale delle Ricerche<br>Istituto Scienze Marine, Dipartimento di<br>Bologna | Nevio Zitellini | nevio.zitellini@bo.ismar.cnr.it |
| 17. | Istituto Nazionale di Fisica Nucleare<br>INFN* | Giorgio Riccobene | riccobene@lns.infn.it |
| 18. | Consejo Superior de Investigaciones<br>CSIC*<br>Cientificas – Unitat de Tecnologia Marina -<br>Centre Mediterrani d'Investigacions Marines i Ambientals | Juan Josè Danobeitia | jjdanobeitia@cmima.csic.es |
| 19. | dBScale<br>dBS* | Eric Delory | eric@dbscale.com |
| 20. | Centro Interdisciplinare di Bioacustica e<br>CIBRA<br>Ricerche Ambientali, Università degli | Gianni Pavan | gpavan@cibra.unipv.it |

| | | | |
|---|---|---|---|
| | Studi di<br>Pavia | | |
| 21. | Technische Fachhochschule Berlin -<br>FB VIII TFH*<br>- Maschinenbau, Verfahrens- und<br>Umwelttechnik - AG Tiefseesysteme | Hans W. Gerber | hwgerber@ism.tu-berlin.de<br>hwgerber@tfh-berlin.de |
| 22. | Tecnomare-ENI S.p.A.<br>TEC* | Francesco Gasparoni | francesco.gasparoni@tecnomare.it |

## Demonstration Mission Activities

| WP /Activity num. | WP/Activity name | Leader Institution | Tasks short description | Related Deliverables |
|---|---|---|---|---|
| WP1 | Recovery, Refurbishment and Deployment of Observatories | INGV | Developments of enhancements of NEMO-SN1 and GEOSTAR observatories and infrastructures to open the nodes of a first nucleus of regional network to other disciplines (bioacoustics) and homogenization of geophysical equipments by integration of additional sensor, devices, and software. | D1.1.1, D1.1.2, D1.1.3, D1.1.4, D1.1.5, D1.1.6 |
| WP2 | Quality and Data Management | UB | Standardisation of ocean observatory measurements by implementing international accepted standard methods in data acquisition and management; Establishment of a sensor inventory; Long- term seismometric measurements and analysis. | D2.1, D2.2, D2.3, D2.4, D2.5 |
| WP3 | Public Outreach | FFCUL | Real-time transmission of marine mammal acoustic signals and acoustic images from seafloor cabled observatory to public institutions (e.g., Scientific Museums, Aquaria) where the whole ESONET network will be presented together with the “sonic imagery” of the LIDO stations. | D3.1 |
| WP4 | RT Software Development | UPC | Development of RT and automatic analysis softwares: Long-term recording and analysis of natural, artificial and biological sound sources; Identification and tracking of cetaceans; Long-term noise interactions and masking. | D2.1,D2.2,D2.3 |
| WP5 | Technological Assessment | INFN | Test and validation of low cost acoustic arrays and recording systems to be implemented in additional locations to extend the monitoring network and possibly evaluate new European sites for long term monitoring. | D4.1, D4.2, D4.3, D4.4, D4.5, D4.6, D4.7, D4.8 |
| WP6 | Project Management | UPC | Implementation of the administrative and financial decisions of the SC, within the framework set by the European Commission and under the authority of the ESONET NoE. The Activity Leaders are advised by the Advisory Council. | D5.1, D5.2 |

| Deliverable Num. | Deliverable Name | Responsible Institution | Deliver y Month |
|---|---|---|---|
| D1.1 | Procedures for sea operations: recovery and deployment of SN-1 and Ovde stations (East Sicily) | INFN | 1 |
| D1.2 | Status of the SN-1 and Ovde stations, new requirements and technical specifications of the enhancements | INGV | 3 |
| D1.3 | Developments of the enhancements and tests | INFN | 7 |
| D1.4 | Sea operations procedures for recovery and deployment of GEOSTAR (Gulf of Cadiz) and refurbishment | TEC | 5 |
| D1.5 | New requirements and technical specifications of the enhancements of the GEOSTAR surface buoy | UPC | 3 |
| D1.6 | Demo mission planning, development and follow-up | INGV | 5 |
| D2.1 | Software of real-time detection of biological sounds (whales and dolphins) and anthropogenic noise | UPC/INFN | 22 |
| D2.2 | Software of automatic classification of biological sounds (whales and dolphins) and anthropogenic noise | UPC/CIBRA | 22 |
| D2.3 | Software of marine mammal localisation and tracking | UPC/CIBRA | 22 |
| D2.4 | Report on the implementation of prototype SWE concepts | UB | 22 |
| D2.5 | Report on the sensor registry | UB | 22 |
| D3.1 | Website with real-time transmission of marine mammal acoustic signals and acoustic images from seafloor cabled observatory to public institutions | FFCUL/UPC | 12 |
| D4.1. | Report on functioning/mis-functioning parts and subsystems of the recovered instrumentation | TEC | 3 |
| D4.2. | TDR of new hydrophone arrays; TDR of data acquisition, power and data transmission systems, sea operations | INFN | 5 |
| D4.3. | Reports on testing activity | TEC | 12 |
| D4.4. | Reports on integration activity | INFN | 15 |
| D4.5. | Final report on station tests after integration. | INGV | 18 |
| D4.6. | Periodic reports of underwater stations, on-shore and offshore systems under activity. | INGV | 9,12,15,18, 21 |
| D4.7. | Report on commercially available underwater acoustic sensors (low and high frequencies) and tsunami detectors. | UB | 22 |
| D4.8. | Report on technological conclusions from test activities. | INFN | 22 |
| D4.9. | Report on possible standardisation and spreading of acoustic sensors and tsunami detectors | UB | 22 |
| D5.1. | Six month based reports | UPC | 6,12,18,24 |
| D5.2. | Final report | | 24 |

| Miliestone Num. | Milestone Description | Month |
|---|---|---|
| M1 | Kick-off meeting | 2 |
| M2 | Infrastructures ready and Observatories deployed for the pilot experiment start. | 7-8 |
| M3 | Museum involved in the DM outreach | 11-12 |
| M4 | End of the pilot experiment | 18-19 |

Demo WP/activity Time Schedule (please insert X)

| | Months | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **WP#** | **1x** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** | **21** | **22** | **23** | **24** |
| **1** | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | | | |
| **2** | | | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | |
| **3** | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| **4** | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| **5** | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| **6** | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| **Milestones** | | M1 | | | | | M2 | | | | M3 | | | | | | | | M4 | | | | | |

**Link with Esonet Main activities**: please update the dates and contents of the foreseen activities

| Inputs from ESONET WPs : | Starting date: dd/mm/yy | Ending date: dd/mm/yy | Comments |
|---|---|---|---|
| WP1 | 01/06/2009 | 31/12/2009 | Activity 1a4<br>Activity 1b4, 1b5<br>Task d: LIDO is currently collaborating with NEPTUNE and VENUS to implement in Canada the LIDO RT analysis softwares. |
| WP2 | 01/10/2008 | 31/03/2010 | Activities 2b2, 2a2, 2b3, 2c2 |
| WP3 | | | Activities 3a1, 3a2, 3a3 |
| WP4 | 01/06/2008 | 31/05/2010 | Activities LIDO 1-5 |
| WP5 | | | Task b: LIDO is particularly sensitive on the effects of noise on marine organisms and will participate in the development and approval of ethical guidelines and procedures. This latter point constitutes a major criteria to award the ESONET LABEL to the observatories. |
| WP6 | | | Activity 6a2<br>Activity 6b1, 6b2 |
| WP7 | | | Task a, b & c |

| Outputs to ESONET WPs : | Starting date: dd/mm/yy | Ending date: dd/mm/yy | Comments |
|---|---|---|---|
| WP4 - Deliverable D12 | - | - | 18 month |
| WP3 - Deliverable D13 | - | - | 18 month |
| WP6 - Deliverable D15 | - | - | 18month |
| WP7 - Deliverable D18 | - | - | 18 month |
| WP1 - Deliverable D19 | - | - | 18 month |
| WP8 - Deliverable D29 | - | - | 12,24,36,48 months |

# Sensors & data management plan

| Measured parameters | Depth | Sampling/storage/acquisition frequency | Access restriction / unrestriction (esonet partners, public, immediately or delayed, to raw data, processed data …) *please note that EC ask Esonet community to provide data in easy and free access* | comments |
|---|---|---|---|---|
| three-component ground velocity | Up to 4000 | 20 ÷ 100 Hz | Raw data: immediate public access<br>Processed data: delayed public access | |
| Pressure perturbations in water | Up to 4000 | 80 ÷ 100 Hz | Raw data: immediate public access<br>Processed data: delayed public access | |
| gravity acceleration | Up to 4000 | 0.01 ÷ 1 Hz | Raw data: immediate public access<br>Processed data: delayed public access | |
| magnetic field (scalar and three components) | Up to 4000 | 1 sample/min<br>1 sample/s | Raw data: immediate public access<br>Processed data: delayed public access | |
| Seafloor water current (three components) | Up to 4000 | 2 Hz | Raw data: immediate public access<br>Processed data: delayed public access | |
| ADCP | Up to 4000 | | Raw data: immediate public access<br>Processed data: delayed public access | |
| Light transmission | Up to 4000 | 1 sample/hour | Raw data: immediate public access<br>Processed data: delayed public access | |
| Conductivity | Up to 4000 | 1 sample/10 min (or 1 sample/hour) | Raw data: immediate public access<br>Processed data: delayed public access | |
| Temperature | Up to 4000 | 1 sample/10 min (or 1 sample/hour) | Raw data: immediate public access<br>Processed data: delayed public access | |
| Static Pressure | Up to 4000 | 1 sample/10 min (or 1 sample/hour) | Raw data: immediate public access<br>Processed data: delayed public access | |
| Methane concentration | Up to 4000 | 1 Hz | Raw data: immediate public access<br>Processed data: delayed public access | |
| $H_2S$ concentration | Up to 4000 | 1 sample/10 min (averaged on 30 samples/s) | Public, delayed | |
| pH | Up to 4000 | 1 sample/6 hours* | Public, delayed | |

| | | | | |
|---|---|---|---|---|
| water sampler | Up to 4000 | Off-line analysis | Public, delayed | |
| Biological noise (cetacean: sperm whales, beaked whales, pilot whales, baleen whales)<br><br>Anthropoge-nic noise (shipping and other activities)<br><br>Natural noise | Up to 2500 | 4 Hydrophones: (sensitivity -195 de re 1V/mPa from 20Hz to 50kHz) preamplification (+20dB) and digitization underwater (at 96 kHz, 24 bit) All 4 hydrophones synchronized and phased All data are continuously sent to shore. Data acquisition and recording on-shore. Data distribution through internet. | ESONET partners, Scientific Community (RT optimised data and delayed if registered to download good quality raw data), Public Real-Time access of optimised data and access to previous recordings | |

## Dissemination and outreach

| | |
|---|---|
| School material that would be available at the issue of the mission:<br>-photos, video, courses, …<br>-others | Website, tutorials,<br>Photos, videos, training, press events.<br>Direct connection to the sites will allow the general public to access acoustic data stream as well as previous recording and information (historical statistics)<br>Specific materials will be produce with a focus on the acoustic monitoring of the ocean, grouping anthropogenic, seismic and bio acoustic sources |
| Dissemination through collaborations with aquaria, museum, sciences centres, …? | Near-real time images via internet from seafloor observatory in museums and aquaria. Direct connection to the sites will allow the general public to access acoustic data stream as well as previous recording and information (historical statistics). In the Lisbon Natural History Museum a panel will be installed where information concerning ESONET will be displayed, with a focus on real-time data. |

# Financial issues: please update the financial budget according to the recently allocated ESONET allowance

1/ please compile the attached budget request form (split the budget to each involved partner on 3 months periods) (see annex 1)
comments:

2/ do you intend to sub contract any activity to some non Esonet partners? Yes

-if yes please describe the activities of the sub contractor and the amount foreseen (Euros)

CIBRA, as a non ESONET partner will be subcontracted to participate in the development of software and analysis of data on biological and anthropogenic noise for an amount of 8 Keuros

3/ is an exchange of personnel foreseen? or any collaborative work of an engineer/researcher/technician to an institute different from the origin institute? (implying travel + journey longer than 1 week) ? Yes

- if yes please explain and specify institutes involved, duration

The development process of LIDO, which will represent a permanent effort will be based on:

- a continuous communication and integration process within ESONET policies and objectives,
- training active scientists sharing knowledge, methods and resources.
- combining oceanographic, geological and biological themes under the same objectives to enhance cost effectiveness.
- constituting a direct link between technological requirements for research and the transfer to the industry/end-users. This will be done by:
  - defining specificacions
  - validating existent technologies
  - designing and jointly developing technological solutions

Institutions involved:

- UPC (one week visit to the Sicily sites, 2 persons (engineer and researcher), 4 times, for the implementation of the RT softwares; three day visit to FFCUL for the implementation of the website, 1 person (engineer, twice).
- INFN (one week to visit UPC for software developments, 2 researchers, 2 times; one week to visit CIBRA for software developments, 2 researchers, 2 times; 3 days to visit Tecnomare for technological developments, 1 researcher 2 engineers, 1 time; 4 days to visit TFH for technological developments, 1 researcher 2 engineers, 1 time).
- CIBRA (one week to visit UPC for software developments, 2 researchers, 2 times; one week to visit CIBRA for software developments, 2 persons, 2 times;
- dBscale**:** one week to CIBRA/Pavia, two persons, for setting long-term collaboration in bioacoustics based on LIDO outcomes; one week to University of Bremen, two persons, to progress on interoperability issues in LIDO; one week to Sicily sites; two persons, to exchange complementary acoustic hardware/software expertise based on LIDO running acoustic experiments and establish future joint research proposals.
- FFCUL (one week visit to Barcelona for the preparation of outreach materials, 1 person, researcher)
- INGV: two week visit to UB of 1 INGV Researcher for the implementation of seafloor observatory data management

# I.4. MOMARD – D

## *Contact references*

| | |
|---|---|
| | Sarradin Pierre-Marie & Colaço Ana |
| **ESONET site** | Açores |
| **Key words:** (scientific topics, technology topics,) | SArea1 : physical oceanography processes<br>SArea2 : hydrothermal processes<br>SArea3 : biodiversity<br>TArea1 : interoperability, data transmission, power supply |

| **Mission's acronym**: | **MoMAR-D** | |
|---|---|---|
| **Coordinator** | Sarradin Pierre-Marie | Colaço Ana |
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| **Partner Num.** | **Partner Institution Name** | **Principal Investigator (PI) for the Demo Mission** | **PI coordinates** |
|---|---|---|---|
| 1 | DOP/UAÇ | A. Colaço | IMAR- Dept Oceanography and Fisheries-Univ of Azores,<br>Cais de Sta Cruz, 9901-862 Horta Portugal<br>Phone: +351-292200436, Fax: +351-292200411<br>acolaco@uac.pt |
| 2 | FFCUL/CGUL | M. Miranda | Centro de Geofisica, Universidade de Lisboa,<br>Rua da Escola Politécnica nº 58, 1250-102 Lisboa, Portugal<br>Phone: (+351) 213 921 863<br>Fax: (+351) 213 908 187<br>jmmiranda@fc.ul.pt |
| 3 | IPGP | M. Cannat | Equipe de Géosciences Marines. Institut de Physique du Globe de Paris. CNRS UMR 7154<br>4 place Jussieu, Tour 14, 5ème étage, 75252 Paris Cedex 05, France<br>Tél: (33) 01 44275192 Fax: (33) 01 44 27 99 69<br>cannat@ipgp.jussieu.fr |
| 4 | NOC | D. Connelly | Geochemistry Group National Oceanography Centre<br>Southampton SO14 3ZH, United Kingdom<br>Tel: (44) 2380 596546<br>Fax: (44) 2380 596554<br>dpc@noc.soton.ac.uk |
| 5 | CNRS - F<br><br><br><br>CNRS - C | V. Chavagnac<br><br><br><br>J. Goslin | LMTG - UMR 5563 UR 154 CNRS Université Paul-Sabatier IRD Observatoire Midi-Pyrénées - 14, avenue Edouard Belin - 31400 Toulouse, France<br>Téléphone +33 5 61 33 26 00 Fax 05 61 33 25 60<br>chavagnac@lmtg.obs-mip.fr<br>UMR6538 "Domaines Oceaniques" U.Bretagne Occidentale-CNRS IUEM - Technopole Brest Iroise 29280 PLOUZANE France<br>tel: +33/(0)298 49 87 14 fax: +33/(0)298 49 87 60<br>Jean.Goslin@univ-brest.fr |
| 6 | Univ. Bremen | C. Waldmann and<br><br><br><br>M. Fabian | University of Bremen/MARUM<br>Leobener Strasse P.O. Box 330440 28334 Bremen Germany<br>Tel + 49- 421 218 65606 FAX + 49- 421 218 65607<br>waldmann@marum.de<br><br>University of Bremen Department 5, Geosciences Sea Technics / Sensors Klagenfurter Straße, GEO 4360 D-28359 Bremen, Germany<br>Tel:049 0421 218-7165 Fax:049 0421 218-7163<br>marcus.fabian@uni-bremen.de |
| 7 | Ifremer | P.M. Sarradin | Ifremer Brest, DEEP/Laboratoire Environnement Profond<br>BP 70, F-29280 PLOUZANE France<br>tel : (33) 02-98-22-46-72, fax : (33) 02-98-22-47-57<br>Pierre.Marie.Sarradin@ifremer.fr |
| 8 | SOPAB | S. Ghiron | Océanopolis<br>Port du Moulin Blanc 29200 Brest, France<br>Tel: +33(0) 298 34 40 63, Fax: +33(0) 298 34 40 69<br>sylvain.ghiron@oceanopolis.com |

Partenaires associés :

| | | | |
|---|---|---|---|
| 10 | UPMC-<br>LOCEAN<br>Associé P# 3 | G. Reverdin | LOCEAN, Univ. Paris VI, boite 100,<br>4, place Jussieu, 75252 Paris Cx 05, France<br>Phonel: 33-1-44-27-23-42 ; fax: 33-1-44-27-38-05<br>gilles.reverdin@lodyc.jussieu.fr |
| 11 | CVARG<br>Associé P#1 | Gabriela Queiroz | Centro de Vulcanologia e Avaliação de Riscos Geológicos -<br>Universidade dos Açores - Edifício do Complexo Científico, 3º Piso, Ala Sul<br>9501 - 801 Ponta Delgada, Portugal<br>Phone 296650147 Fax 296650142<br>Maria.GP.Queiroz@azores.gov.pt |

**CNRS Member C**
Key participant
J. Goslin, Jean.Goslin@univ-brest.fr

# Demonstration Mission Activities

| WP# | WP/Activity name | Leader | Tasks short description | Related Deliverables |
|---|---|---|---|---|
| 1 | Scientific experiments | M. Cannat (P#3) | The aim of each subWP is the acquisition of valuable data sets to fulfill the scientific objectives. WP1-6 will deal with the design of the experiments to obtain synchronized data. It will also tackle the treatment of the pluridisciplinary data set obtained at the end of the experiment. | D8 |
| 2 | Infrastructure of the observing system | J. Blandin (P#7) | WP2 will be in charge of the final design of the observatory infrastructure, integration of the sensors, and on shore trials and validation. | D2 |
| 3 | Data management | T. Carval (P#7) | The first task of WP3 will be the edition of a contractual data management policy. The second task of WP3 is to implement a data management system to receive and validate the data, share them with the scientists involved, archive the data. The dissemination will be achieved through a web portal according to the EU standard procedures and policies. | D3, D8 |
| 4 | Site management | A. Colaço (P#1) | This task will interface the scientists (EU and US) with MPA responsibles and local maritime autorities to comply with the MPA rules and develop a coherent experimental management plan. WP4 will also propose a code of conduct (following the MPA and InterRidge work). | |
| 5 | Communication plan | J. Sarrazin (P#7) | The dissemination plan will be designed at the beginning of the project. It will cover international to regional initiatives. Key actions will be the edition of a web site during the course of the project, the real time transmission of images from the deep sea during the deployment cruises and different actions performed at the national levels. A consortium agreement setting the basis of image (video, photo, …) property will be signed between the different Institutes at the beginning of the project. | D4, D9 |
| 6 | Cruise | M. Cannat (P#3) J. Blandin and P.M. Sarradin (P#7) | WP6 will submit a cruise proposal to the French Fleet authority in January 2008. This cruise proposal will concern the deployment and recovery of the system and site studies, in 2009 and 2010 using a large oceanographic vessel and a scientific ROV. WP6 will also be responsible for the organization of the cruises: authorization to work in the Portuguese ZEE, cruise preparation file, realisation of the cruise and cruise report. | D1, D6, D7 |
| 7 | Management | A. Colaço (P#1) & P.M. Sarradin (P#7) | This WP will deal with the overall organization of the project. | |

| Deliverable Num. | Deliverable Name | Responsible Institution | Delivery Month |
|---|---|---|---|
| D1 | Cruise proposal submission | WP6<br>M. Cannat (P#3)<br>J. Blandin and P.M. Sarradin (P#7) | January 08 |
| D2 | Report Description of the operational system : interface specifications, sensors, localisation | WP2<br>J. Blandin (P#7) | March 09 |
| D3 | Signed agreement Data management policy | WP3<br>T. Carval (P#7) | March 09 |
| D4 | Communication plan | WP5<br>J. Sarrazin (P#7) | March 09 |
| D5 | On shore integration and test report | WP2<br>J. Blandin (P#7) | December 09 |
| D6 | Cruise preparation file | WP6<br>M. Cannat (P#3)<br>J. Blandin and P.M. Sarradin (P#7) | March 10 |
| D7 | Deployment of the system during the cruise | WP6<br>M. Cannat (P#3)<br>J. Blandin and P.M. Sarradin (P#7) | Summer 10 |
| D8 | 1 month data file | WP1- WP3<br>M. Cannat (P#3)<br>T. Carval (P#7) | Summer 10 |
| D9 | Report of dissemination activities | WP5<br>J. Sarrazin (P#7) | December 10 |

| Miliestone Num. | Milestone Description | Month |
|---|---|---|
| M1 | Submission of the cruise proposal | January 08 |
| M2 | Validation of the data management policy | March 09 |
| M3 | On shore integration and test report | December 09 |
| M4 | Deployment of the system during the cruise | July 10 |

## Demo WP/activity Time Schedule

| | Months | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WP# | *-12* | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 1 | | | | | | | | | | | | | | | | | | | | | **D8** | | | |
| 2 | | | **D2** | | | | | | | | | **D5** | | | | | | | | | | | | |
| 3 | | | **D3** | | | | | | | | | | | | | | | | | | **D8** | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | **D4** | | | | | | | | | | | | | | | | | | | | | **D9** |
| 6 | **D1** | | | | | | | | | | | | | | **D6** | | | | | **D7** | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | |
| Milestones | **M1** | | **M2** | | | | | | | | | **M3** | | | | | | | | **M4** | | | | |

Version septembre 2008

# MoMAR/D budget request form

| Partner | Partner | T2-2008 | T3-2008 | T4-2008 | T1-2009 | T2-2009 | T3-2009 | T4-2009 | T1-2010 | T2-2010 | T3-2010 | T4-2010 | Total requested budget k€ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DOP/UAÇ | | | 2.5 | 0 | | 27 | | 13.5 | | | | 43 |
| 2 | FFCUL/CGUL | | | 15 | 10 | | 7 | | 5 | | | | 37 |
| 3 | IPGP | | | 50 | 24 | | 15 | | 10 | | | | 99 |
| 4 | NOC | | | 30 | 20 | | 10 | | 6 | | | | 66 |
| 5 | CNRS-F | | | 7 | 0 | | 3 | | 3 | | | | 13 |
| | CNRS-C | | | 0 | 0 | | 4 | | 4 | | | | 8 |
| 6 | Univ. Bremen | | | 25 | 20 | | 5 | | 0 | | | | 50 |
| | MARUM | | | 10 | 10 | | 5 | | 0 | | | | 25 |
| 7 | Ifremer | | | 40 | 30 | | 70 | | 11 | | | | 151 |
| 8 | SOPAB | | | | | | 6 | | 2 | | | | 8 |
| | **Total** | | | **179.5** | **114** | | **152** | | **54.5** | | | | **500** |

Budget LOCEAN inclus dans IPGP (7 k€)
Budget CVARG inclus dans IMAR (4 k€)

**Link with Esonet Main activities**: please update the dates and contents of the foreseen activities

**The MoMAR/D proposal was written following the ESONET NoE guidelines about the different steps of implementation of a deep sea observatory. Inputs from ESONET and outputs to ESONET are therefore present throughout the whole project.**

## Financial issues: please update the financial budget according to the recently allocated ESONET allowance

| |
|---|
| 1/ please compile the attached budget request form (split the budget to each involved partner on 3 months periods) (see annex 1)<br>comments: |
| 2/ do you intend to sub contract any activity to some non Esonet partners? Y<br><br>-if yes please describe the activities of the sub contractor and the amount foreseen (Euros)<br>Activities related to the outreach program. A didactic kit, a DVD and a web page. 15000 euros (IMAR, P#1). |
| 3/ is an exchange of personnel foreseen? or any collaborative work of an engineer/researcher/technician to an institute different from the origin institute? (implying travel + journey longer than 1 week) ? Y/N<br><br>- if yes please explain and specify institutes involved, duration |

## *II. Short report for councils for demonstration missions*

### II.1. MOMARD - D

| | |
|---|---|
| DM acronym: | MoMAR-D |
| DM title: | MoMAR-Demonstration |
| ESONET Site: | Azores- MoMAR, Lucky Strike hydrothermal field |
| Scientific Area(s): | SArea1 : physical oceanography processes<br>SArea2 : hydrothermal processes<br>SArea3 : biodiversity |
| Technological Area(s): | TArea1 : interoperability, data transmission, power supply |
| DM Start date: | September 2008 |
| DM duration: | 24 |

| Partner Num. | Partner Institution Name | Principal Investigator (PI) for the Demo Mission | PI coordinates |
|---|---|---|---|
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| 2 | FFCUL/CGUL | M. Miranda | Centro de Geofisica, Universidade de Lisboa, jmmiranda@fc.ul.pt |
| 3 | IPGP | M. Cannat | Equipe de Géosciences Marines. Institut de Physique du Globe de Paris. CNRS UMR 7154 cannat@ipgp.jussieu.fr |
| 4 | NOC | D. Connelly | Geochemistry Group National Oceanography Centre dpc@noc.soton.ac.uk |
| 5 | CNRS - F<br><br><br>CNRS - C | V. Chavagnac<br><br><br>J. Goslin | LMTG - UMR 5563 UR 154 CNRS Université Paul-Sabatier IRD Observatoire Midi-Pyrénées - chavagnac@lmtg.obs-mip.fr<br>UMR6538 "Domaines Oceaniques" U.Bretagne Occidentale-CNRS IUEM - Jean.Goslin@univ-brest.fr |
| 6 | Univ. Bremen | C. Waldmann and<br><br>M. Fabian | University of Bremen/MARUM waldmann@marum.de<br>University of Bremen Department 5, Geosciences Sea Technics / Sensors marcus.fabian@uni-bremen.de |
| 7 | Ifremer | P.M. Sarradin | Ifremer Brest, DEEP/Laboratoire Environnement Profond BPierre.Marie.Sarradin@ifremer.fr |
| 8 | SOPAB | S. Ghiron | Océanopolis sylvain.ghiron@oceanopolis.com |

Associated partners

| | | | |
|---|---|---|---|
| 10 | UPMC-LOCEAN Associé P# 3 | G. Reverdin | LOCEAN, Univ. Paris VI, boite 100, gilles.reverdin@lodyc.jussieu.fr |
| 11 | CVARG Associé P#1 | Gabriela Queiroz | Centro de Vulcanologia e Avaliação de Riscos Geológicos - Universidade dos Açores - Maria.GP.Queiroz@azores.gov.pt |

### *Executive summary*

The MoMAR (Monitoring the Mid Atlantic Ridge) initiative aims at providing multidisciplinary time-series data set for hydrothermal systems in the Azores region of the Mid-Atlantic Ridge. This coordinated plan aims at determining the feed-backs between volcanism, deformation, seismicity, and hydrothermalism, and to understand how hydrothermal ecosystems couple with these sub-surface processes, and how this affects exchanges with the ocean.
Monitoring at Lucky Strike has started with the MoMARETO (ecology), GRAVILUCK (geodesy), and BBMoMAR (sismology and MT) experiments and will be further implemented in 2008 with the deployment of autonomous temperature probes at selected vents. MoMARSAT will maintain and reinforce these experiments, with a stronger participation of colleagues from other European countries. MoMARSAT is the cruise proposal to implement the MoMAR-D project.
We will use the SEAMON technology developed during the ASSEM EC project, with two nodes acoustically linked to a surface buoy that will ensure satellite communication to a land base station. The system will comprise 2 scientific nodes: a geophysical node moored in the Lucky Strike lava lake, and a geochemical/ecological node at the Eiffel Tower vent site. This observatory infrastructure will acquire a synchronized multidisciplinary data set, and allow us to develop solutions for sensor interoperability, shore-sensor interactive communication, data management and dissemination, and public outreach.
MoMARSAT comprises two multidisciplinary ROV cruises, the first one is prescheduled in 2010 to deploy the acoustically-linked multidisciplinary observing system at the Lucky Strike

vent field and the second one in 2010 to recover it. The study area belongs to the Portuguese ZEE and is part of a planned OSPAR "Marine Protected Area".

| WP# | WP/Activity name | Leader |
|---|---|---|
| 1 | Scientific experiments | M. Cannat (P#3) |
| 2 | Infrastructure of the observing system | J. Blandin (P#7) |
| 3 | Data management | T. Carval (P#7) |
| 4 | Site management | A. Colaço (P#1) |
| 5 | Communication plan | J. Sarrazin (P#7) |
| 6 | Cruise | M. Cannat (P#3)<br>J. Blandin and P.M. Sarradin (P#7) |
| 7 | Management | A. Colaço (P#1) & P.M. Sarradin (P#7) |

*Progress of the project*

In January 2008, the MoMARSAT cruise proposal was submitted to the French Fleet Committee. After evaluation, the cruise has been prescheduled for the summer 2010. The activity of the MoMAR-D DM was then postponed to cope with this new schedule. The first MoMAR-D plenary meeting will be held in early 2009.
In August 2008, the TEMPO module was recovered during the MoMAR 08 cruise at Lucky Strike. TEMPO was moored during the MoMARETO cruise in 2006. TEMPO constituted a first long term at sea trial of the MoMAR-D ecological node. After nearly 2 years on the bottom (instead of 1 year), TEMPO was in a good state and has recorded video images, temperature and chemical data. The time series obtained are currently under treatment, the mooring is under technological expertise.

### *Scientific objectives M. Cannat, IPGP, (P#3)*

Monitoring at Lucky Strike aims at determining the feed-backs between volcanism, deformation, seismicity, and hydrothermalism, and to understand how the hydrothermal ecosystem couples with these sub-surface processes. Experiments planned at the Lucky Strike vent field as part of this demonstration mission will belong to 5 thematic packages exploring the dynamics of the geosphere, its impact on the hydrothermal fluid temperature and composition, and on the associated fauna and finally the exchange with the ocean.

Thematic Package 1:Seismicity and hydrothermal activity
Thematic Package 2: Vertical deformation of the seafloor at the Lucky Strike volcano
Thematic Package 3: Chemical fluxes at Lucky Strike vents
Thematic Package 4: Ecology at Lucky Strike vents
Thematic Package 5: Physical oceanography

The experimental design will combine autonomous instruments which will store data over the duration of the mission, and instruments that will be connected to shore via the SEAMON system. Two SEAMON nodes will be deployed in the Lucky Strike vent field, one to the west of the lava lake primarily for geophysical instruments (the "geophysical node"), and one at the bottom of the Tour Eiffel edifice in the east, primarily for fluid chemistry and ecology (the "Tour Eiffel node"). A site survey will be performed before the implementation

and after the recovery of the observatory infrastructure to validate the time series obtained during 12 months and to increase the spatial representativeness of the time series.

Scientific integration of collected data sets will be conducted in two stages: in near real time for the subset of data transmitted through the SEAMON system; and after the 12 months of the demonstration for the whole data set. The near real time data will serve both as support for scientific interpretation, and as an indicator that an "event" is occurring. Events at Lucky Strike may be volcanic (eruption, underground dyking event, or rapid degassing of the magma chamber), tectonic (displacement along axial faults), or hydrothermal. The response or the impact of these events on biological communities (micro organism bloom, composition, structure,) is one of the key scientific questions behind this proposal.

Our array of connected sensors will be able to detect all, or most of these events. Rapid response is particularly indicated in the case of a volcanic event, as it has been shown to profoundly modify vent ecosystems, with a variability of hours, days, and weeks, probably extending to years. Our rapid response capability at Lucky Strike will be limited, but enough to open exciting opportunities. The SEAMON capability for interrogating sensors and modifying certain parameters from shore allows us for example to modify data sampling rates for a given sensor, if an event is detected. We also plan to take advantage of the access the Azores-based RV Arquipelago, which unfortunately does not allow for ROV-type intervention, but can perform water column sampling, and recover acoustically released device.

**Test and Operations** J. Blandin, Ifremer (P#7) for the infrastructure, M. Cannat (P#3), J. Blandin and P.M. Sarradin (P#7) for the cruise.

The SEAMON (Sea Monitoring Node) technology was developed during the ASSEM project. It is an integrated system that provides a set of sensors with energy, data acquisition capabilities and several data communication channels. Those can be local communication with an ROV or manned submersible, for underwater installation and maintenance purposes, acoustic communication to a passing-by ship for partial data recovery, or communication to a permanent installation on shore via a buoy (BOREL) moored in the vicinity and acting as a relay between acoustic and satellite segments. SEAMON stations can be operated either as stand-alone monitoring stations (e.g. the TEMPO module deployed at Lucky Strike) or as monitoring nodes for the connection of seabed sensors. The SEAMON stations are rated for 4000 mwd operations. Each one can provide 8 kW h allowing for the sensors operation and a daily data transmission of *ca.* 40 kbytes. The final tuning of each sensor connected to SEAMON will be done according to this energy budget. SEAMON station can be seen in a phased implementation strategy as precursor of cabled junction boxes.

We plan to install 2 SEAMON nodes during the MoMARSAT cruise:

- SEAMON-East will be primarily devoted to thematic experiments 4 (Ecology) and 3 (Vent fluid chemistry). It will hold the video camera, the chemical sensors and the CTD/ADCP package. T-probes and array connected to this station will also provide time-series data for experiment 1 (Seismicity and hydrothermal activity). This node will be moored at the basis of the active hydrothermal edifice Tour Eiffel, to carry on the work done by the TEMPO station during the MoMARETO cruise.
- SEAMON-West will be primarily devoted to thematic experiments 1 (Seismicity and hydrothermal activity) and 2 (Seafloor deformation). It will be connected to the pressure probe, to one OBSand one OBM, and to T-Probes. This second node will be moored in the western part of the fossil lava lake, near the present location of the pressure probe installed in 2006.

The BOREL Buoy acts as a data transmission relay. For reliability reasons, the system comprises two redundant communication channels, each composed of an acoustic modem, a local interface and management electronic unit and an Iridium modem. Energy sources are also redundant. Two local sensors interfaces are also available on the buoy. The buoy position is transmitted to shore every 6 hours. Data transmitted by the sensors through the SEAMON Node and the buoy will be received on shore every 6 hours from the sea, controlled, and archived. Furthermore, interrogation of sensors and modification of functioning parameters is possible at any time from shore. Finally, the transmission of alarms generated on the seabed may be implemented under conditions to be defined. The response or the impact of these events to biological communities (micro organism bloom, composition, structure, …) is one of the key question of this proposal..

**Sensors connected to the Seamon nodes**

| Sensors | In charge | Node |
|---|---|---|
| GPS | V. Ballu | Borel buoy |
| OBS | M. Miranda | SEAMON-West |
| Pressure gauge | V. Ballu | SEAMON-West |
| Ocean bottom tiltmeter | H. Villinger | SEAMON-West |
| T probes | J. Escartin | SEAMON-East |
| In situ Fe & Mn | D. Connelly | SEAMON-East |
| $CH_4$ | D. Connelly | SEAMON-East |
| Video imagery | J. Sarrazin | SEAMON-East |
| Optode | P.M. Sarradin | SEAMON-East |
| In situ Fe | P.M. Sarradin | SEAMON-East |
| CTD/ ADCP | C. Waldmann | SEAMON-East |

**Data Management** T. Carval (Ifremer, (P#7))

Data management and dissemination is a key task in the implementation of a multidisciplinary long term observatory. Principles of data management and dissemination will be discussed at the beginning of the MoMAR-D project (Spring 2008) to obtain a formal participant agreement. The data management policy and procedure will be defined taking benefit of the experience gained by Neptune Canada. The principles to be specified are: i) the definition of the data to be acquired, ii) the procedures of control for these data and the definition of metadata in accordance with the standards recommendations on data documentation, and finally iii) the dissemination level. The framework for this discussion is defined in the ESONET Description of Work. Data management procedures will be fully compatible with international recommendations and standards in order to improve interoperability with other systems and to ease comparison with other datasets: ISO standards for metadata, COI/WMO standards for quality flag scale. SISMER will collect, flag and archive the data (in real time and after the recovery). Data will be made available online according to ESONET data policy and European directives. Data will also be forwarded to data centres involved in the ESONET project in order to be permanently archived and distributed.
The MoMAR-D demonstration will also produce data from autonomous sensors or complementary site studies. These data will also be archived and part of the demonstration will be to design appropriate procedures for control and dissemination of these data. Site survey data acquired during the cruises will be available through the BIOCEAN database.
An important task of our data management WG will be to develop links between the MoMAR-D data management system, and the data management systems currently used for

volcanic and seismic monitoring, and for ecosystem inventory and surveillance, at and near the Azores Islands. To this aim, we have secured the participation of colleagues from the Centro de Vulcanologia e Avaliação de Riscos Geológicos, and from the Department of Oceanography and Fisheries of the University of the Azores.
The data management policy will be decided during the next MoMAR-D meeting. However, some restrictions will appear as the MoMAR-D project involves sensor prototypes.

| | Deliverable Name | Responsible Institution | Date |
|---|---|---|---|
| D1 | Cruise proposal submission | WP6<br>M. Cannat (P#3) J. Blandin and P.M. Sarradin (P#7) | January 2008 |
| D2 | Report Description of the operational system : interface specifications, sensors, localisation | WP2<br>J. Blandin (P#7) | February 2009 |
| D3 | Signed agreement Data management policy | WP3<br>T. Carval (P#7) | February 2009 |
| D4 | Communication plan | WP5<br>J. Sarrazin (P#7) | February 2009 |
| D5 | On shore integration and test report | WP2<br>J. Blandin (P#7) | June 2009 |
| D6 | Cruise preparation file | WP6<br>M. Cannat (P#3) J. Blandin and P.M. Sarradin (P#7) | June 2009 |
| D7 | Deployment of the system during the cruise | WP6<br>M. Cannat (P#3) J. Blandin and P.M. Sarradin (P#7) | Summer 2010 |
| D8 | 1 month data file | WP1- WP3<br>M. Cannat (P#3) T. Carval (P#7) | September 2010 |
| D9 | Report of dissemination activities | WP5<br>J. Sarrazin (P#7) | December 2010 |

## II.2. LIDO

| Partner Num. | Partner Institution Name | Principal Investigator (PI) for the Demo Mission | PI coordinates (Address, Email, Telephone, fax..) |
|---|---|---|---|
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| 24. | UB*<br>University of Bremen (Marum) | Christoph Waldmann | waldmann@marum.de |
| 25. | FFCUL/ CGUL*<br>Fundação da Faculdade de Ciências da<br>Universidade de Lisboa Centro de Geofísica<br>da Universidade de Lisboa | Jorge Miguel Miranda | jmiranda@fc.ul.pt |
| 26. | INGV<br>Istituto Nazionale di Geofisica e Vulcanologia | Paolo Favali | paolofa@ingv.it |
| 27. | ISMAR<br>Consiglio Nazionale delle Ricerche<br>Istituto Scienze Marine, Dipartimento di<br>Bologna | Nevio Zitellini | nevio.zitellini@bo.ismar.cnr.it |
| 28. | Istituto Nazionale di Fisica Nucleare<br>INFN* | Giorgio Riccobene | riccobene@lns.infn.it |
| 29. | Consejo Superior de Investigaciones CSIC*<br>Cientificas – Unitat de Tecnologia Marina -<br>Centre Mediterrani d'Investigacions Marines i Ambientals | Juan Josè Danobeitia | jjdanobeitia@cmima.csic.es |
| 30. | dBScale<br>dBS* | Eric Delory | eric@dbscale.com |
| 31. | Centro Interdisciplinare di Bioacustica e<br>CIBRA<br>Ricerche Ambientali, Università degli Studi di<br>Pavia | Gianni Pavan | gpavan@cibra.unipv.it |
| 32. | Technische Fachhochschule Berlin - FB VIII TFH*<br>- Maschinenbau, Verfahrens- und Umwelttechnik - AG Tiefseesysteme | Hans W. Gerber | hwgerber@ism.tu-berlin.de<br>hwgerber@tfh-berlin.de |
| 33. | Tecnomare-ENI S.p.A.<br>TEC* | Francesco Gasparoni | francesco.gasparoni@tecnomare.it |

| | |
|---|---|
| DM acronym: | *LIDO* |
| DM title: | *LISTENING TO THE DEEP-OCEAN ENVIRONMENT* |
| ESONET Site: | *EASTERN-SICILY & IBERIAN MARGIN* |
| Scientific Area(s): | *GEOPHYSICS & BIOACOUSTICS* |
| Technological Area(s): | *GEOPHYSICS & BIOACOUSTICS* |
| DM Start date: | *1 SEPTEMBER 2008* |
| DM duration: | *24 months* |

# *Executive summary*

LIDO (Listening to the Deep Ocean environment) proposes to establish a first nucleus of a regional network of multidisciplinary seafloor observatorios contributing to the coordination of high quality research in the ESONET NoE by allowing the long-term monitoring of Geohazards and Marine Ambient Noise in the Mediterranean Sea and the adjacent Atlantic waters. Specific activities are addressed to a long-term monitoring of earthquakes and tsunamis and the characterisation of ambient noise induced by marine mammals (Bioacoustics) and anthropogenic noise.

The objective of the proposal will be achieved through the extension of the present capabilities of the observatories working in the ESONET key-sites of Eastern Sicily (NEMO-SN1) and of the Gulf of Cadiz (GEOSTAR configured for NEAREST pilot experiment) by installing not-already-included sensor equipments related to Bioacoustics and Geohazards;

***Scientific Objectives***

Geo-Hazards: LIDO aims at improving the real-time and near-real-time detection of signals by a multiparameter seafloor observatory network at regional scale for the characterisation of potential tsunamigenic sources. Its methodological approach is based on the cross-checking of geophysical, oceanographic and environmental time series acquired on the seafloor and in the water column. LIDO will provide real-time and nearto-real-time seismological and water-pressure comparative time series from near-shore sources and operational tools (e.g., prototype of tsunameters) integrated in seafloor observation systems, and in the terrestrial Networks LIDO follows the recommendation of the Intergovernmental Coordination Group of the Intergovernmental Oceanographic Commission (UNESCO) for the North-Eastern Atlantic and Mediterranean Tsunami Warning System (ICG/NEAMTWS) for the urgent deployment of a tsunami warning system in the related areas with special regard to the definition of trans-national seismic and sea level monitoring networks.

Bioacoustics: LIDO will evaluate the human and natural contributions to marine ambient noise and for the first time describe the long-term trends in ambient Boise levels, especially from human activities (influenced for example by increasing shipping) and in marine mammals populations (migration patterns, presence, and habitat use of key species, like sperm -, fin - and beaked whales). LIDO will allow real-time and nearreal-time long-term acoustic monitoring of marine mammals at regional level, as well as noise propagation that could be in the next years correlated with the effects of anthropogenic impacts and climate changes, using the same infrastructure defined above.

***Technological objectives***

The technological objective of LIDO is the development of the first nucleus of a regional multiparameter seafloor network of homogeneous observatories (same sensors) and its long-term operability beyond the duration of LIDO demo mission in two ESONET key-sites, East Sicily (cabled) and Gulf of Cadiz (acoustically linked with a surface buoy).

**Scientific objectives, expected scientific achievements and impact with respect to ESONET WP1, WP3 and WP4**

*(methodologies/technique to achieve the objectives, scientific advancements and spin-off, 1 page recommended )*

*Geo-Hazards (INGV/INFN):* LIDO aims at improving the real-time and near-real-time detection of signals by a multiparameter seafloor observatory network at regional scale for the characterisation of potential tsunamigenic sources. Its methodological approach is based on the cross-checking of geophysical, oceanographic and environmental time series acquired on the seafloor and in the water column. LIDO will provide real-time and nearto-real-time seismological and water-pressure comparative time series from near-shore sources and operational tools (e.g., prototype of tsunameters) integrated in seafloor observation systems, and in the terrestrial Networks LIDO follows the recommendation of the Intergovernmental Coordination Group of the Intergovernmental Oceanographic Commission (UNESCO) for the North-Eastern Atlantic and Mediterranean Tsunami Warning System (ICG/NEAMTWS) for the urgent deployment of a tsunami warning system in the related areas with special regard to the definition of trans-national seismic and sea level monitoring networks.
The RT analysis of the geo-hazards is already implemented.

*Bioacoustics (UPC):* LIDO will evaluate the human and natural contributions to marine ambient noise and for the first time describe the long-term trends in ambient Boise levels, especially from human activities (influenced for example by increasing shipping) and in marine mammals populations (migration patterns, presence, and habitat use of key species, like sperm -, fin - and beaked whales). LIDO will allow real-time and nearreal-time long-term acoustic monitoring of marine mammals at regional level, as well as noise propagation that could be in the next years correlated with the effects of anthropogenic impacts and climate changes, using the same infrastructure defined above.

At that stage, the procedure for the acoustic management succeeded in RT separating sea-noise from interesting sound sources. The acoustic data stream in separated in 22 second segments that are submitted to a series of detectors (a series of eight) that discard any portion of data that does not contain targeted signals and catalogue the remaining in broad categories (tonal, impulse, etc.) that, in a second RT phase, will be classified in biological (mainly cetaceans) or man-made noise and will allow the tracking of interesting sound sources.
The third phase concerns the analysis of the classified data in terms of the biological assessment of the interactions between natural/biological sound source and noise.

The input to WP1 has consisted in organising several meetings in different locations, bringing together representatives of partner institutions (Roma, Catania, Barcelona, Vilanova i la Geltrú, etc.) both at a scientific, technical and management levels. Students have already started to spend time for practise in partner institutions (activity 1a4).
In terms of management, the RT acoustic data is showing that the chosen architecture can be extended and adapted to other ESONET sites depending on the local antenna configuration and ambient noise. Preliminary tests have been made with data coming from ANTARES (activity 1b4), significantly contributing to the concept for a multi-disciplinary generally accessible observatory network (activity 1b5).

WP3: *foresees specific scientific modules using technologies that might bring improved monitoring capacities will also be investigated*. By comparing a cabled observatory (Eatsern-Sicily) data analysis with a stand-alone (Iberian margin) observatory, LIDO greatly contributes to improve the monitoring capacities of both sites (activities 3a, 3b, 3c).

WP4: LIDO proposes to demonstrate a concept of real-time analysis of geohazards and bioacoustics that has the clear objective to be exported and adapted to the whole network of deep-sea observatories. (*UPC*)

**Test and Operations: expected results with respect to ESONET WP2, WP4 and WP5**

*(infrastructures, facilities, sensor packages, underwater intervention, sensor qualification, and achieved integration, 1 page recommended )*

## Eastern Sicily

Previous configuration

| Present Sensor | Sampling rate |
|---|---|
| Three-component broad-band seismometer | 100Hz |
| Hydrophone (geophysics) | 100 Hz |
| Hydrophones (bio-acoustics, OvDE) | 96 KHz |
| Gravity meter | 1 Hz |
| Scalar magnetometer | 1 sample every 10 min. |
| Three-axes single-point current meter | 2Hz |
| CTD | 1 sample every 12 min. |

Recovery succesfully performed on April 2008, in the same campaign for the SN1 recovery.
Test onshore after recovery: all the "acoustic" components were perfectly working. An auxiliary instrument, the compass, was not working due to bad fiber connection inside the internal vessel.

Improved configuration (estimated September-October 2009)

- Additional sensors:
  - → Absolute Pressure Gauge (APG)
  - → Differential Pressure Gauge (DPG)
  - → Acoustics Doppler Current Profiler (ADCP)
  - → Fluxgate magnetometer
  - → High sampling hydrophones for Bioacoustics

- Data acquisition and automatic processing

→ at seafloor : data digitalisation for seismological sensor package (seismometers + hydrophones)

→ on land : time series synchronisation + overall data acquisition + Tsunami detection algorithm + RT acoustic data management

## Iberian Margin

Previous configuration

| Sensor | rate | MODEL |
|---|---|---|
| Triaxial broad band seismometer | 100Hz | Guralp CMG-40 |
| Triaxial accelerometer | 100Hz | Guralp CMG5-T |
| Hydrophone | 100Hz | OAS E-2PD |
| Absolute Pressure Sensor | 15sec | Paroscientific 8CB4000-1 |
| Accelerometer+Gyros (IMU) | 100Hz | Gladiator Technologies Landmark 10 |
| Gravity meter | 1Hz | IFSI (INAF) Prototype #2 |
| CTD + Turbidimeter | 1smp/hour | SeaBird SBE 16 plus Wet Labs ECO-BBRTD 6000m |
| ADCP | 1profile/hour | RDI Workhorse 300 Khz |
| Currentmeter | 5Hz | Nobska MAVS-3 |

Improved configuration (estimated May 2009)

* Seafloor observatory equipment, hard and sft-ware unaltered

* Bioacoustics monitoring system installed on the buoy mooring with
- Autonomous power supply
- Local Data Storage
- Periodical transmission of significant events through satellite link

**Data Management: expected results with respect to ESONET WP1, WP6 and WP7**
*(data management plan, data infrastructure and data portal, accessibility, restrictions, public outreach, 1 page recommended )*

Interoperability (UB/dBscale) In LIDO observatories, as well as for ESONET observatories at large, the Data Management workpackage partners have focused on identifying primary hotspots for interoperability, at the physical interfacing layer and at the data access and presentation layer. So, here we will also give a primary set of possible standard solutions.

Effort has been made where it is thought prioritary to focus the attention for the implementation of interoperability concepts: at the physical layer sensor interface, at the main station's data servers, and in the encoding of hydrophones in standard format. The latter will imply agreement on a common vocabulary for ocean acoustic sensors and the contribution to and collaboration with ocean-related ontology initiatives.

One approach consists in opening a local directory to the public with a catalog service available and standard data and metadata formats. It is rather proven approach for data servers, and as a generic approach it lacks the specificities that ocean observatories may call for. For example there is no protocol companion for sensor control (it is about data and data only). Approach B, which is currently evolving (these standards have been recently fully-approved), answers a broader set of needs although due to its rather recent release it is more complex and risky to implement. One neat advantage as regards the sensor web approach is that is will evolve in close collaboration with the ocean community and ESONET is already contributing actively to its development (UB & dBscale).

Acoustic data management (UPC). Development of RT and automatic analysis softwares for the Long-term recording and analysis of natural, artificial and biological sound sources; Identification and tracking of cetaceans; Long-term noise interactions and masking. At the CTSL location, the 4 channels data will be streamed to the preprocessing server as we have just seen, that will be responsible for the analysis of the segments and the tagging of data. One channel will also be encoding the output of the analysis into mp3 format for public access. At that stage no storage is performed (available at the end of next month). The analysis server in turn will identify the acoustic sources and track them as much as possible (sperm, beaked whales, ships, etc.). These codes will be ready next spring 2009. At the LNS, besides the storage of the data at the MADS server, the web server will store the analysis results in xml format; make available mp3 data and analysis results to the flash client; stream analysis results to the LAB-UPC; and provide access to selected data stored for third parties (research collaborators, etc.). Finally, at the UPC, the server will be responsible of the configuration for the: General public access to Real-Time flash client; General public access to sound library; General public access to (statistical) analysis of the acoustic environment near the platform; Registration for third party collaboration and access control to high quality data.

# ANNEX B2
# Short Report for Councils for Demonstration Missions

# Short report for Councils
# From Demonstration Missions

# ESONET Demonstration Missions

Note for the Councils – October 2008

# MoMAR-D

| | |
|---|---|
| DM acronym: | MoMAR-D |
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| Technological Area(s): | TArea1 : interoperability, data transmission, power supply |
| DM Start date: | September 2008 |
| DM duration: | 24 |

| Partner Num. | Partner Institution Name | Principal Investigator (PI) for the Demo Mission | PI coordinates |
|---|---|---|---|
| 1 | DOP/UAÇ | A. Colaço | IMAR- Dept Oceanography and Fisheries-Univ of Azores, acolaco@uac.pt |
| 2 | FFCUL/CGUL | M. Miranda | Centro de Geofisica, Universidade de Lisboa, jmmiranda@fc.ul.pt |
| 3 | IPGP | M. Cannat | Equipe de Géosciences Marines. Institut de Physique du Globe de Paris. CNRS UMR 7154 cannat@ipgp.jussieu.fr |
| 4 | NOC | D. Connelly | Geochemistry Group National Oceanography Centre dpc@noc.soton.ac.uk |
| 5 | CNRS - F<br><br>CNRS - C | V. Chavagnac<br><br>J. Goslin | LMTG - UMR 5563 UR 154 CNRS Université Paul-Sabatier IRD Observatoire Midi-Pyrénées - chavagnac@lmtg.obs-mip.fr<br>UMR6538 "Domaines Oceaniques" U.Bretagne Occidentale-CNRS IUEM - Jean.Goslin@univ-brest.fr |
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Associated partners

| | | | |
|---|---|---|---|
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## 1- Executive summary

The MoMAR (Monitoring the Mid Atlantic Ridge) initiative aims at providing multidisciplinary time-series data set for hydrothermal systems in the Azores region of the Mid-Atlantic Ridge. This coordinated plan aims at determining the feed-backs between volcanism, deformation, seismicity, and hydrothermalism, and to understand how hydrothermal ecosystems couple with these sub-surface processes, and how this affects exchanges with the ocean.
Monitoring at Lucky Strike has started with the MoMARETO (ecology), GRAVILUCK (geodesy), and BBMoMAR (sismology and MT) experiments and will be further implemented in 2008 with the

deployment of autonomous temperature probes at selected vents. MoMARSAT will maintain and reinforce these experiments, with a stronger participation of colleagues from other European countries. MoMARSAT is the cruise proposal to implement the MoMAR-D project.
We will use the SEAMON technology developed during the ASSEM EC project, with two nodes acoustically linked to a surface buoy that will ensure satellite communication to a land base station. The system will comprise 2 scientific nodes: a geophysical node moored in the Lucky Strike lava lake, and a geochemical/ecological node at the Eiffel Tower vent site. This observatory infrastructure will acquire a synchronized multidisciplinary data set, and allow us to develop solutions for sensor interoperability, shore-sensor interactive communication, data management and dissemination, and public outreach.
MoMARSAT comprises two multidisciplinary ROV cruises, the first one is prescheduled in 2010 to deploy the acoustically-linked multidisciplinary observing system at the Lucky Strike vent field and the second one in 2010 to recover it. The study area belongs to the Portuguese ZEE and is part of a planned OSPAR "Marine Protected Area".

| WP# | WP/Activity name | Leader |
|---|---|---|
| 1 | Scientific experiments | M. Cannat (P#3) |
| 2 | Infrastructure of the observing system | J. Blandin (P#7) |
| 3 | Data management | T. Carval (P#7) |
| 4 | Site management | A. Colaço (P#1) |
| 5 | Communication plan | J. Sarrazin (P#7) |
| 6 | Cruise | M. Cannat (P#3)<br>J. Blandin and P.M. Sarradin (P#7) |
| 7 | Management | A. Colaço (P#1) & P.M. Sarradin (P#7) |

## 2- Progress of the project

In January 2008, the MoMARSAT cruise proposal was submitted to the French Fleet Committee. After evaluation, the cruise has been prescheduled for the summer 2010. The activity of the MoMAR-D DM was then postponed to cope with this new schedule. The first MoMAR-D plenary meeting will be held in early 2009.
In August 2008, the TEMPO module was recovered during the MoMAR 08 cruise at Lucky Strike. TEMPO was moored during the MoMARETO cruise in 2006. TEMPO constituted a first long term at sea trial of the MoMAR-D ecological node. After nearly 2 years on the bottom (instead of 1 year), TEMPO was in a good state and has recorded video images, temperature and chemical data. The time series obtained are currently under treatment, the mooring is under technological expertise.

## 3- Scientific objectives M. Cannat, IPGP, (P#3)

Monitoring at Lucky Strike aims at determining the feed-backs between volcanism, deformation, seismicity, and hydrothermalism, and to understand how the hydrothermal ecosystem couples with these sub-surface processes. Experiments planned at the Lucky Strike vent field as part of this demonstration mission will belong to 5 thematic packages exploring the dynamics of the geosphere, its impact on the hydrothermal fluid temperature and composition, and on the associated fauna and finally the exchange with the ocean.

Thematic Package 1:Seismicity and hydrothermal activity
Thematic Package 2: Vertical deformation of the seafloor at the Lucky Strike volcano
Thematic Package 3: Chemical fluxes at Lucky Strike vents
Thematic Package 4: Ecology at Lucky Strike vents
Thematic Package 5: Physical oceanography

The experimental design will combine autonomous instruments which will store data over the duration of the mission, and instruments that will be connected to shore via the SEAMON system. Two SEAMON nodes will be deployed in the Lucky Strike vent field, one to the west of the lava lake primarily for geophysical instruments (the "geophysical node"), and one at the bottom of the Tour Eiffel edifice in the east, primarily for fluid chemistry and ecology (the "Tour Eiffel node"). A site survey will be performed

before the implementation and after the recovery of the observatory infrastructure to validate the time series obtained during 12 months and to increase the spatial representativeness of the time series.
Scientific integration of collected data sets will be conducted in two stages: in near real time for the subset of data transmitted through the SEAMON system; and after the 12 months of the demonstration for the whole data set. The near real time data will serve both as support for scientific interpretation, and as an indicator that an "event" is occurring. Events at Lucky Strike may be volcanic (eruption, underground dyking event, or rapid degassing of the magma chamber), tectonic (displacement along axial faults), or hydrothermal. The response or the impact of these events on biological communities (micro organism bloom, composition, structure,) is one of the key scientific questions behind this proposal.

Our array of connected sensors will be able to detect all, or most of these events. Rapid response is particularly indicated in the case of a volcanic event, as it has been shown to profoundly modify vent ecosystems, with a variability of hours, days, and weeks, probably extending to years. Our rapid response capability at Lucky Strike will be limited, but enough to open exciting opportunities. The SEAMON capability for interrogating sensors and modifying certain parameters from shore allows us for example to modify data sampling rates for a given sensor, if an event is detected. We also plan to take advantage of the access the Azores-based RV Arquipelago, which unfortunately does not allow for ROV-type intervention, but can perform water column sampling, and recover acoustically released device.

**Test and Operations** J. Blandin, Ifremer (P#7) for the infrastructure, M. Cannat (P#3), J. Blandin and P.M. Sarradin (P#7) for the cruise.

The SEAMON (Sea Monitoring Node) technology was developed during the ASSEM project. It is an integrated system that provides a set of sensors with energy, data acquisition capabilities and several data communication channels. Those can be local communication with an ROV or manned submersible, for underwater installation and maintenance purposes, acoustic communication to a passing-by ship for partial data recovery, or communication to a permanent installation on shore via a buoy (BOREL) moored in the vicinity and acting as a relay between acoustic and satellite segments. SEAMON stations can be operated either as stand-alone monitoring stations (e.g. the TEMPO module deployed at Lucky Strike) or as monitoring nodes for the connection of seabed sensors. The SEAMON stations are rated for 4000 mwd operations. Each one can provide 8 kW h allowing for the sensors operation and a daily data transmission of *ca.* 40 kbytes. The final tuning of each sensor connected to SEAMON will be done according to this energy budget. SEAMON station can be seen in a phased implementation strategy as precursor of cabled junction boxes.

We plan to install 2 SEAMON nodes during the MoMARSAT cruise:

- SEAMON-East will be primarily devoted to thematic experiments 4 (Ecology) and 3 (Vent fluid chemistry). It will hold the video camera, the chemical sensors and the CTD/ADCP package. T-probes and array connected to this station will also provide time-series data for experiment 1 (Seismicity and hydrothermal activity). This node will be moored at the basis of the active hydrothermal edifice Tour Eiffel, to carry on the work done by the TEMPO station during the MoMARETO cruise.
- SEAMON-West will be primarily devoted to thematic experiments 1 (Seismicity and hydrothermal activity) and 2 (Seafloor deformation). It will be connected to the pressure probe, to one OBSand one OBM, and to T-Probes. This second node will be moored in the western part of the fossil lava lake, near the present location of the pressure probe installed in 2006.

The BOREL Buoy acts as a data transmission relay. For reliability reasons, the system comprises two redundant communication channels, each composed of an acoustic modem, a local interface and management electronic unit and an Iridium modem. Energy sources are also redundant. Two local sensors interfaces are also available on the buoy. The buoy position is transmitted to shore every 6 hours. Data transmitted by the sensors through the SEAMON Node and the buoy will be received on shore every 6 hours from the sea, controlled, and archived. Furthermore, interrogation of sensors and modification of functioning parameters is possible at any time from shore. Finally, the transmission of alarms generated on the seabed may be implemented under conditions to be defined. The response or the impact of these

events to biological communities (micro organism bloom, composition, structure, …) is one of the key question of this proposal..

**Sensors connected to the Seamon nodes**

| Sensors | In charge | Node |
|---|---|---|
| GPS | V. Ballu | Borel buoy |
| OBS | M. Miranda | SEAMON-West |
| Pressure gauge | V. Ballu | SEAMON-West |
| Ocean bottom tiltmeter | H. Villinger | SEAMON-West |
| T probes | J. Escartin | SEAMON-East |
| In situ Fe & Mn | D. Connelly | SEAMON-East |
| $CH_4$ | D. Connelly | SEAMON-East |
| Video imagery | J. Sarrazin | SEAMON-East |
| Optode | P.M. Sarradin | SEAMON-East |
| In situ Fe | P.M. Sarradin | SEAMON-East |
| CTD/ ADCP | C. Waldmann | SEAMON-East |

**Data Management** T. Carval (Ifremer, (P#7))

Data management and dissemination is a key task in the implementation of a multidisciplinary long term observatory. Principles of data management and dissemination will be discussed at the beginning of the MoMAR-D project (Spring 2008) to obtain a formal participant agreement. The data management policy and procedure will be defined taking benefit of the experience gained by Neptune Canada. The principles to be specified are: i) the definition of the data to be acquired, ii) the procedures of control for these data and the definition of metadata in accordance with the standards recommendations on data documentation, and finally iii) the dissemination level. The framework for this discussion is defined in the ESONET Description of Work. Data management procedures will be fully compatible with international recommendations and standards in order to improve interoperability with other systems and to ease comparison with other datasets: ISO standards for metadata, COI/WMO standards for quality flag scale. SISMER will collect, flag and archive the data (in real time and after the recovery). Data will be made available online according to ESONET data policy and European directives. Data will also be forwarded to data centres involved in the ESONET project in order to be permanently archived and distributed.
The MoMAR-D demonstration will also produce data from autonomous sensors or complementary site studies. These data will also be archived and part of the demonstration will be to design appropriate procedures for control and dissemination of these data. Site survey data acquired during the cruises will be available through the BIOCEAN database.
An important task of our data management WG will be to develop links between the MoMAR-D data management system, and the data management systems currently used for volcanic and seismic monitoring, and for ecosystem inventory and surveillance, at and near the Azores Islands. To this aim, we have secured the participation of colleagues from the Centro de Vulcanologia e Avaliação de Riscos Geológicos, and from the Department of Oceanography and Fisheries of the University of the Azores.
The data management policy will be decided during the next MoMAR-D meeting. However, some restrictions will appear as the MoMAR-D project involves sensor prototypes.

| | Deliverable Name | Responsible Institution | Date |
|---|---|---|---|
| D1 | Cruise proposal submission | WP6<br>M. Cannat (P#3) J. Blandin and P.M. Sarradin (P#7) | January 2008 |
| D2 | Report Description of the operational system : interface specifications, sensors, localisation | WP2<br>J. Blandin (P#7) | February 2009 |
| D3 | Signed agreement Data management policy | WP3<br>T. Carval (P#7) | February 2009 |
| D4 | Communication plan | WP5<br>J. Sarrazin (P#7) | February 2009 |
| D5 | On shore integration and test report | WP2<br>J. Blandin (P#7) | June 2009 |
| D6 | Cruise preparation file | WP6<br>M. Cannat (P#3) J. Blandin and P.M. Sarradin (P#7) | June 2009 |
| D7 | Deployment of the system during the cruise | WP6<br>M. Cannat (P#3) J. Blandin and P.M. Sarradin (P#7) | Summer 2010 |
| D8 | 1 month data file | WP1- WP3<br>M. Cannat (P#3) T. Carval (P#7) | September 2010 |
| D9 | Report of dissemination activities | WP5<br>J. Sarrazin (P#7) | December 2010 |

| Partner Num. | Partner Institution Name | Principal Investigator (PI) for the Demo Mission | PI coordinates (Address, Email, Telephone, fax..) |
|---|---|---|---|
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| 4. | INGV<br>Istituto Nazionale di Geofisica e Vulcanologia | Paolo Favali | paolofa@ingv.it |
| 5. | ISMAR<br>Consiglio Nazionale delle Ricerche<br>Istituto Scienze Marine, Dipartimento di Bologna | Nevio Zitellini | nevio.zitellini@bo.ismar.cnr.it |
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| 8. | dBScale<br>dBS* | Eric Delory | eric@dbscale.com |
| 9. | Centro Interdisciplinare di Bioacustica e CIBRA<br>Ricerche Ambientali, Università degli Studi di<br>Pavia | Gianni Pavan | gpavan@cibra.unipv.it |
| 10. | Technische Fachhochschule Berlin -FB VIII TFH*<br>- Maschinenbau, Verfahrens- und Umwelttechnik - AG Tiefseesysteme | Hans W. Gerber | hwgerber@ism.tu-berlin.de<br>hwgerber@tfh-berlin.de |
| 11. | Tecnomare-ENI S.p.A.<br>TEC* | Francesco Gasparoni | francesco.gasparoni@tecnomare.it |

| | |
|---|---|
| DM acronym: | *LIDO* |
| DM title: | *LISTENING TO THE DEEP-OCEAN ENVIRONMENT* |
| ESONET Site: | *EASTERN-SICILY & IBERIAN MARGIN* |
| Scientific Area(s): | *GEOPHYSICS & BIOACOUSTICS* |
| Technological Area(s): | *GEOPHYSICS & BIOACOUSTICS* |
| DM Start date: | *1 SEPTEMBER 2008* |
| DM duration: | *24 months* |

**Executive summary** *(max half page)*
*Brief description of the DM*

**LIDO (Listening to the Deep Ocean environment) proposes to establish a first nucleus of a regional network of multidisciplinary seafloor observatorios contributing to the coordination of high quality research in the ESONET NoE by allowing the long-term monitoring of Geohazards and Marine Ambient Noise in the Mediterranean Sea and the adjacent Atlantic waters. Specific activities are addressed to a long-term monitoring of earthquakes and tsunamis and the characterisation of ambient noise induced by marine mammals (Bioacoustics) and anthropogenic noise.**

The objective of the proposal will be achieved through the extension of the present capabilities of the observatories working in the ESONET key-sites of Eastern Sicily (NEMO-SN1) and of the Gulf of Cadiz (GEOSTAR configured for NEAREST pilot experiment) by installing not-already-included sensor equipments related to Bioacoustics and Geohazards;

***Scientific Objectives***
Geo-Hazards: LIDO aims at improving the real-time and near-real-time detection of signals by a multiparameter seafloor observatory network at regional scale for the characterisation of potential tsunamigenic sources. Its methodological approach is based on the cross-checking of geophysical, oceanographic and environmental time series acquired on the seafloor and in the water column. LIDO will provide real-time and nearto-real-time seismological and water-pressure comparative time series from near-shore sources and operational tools (e.g., prototype of tsunameters) integrated in seafloor observation systems, and in the terrestrial Networks LIDO follows the recommendation of the Intergovernmental Coordination Group of the Intergovernmental Oceanographic Commission (UNESCO) for the North-Eastern Atlantic and Mediterranean Tsunami Warning System (ICG/NEAMTWS) for the urgent deployment of a tsunami warning system in the related areas with special regard to the definition of trans-national seismic and sea level monitoring networks.

Bioacoustics: LIDO will evaluate the human and natural contributions to marine ambient noise and for the first time describe the long-term trends in ambient Boise levels, especially from human activities (influenced for example by increasing shipping) and in marine mammals populations (migration patterns, presence, and habitat use of key species, like sperm -, fin - and beaked whales). LIDO will allow real-time and nearreal-time long-term acoustic monitoring of marine mammals at regional level, as well as noise propagation that could be in the next years correlated with the effects of anthropogenic impacts and climate changes, using the same infrastructure defined above.

***Technological objectives***
The technological objective of LIDO is the development of the first nucleus of a regional multiparameter seafloor network of homogeneous observatories (same sensors) and its long-term operability beyond the duration of LIDO demo mission in two ESONET key-sites, East Sicily (cabled) and Gulf of Cadiz (acoustically linked with a surface buoy).

**Scientific objectives, expected scientific achievements and impact with respect to ESONET WP1, WP3 and WP4**
*(methodologies/technique to achieve the objectives, scientific advancements and spin-off, 1 page recommended )*

*Geo-Hazards (INGV/INFN):* LIDO aims at improving the real-time and near-real-time detection of signals by a multiparameter seafloor observatory network at regional scale for the characterisation of potential tsunamigenic sources. Its methodological approach is based on the cross-checking of geophysical, oceanographic and environmental time series acquired on the seafloor and in the water column. LIDO will provide real-time and nearto-real-time seismological and water-pressure comparative time series from near-shore sources and operational tools (e.g., prototype of tsunameters) integrated in seafloor observation systems, and in the terrestrial Networks LIDO follows the recommendation of the Intergovernmental Coordination Group of the Intergovernmental Oceanographic Commission (UNESCO) for the North-Eastern Atlantic and Mediterranean Tsunami Warning System (ICG/NEAMTWS) for the urgent deployment of a tsunami warning system in the related areas with special regard to the definition of trans-national seismic and sea level monitoring networks.
The RT analysis of the geo-hazards is already implemented.

*Bioacoustics (UPC):* LIDO will evaluate the human and natural contributions to marine ambient noise and for the first time describe the long-term trends in ambient Boise levels, especially from human activities (influenced for example by increasing shipping) and in marine mammals populations (migration patterns, presence, and habitat use of key species, like sperm -, fin - and beaked whales). LIDO will allow real-time and nearreal-time long-term acoustic monitoring of marine mammals at regional level, as well as noise propagation that could be in the next years correlated with the effects of anthropogenic impacts and climate changes, using the same infrastructure defined above.

At that stage, the procedure for the acoustic management succeeded in RT separating sea-noise from interesting sound sources. The acoustic data stream in separated in 22 second segments that are submitted to a series of detectors (a series of eight) that discard any portion of data that does not contain targeted signals and catalogue the remaining in broad categories (tonal, impulse, etc.) that, in a second RT phase, will be classified in biological (mainly cetaceans) or man-made noise and will allow the tracking of interesting sound sources. The third phase concerns the analysis of the classified data in terms of the biological assessment of the interactions between natural/biological sound source and noise.

The input to WP1 has consisted in organising several meetings in different locations, bringing together representatives of partner institutions (Roma, Catania, Barcelona, Vilanova i la Geltrú, etc.) both at a scientific, technical and management levels. Students have already started to spend time for practise in partner institutions (activity 1a4).

In terms of management, the RT acoustic data is showing that the chosen architecture can be extended and adapted to other ESONET sites depending on the local antenna configuration and ambient noise. Preliminary tests have been made with data coming from ANTARES (activity 1b4), significantly contributing to the concept for a multi-disciplinary generally accessible observatory network (activity 1b5).

WP3: *foresees specific scientific modules using technologies that might bring improved monitoring capacities will also be investigated*. By comparing a cabled observatory (Eatsern-Sicily) data analysis with a stand-alone (Iberian margin) observatory, LIDO greatly contributes to improve the monitoring capacities of both sites (activities 3a, 3b, 3c).

WP4: LIDO proposes to demonstrate a concept of real-time analysis of geohazards and bioacoustics that has the clear objective to be exported and adapted to the whole network of deep-sea observatories. (*UPC*)

**Test and Operations: expected results with respect to ESONET WP2, WP4 and WP5**

*(infrastructures, facilities, sensor packages, underwater intervention, sensor qualification, and achieved integration, 1 page recommended )*

## Eastern Sicily

Previous configuration

| Present Sensor | Sampling rate |
|---|---|
| Three-component broad-band seismometer | 100Hz |
| Hydrophone (geophysics) | 100 Hz |
| Hydrophones (bio-acoustics, OvDE) | 96 KHz |
| Gravity meter | 1 Hz |
| Scalar magnetometer | 1 sample every 10 min. |
| Three-axes single-point current meter | 2Hz |
| CTD | 1 sample every 12 min. |

Improved configuration (September-October 2009)

- **Additional sensors**:

→Absolute Pressure Gauge (APG)

→ Differential Pressure Gauge (DPG)

→ Acoustics Doppler Current Profiler (ADCP)

→ Fluxgate magnetometer

→ High sampling hydrophones for Bioacoustics

- **Data acquisition and automatic processing**

→at seafloor: data digitalisation for seismological sensor package (seismometers + hydrophones)

→on land: time series synchronisation + overall data acquisition + Tsunami detection algorithm + RT acoustic data management

## Iberian Margin

Previous configuration

| Sensor | rate | MODEL |
|---|---|---|
| Triaxial broad band seismometer | 100Hz | Guralp CMG-40 |
| Triaxial accelerometer | 100Hz | Guralp CMG5-T |
| Hydrophone | 100Hz | OAS E-2PD |
| Absolute Pressure Sensor | 15sec | Paroscientific 8CB4000-1 |
| Accelerometer+Gyros (IMU) | 100Hz | Gladiator Technologies Landmark 10 |
| Gravity meter | 1Hz | IFSI (INAF) Prototype #2 |
| CTD + Turbidimeter | 1smp/hour | SeaBird SBE 16 plus Wet Labs ECO-BBRTD 6000m |
| ADCP | 1profile/hour | RDI Workhorse 300 Khz |
| Currentmeter | 5Hz | Nobska MAVS-3 |

Improved configuration (May 2009)

- Seafloor observatory equipment, hard- and soft-ware unaltered

- Bioacoustics monitoring system installed on the buoy mooring with
  - Autonomous power supply
  - Local Data Storage
  - Periodical transmission of significant events through satellite link

**Data Management: expected results with respect to ESONET WP1, WP6 and WP7**

*(data management plan, data infrastructure and data portal, accessibility, restrictions, public outreach, 1 page recommended )*

In LIDO observatories, as well as for ESONET observatories at large, the Data Management workpackage partners have focused on identifying primary hotspots for interoperability, at the physical interfacing layer and at the data access and presentation layer. So, here we will also give a primary set of possible standard solutions.

Effort has been made where it is thought prioritary to focus the attention for the implementation of interoperability concepts: at the physical layer sensor interface, at the main station's data servers, and in the encoding of hydrophones in standard format. The latter will imply agreement on a common vocabulary for ocean acoustic sensors and the contribution to and collaboration with ocean-related ontology initiatives.

One approach consists in opening a local directory to the public with a catalog service available and standard data and metadata formats. It is rather proven approach for data servers, and as a generic approach it lacks the specificities that ocean observatories may call for. For example there is no protocol companion for sensor control (it is about data and data only). Approach B, which is currently evolving (these standards have been recently fully-approved), answers a broader set of needs although due to its rather recent release it is more complex and risky to implement. One neat advantage as regards the sensor web approach is that is will evolve in close collaboration with the ocean community and ESONET is already contributing actively to its development (UB & dBscale).

Acoustic data management (UPC). Development of RT and automatic analysis softwares for the Long-term recording and analysis of natural, artificial and biological sound sources; Identification and tracking of cetaceans; Long-term noise interactions and masking. At the CTSL location, the 4 channels data will be streamed to the preprocessing server as we have just seen, that will be responsible for the analysis of the segments and the tagging of data. One channel will also be encoding the output of the analysis into mp3 format for public access. At that stage no storage is performed (available at the end of next month). The analysis server in turn will identify the acoustic sources and track them as much as possible (sperm, beaked whales, ships, etc.). These codes will be ready next spring 2009. At the LNS, besides the storage of the data at the MADS server, the web server will store the analysis results in xml

format; make available mp3 data and analysis results to the flash client; stream analysis results to the LAB-UPC; and provide access to selected data stored for third parties (research collaborators, etc.). Finally, at the UPC, the server will be responsible of the configuration for the: General public access to Real-Time flash client; General public access to sound library; General public access to (statistical) analysis of the acoustic environment near the platform; Registration for third party collaboration and access control to high quality data.

# ANNEX B3
# Sensor ML-Template Creation

# SensorML template creation: ESTOC site

**Date: 21/04/2008**

**Introduction**

Here is a first attempt to create a SensorML description for ESTOC mooring.
I initially focus on CTD observations.
There should be one metadata file per instrument deployment.
I use Oxygen XML editor (www.oxygenxml.com).

I think that we have to insert all the following information in the meta-data file:

- All the content of the global attributes section from an OceanSITES data-file of a mooring deployment (annex 1).
- All the content from the EuroSITES web site (annex 2).
- The sensors description, including serial numbers and calibrations (available from NOCs ?).

The original template file comes from <MMI /> web site, MBARI CTD example (John Graybeal).
http://marinemetadata.org/examples/mmihostedwork/ontologieswork/mmiworkshop06/materials/track1/sensorml/EXAMPLES/MBARI_CTD_SensorML/view

**OSML: OceanSITES Markup Language**

To store all the content of Annex 1 (global attribute section of an OceanSITES NeTCDF data file), I created an <osml:netcdf_global_attributes> tag.
It gives a direct link between OceanSITES NeTCDF format and OceanSITES SensorML format. This is maybe not very orthodox, but it will make the firsts SensorML steps easier. Hopefully, this OSML will merge into plain SensorML content.

```
<osml:netcdf_global_attributes>
        <!-- WHAT -->
        <osml:data_type>OceanSITES time-series data</osml:data_type>
        <osml:format_version>1.1</osml:format_version>
…
        <osml:qc_manual>OceanSites quality control manual V1.0</osml:qc_manual>
</osml:netcdf_global_attributes>
```

# Annex 1: OceanSITES data file, meta-data subset

This is the global attribute section of an OceanSITES NeTCDF data file.

| Name | Example | Definition |
|---|---|---|
| **WHAT** | | |
| data_type | data_type="OceanSITES time-series data" | This field contains the type of data contained in the file. The list of acceptable data types is in reference table 1. Example: "OceanSITES time-series data". **This attribute is mandatory**. |

| | | |
|---|---|---|
| format_version | format_version="1.1" | OceanSITES format version<br>Example: "1.1".<br>**This attribute is mandatory**. |
| platform_code | platform_code="CIS-1" | Platform unique code within OceanSITES project.<br>Example:<br>"CIS-1" mooring on CIS site (Central Irminger Sea).<br>**This attribute is mandatory.** |
| date_update | date_update="2006-04-11T08:35:00Z" | File update or creation date (UTC). See note on time format below.<br>**This attribute is mandatory.** |
| institution | institution="National Oceanographic Centre" | Specifies institution where the original data was produced. |
| site_code | site_code="CIS" | Name of the site within OceanSITES project.<br>Example: "CIS" for Central Irminger Sea. |
| wmo_platform_code | wmo_platform_code="48409" | WMO (World Meteorological Organization) identifier.<br>This platform number is unique within the OceanSITES project.<br>Example: "48409" for CIS-1 mooring. |
| source | source="Mooring observation" | The method of production of the original data. For OceanSITES data, use one of the following:<br>"Shipborne observation", "Mooring observation" |
| history | history= "2005-04-11T08:35:00Z data collected, A. Meyer.\n 2005-04-12T10:11:00Z OceanSITES file with post-recovery data compiled and sent to DAC, A. Meyer." | Provides an audit trail for modifications to the original data. It should contain a separate line for each modification, with each line beginning with a timestamp, and including user name, modification name, and modification arguments. The time stamp should follow the format outlined in the note on time formats below. |
| data_mode | data_mode="R" | Indicates if the file contains real-time, post-recovery, or delayed-mode data.<br>The list of valid data modes is in reference table 5. |
| quality_control_indicator | quality_control="6" | Level of quality control applied to data.<br>The values are listed in reference table 2.1. |
| quality_index | quality_index="A" | A code value valid for the whole dataset:<br>0 unknown quality<br>A excellent (no known problems, regular quality checking)<br>B probably good (occasional problems, validation phase)<br>C extremely suspect, frequent problems |
| references | references="http://www.oceansites.org, http://www.noc.soton.ac.uk/animate/index.php" | Published or web-based references that describe the data or methods used to produce it. Include a reference to OceanSITES and a project-specific reference if appropriate. |
| comment | comment="…" | Miscellaneous information about the data or methods used to produce it. Any free-format text is appropriate. |
| conventions | conventions="OceanSITES Manual 1.1, CF-1.1" | Name of the conventions followed by the dataset. |
| netcdf_version | netcdf_version="3.5" | Netcdf version used for the data set |
| title<br>summary | title="CIS Mooring Data"<br>summary="Oceanographic mooring data from CIS observatory in the Central Irminger Sea, North Atlantic, in 2005. Measured properties: temperature and salinity at ten depth levels." | Free-format text describing the dataset. The display of these two attributes together should allow data discovery for a human reader.<br>"title": title of the dataset. Use the file name if in doubt.<br>"summary": a longer description of the dataset. A paragraph of up to 100 words is appropriate. |

| | | |
|---|---|---|
| naming_authority id | naming_authority="OceanSITES" id="OS_CIS-1_200502_TS" | The "id" and "naming_authority" attributes are intended to provide a globally unique identification for each dataset. For OceanSITES data, choose: naming_authority="OceanSITES" and id=file name (without .nc suffix), which is designed to be unique. |
| cdm_data_type | cdm_data_type="Station" | The "cdm_data_type" attribute gives the Unidata CDM (common data model) data type used by THREDDS. E.g. "Point", "Trajectory", "Station", "Radial", "Grid", "Swath". Use "Station" for OceanSITES mooring data. More: http://www.unidata.ucar.edu/projects/THREDDS/CDM/CDM-TDS.htm |
| **WHERE** | | |
| area | area="North Atlantic Ocean" | Geographical coverage. Try to compose of the following: North/Tropical/South Atlantic/Pacific/Indian Ocean, Southern Ocean, Arctic Ocean. |
| geospatial_lat_min | geospatial_lat_min="59.8" | The southernmost latitude, a value between -90 and 90 degrees. |
| geospatial_lat_max | geospatial_lat_max="59.8" | The northernmost latitude, a value between -90 and 90 degrees. |
| geospatial_lon_min | geospatial_lon_min="-41.2" | The westernmost longitude, a value between -180 and 180 degrees. |
| geospatial_lon_max | geospatial_lon_max="-41.2" | The easternmost longitude, a value between -180 and 180 degrees. |
| geospatial_vertical_min | geospatial_vertical_min="10.0" | Minimum depth for measurements |
| geospatial_vertical_max | geospatial_vertical_max="2000" | Maximum depth for measurements |
| **WHEN** | | |
| time_coverage_start | time_coverage_start="2006-03-01T00:00:00Z" | Start date of the data in UTC. See note on time format below. |
| time_coverage_end | time_coverage_end="2006-03-05T23:59:29Z" | Final date of the data in UTC. See note on time format below. |
| **WHO** | | |
| institution_references | institution_references="http://www.nocs.uk" | References to data provider institution, the place to find all information on the dataset (web-based, i.e. give URLs). |
| contact | contact="codac@nocs.uk" | Contact person's e-mail. |
| author | author="John Smith" | Name of the person responsible for the creation of the dataset. |
| data_assembly_center | data_assembly_center="EUROSITES" | Data Assembly Center (DAC) in charge of this data file. The data_assembly_center are listed in reference table 4. |
| pi_name | pi_name="Alice Juarez" | Name of the principal investigator in charge of the platform. |
| **HOW** | | |

| | | |
|---|---|---|
| distribution_statement | distribution_statement="Follows CLIVAR (Climate Varibility and Predictability) standards, cf. http://www.clivar.org/data/data_policy.php. Data available free of charge. User assumes all risk for use of data. User must display citation in any publication or product using data. User must contact PI prior to any commercial use of data." | Statement describing data distribution policy. OceanSITES has adopted the CLIVAR data policy, which explicitly calls for free and unrestricted data exchange. Details at: http://www.clivar.org/data/data_policy.php |
| citation | citation="These data were collected and made freely available by the OceanSITES project and the national programs that contribute to it." | The citation to be used in publications using the dataset. |
| update_interval | update_interval="daily" | Update interval for the file, one of the following: "hourly", "daily", "yearly", "void". Use "void" for delayed-mode or archive data that do not need continuous updating. |
| qc_manual | qc_manual="OceanSITES User's Manual v1.1" | This field contains the name of the manual that describes the quality control procedure. As of now, there is no separate QC manual, so the user's manual is the appropriate reference. |

# Annex 2 : EuroSITES web site content, ESTOC description

Here is the content of the web dscription of ESTOC mooring (see http://www.eurosites.info/estoc.htm).
The green xml tags indicate where to find the described items in the SensorML file.

<gml:location>
Latitude and Longitude:29.04N, -15.15W
Depth: 3670m
Oceanographic Region: Northeast Atlantic, Subtropical gyre

<gml:description>
History of the Site:
ESTOC was initiated in 1994 about 100 km north of the Canary islands and in 3618 m water depth. Its intention is to create a long time series on an inter- and multidisciplinary basis in order to monitor and help understanding oceanic long-term variability in the North atlantic's subtropical gyre in conjunction with the Bermuda station BATS. It is an open ocean site in the sense that it is located well outside the highly variable eastern boundary with its strong coastal upwelling regime (although interaction with this regime exists), is deep enough to encompass the eastern subtropical North Atlantic's major water masses including the North Atlantic Deep Water (however not the AABW), is windward of the Canary Islands to avoid wake effects of both the major currents and winds (Canary Current and Northeast Trade), and is far enough from coasts and islands (the Selvages 100 km northwards are very small and flat) to serve as reference for satellite images and altimetry. Thus, it is expected that long-term observations at ESTOC represent open-ocean eastern subtropical North Atlantic conditions and variability. Finally, ESTOC is easy to reach by and be serviced with small research vessels.

Parameters measured:
Parameter Depths measured (m) Sensor(s) used
<sml:capabilities> <swe:field name="Depth Capability">

---

Temperature various MicroCAT
Salinity various MicroCAT
Chl-a WETLabs FLNTUSB
Nitrate NAS2 NO3
PAR -
Dissolved Carbon Dioxide Sunburst SAMI
POC -
Sea pressure various MicroCAT
Dissolved Oxygen -
Wave Height -
Current Profile ADCP
Turbidity -

Enhancement/Modifications planned within EuroSITES:

Continuation: Real-time and delayed-mode data on PCO2, Chlorophyll, nutrients and water column physics. (Karstensen et al. 2006): Enhancement: pCO2, O2, near-real time pH.

Contacts:
Principal Investigators: Octavio Llinas Gonzalez, Melchor González Dávila, Magdalena Santana-Casiano

Links to related websites:
http://www.noc.soton.ac.uk/animate/

# ANNEX B4
# ANTARES data management

# ANTARES
# Data management

## I) Introduction.

ANTARES is a large water Cherenkov detector immersed at 2500m depth off the island off Porquerolles (Var - France). This neutrino telescope is optimised for the detection of muons produced from high-energy astrophysical neutrinos. Detecting high energy neutrinos, from a astrophysical source, will open a new window on the Universe.

### a) Detection principle.

Since the Earth acts as a shield against all particles except neutrinos, a neutrino telescope uses the detection of upward-going muons as a signature of muon neutrino interactions in the matter below the detector. The muon detection medium may be a natural body of water or ice through which the muon emits Cherenkov light. Observing the Cherenkov radiation allows us to determine of the muon trajectory and the origin of the neutrino.

### b) Detector.

The detector consists of 12 vertical strings separated by about 70 metres (spread over an area of about 0.1 $km^2$) and with an active height of about 350 metres. Each line consists of 25 storeys of three optical modules (photomultiplier in pressure resistant glass sphere), giving a three-dimensional array of approximately 900 photomultiplier tubes. Figure 1 shows a schematic view of part of the detector array indicating the principal components of the detector.

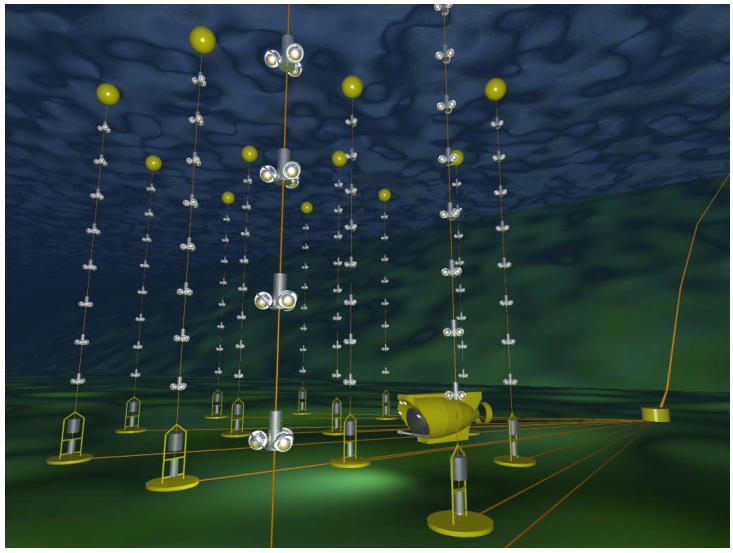


**Figure 1 :** ANTARES detector (artist view)

Each of these storeys constitutes a node of the data transmission network, receiving and transmitting data and slow-control commands. Supported functions include reading sensors, adjusting slow-control parameters, as well as the distribution of power, master clock and reset signals to the front-end electronics.

## II) Importance of oceanographical parameters.

To be able to reconstruct the muon trajectory, we must know both the relative position of each floor to an accuracy better than 10cm and the transmission quality of the Cherenkov light in water.

The relative positions of all optical modules in the detector are given in real time by an acoustic positioning system and a set of tiltmeter and compass cards which measure local tilt angles and orientations of storeys.

Processes of absorption and scattering characterise the transmission of light in water. They are parameterised by the absorption length $\lambda_a$, the scattering length $\lambda_s$, and the scattering function $\beta(\theta)$ which describes the angular distribution of the scattering. The relevant window of wavelengths for a sea water Cherenkov detector is centred on blue light for which the sea water transparency is maximal. Seasonal variations are expected to affect these values, especially the scattering parameters which are governed by the amount of suspended particulate matter. Some in situ measurements of optical properties have been performed at the ANTARES site.

To calculate all these parameters we must know precisely the deep sea parameters of the ANTARES site. For this purpose, various sensors have been placed on some of the 12 lines and on an additional line called "Instrumented Line" or "IL" dedicated to oceanographical studies.

To summarise, the oceanographic sensors employed in the ANTARES detector are :

- 13 Pressure sensors from GENISEA/ECA (one on each base of line).
- 6 Sound Velocimeter from GENISEA/ECA (one on IL @ ~2290m ).
- 1 Aquadopp currentmeter from Nortek (@ ~2050m of depth).
- 2 ADCP current profilers from RDI (on IL @ ~2200m and ~2400m of depth)
- 2 Cstar light transmissioneters from WetLabs (on IL @ ~2290m and ~2320m of depth)
- 1 Optode oxygen sensors from Aanderaa (on IL @ ~2302m of depth)
- 2 CT(D) from SeaBird (on IL @ ~2190m and ~2290m of depth)
- 1 seismometer from GURALP.
- 2 IP-Camera (on IL @ ~2200m and ~2400m of depth).
- IODA (In situ Oxygen Dynamics Auto-sampler) including 2 Optodes oxygen sensors from Aanderaa.

### III) Recovery and Recording of the data.

Since September 2005, all the output off all sensors are readout every two minutes and stored in the database in a special "RawData" table. At the same time, a parser code reads this table to fill different tables dedicated to each sensor, storing the data timestamp, the parameter values and the reference of the line from where it was extracted from the RawData table.

The typical flow is of 12500 new lines in RawData table per hour (one line per oceanographic sensor and other slow control information). All these data are processed in quasi real time.

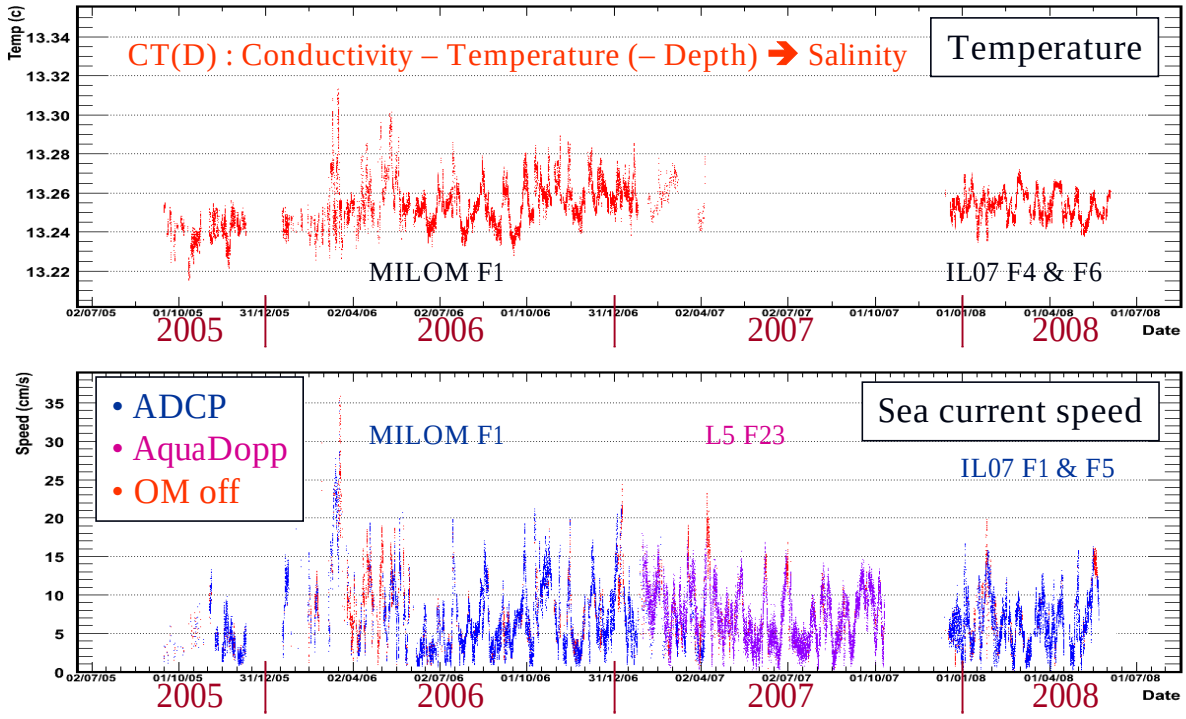



**Figure 2 :** Example of data recorded since September 2005: first with the MILOM (The predecessor of the IL) up to April 2007 and with the IL since the end of December 2007. **On top:** an example of temperature measurement. **On bottom:** an example of sea current speed measurement recorded by the ADCP (blue) compared at the measurement recorded by the Aquadopp of the Line 5 (purple).

**Current procedure :**

– Each sensor was calibrated before deployment.

– The acquisition of the oceanographical data is synchronized with the ANTARES acquisition data. Each run duration is approximately ~20hs for the sensors connected to the IL and ~2hs for those connected to the other ANTARES lines. The pause delay between two acquisition runs takes ~3 minutes.

The data readout method depends on connection type of the sensors :

– For most of the sensors, the connection is done by a serial link RS232. For them, the data measurement and their recording is done by slow control request.

– The IP camera and the seismometer have an autonomous Ethernet connection.

– The IODA has its own system of internal data acquisition and buffering. Those data are then send to shore by the Slow Control.

## IV) Next stages: Valorisation of the data and Data Quality.

### a) possible improvements.

- required to carry out intercalibrations regularly, by sensors placed on an autonomous line and immersed close to the detector, to monitor and correct the drift of the instruments *in-situ*.
- …

### b) Data quality and validation.

People must be able to know simply and quickly the quality of the oceanographic data which are consulted. For that, all data should be prepared by the following steps :

**Automatic parsing :**

- Wrong values (transmission or power problem…)
- values not acceptable because they are outside of a specific range (this can be done only after calibration).
- …

**Expert Validity check :**

- Data validity check by an expert for final validation of a data set.
- …

A policy of data quality, taking account of all these prerogatives, is currently in progress.

### c) Valorisation.

To valorise these data, we are currently developing a Web interface for an easy access to the oceanographic data and a simple management of these data.

Note : For the moment, the agreement of the ANTARES collaboration is needed to access and use the data. At first, the access to this Web site will be limited to members of the ANTARES collaboration. It is however foreseen to offer a maximum of information to the whole scientific community in a near future.

Several concepts have been presented during the kickoff meeting in Barcelona. SWE as final recommendation. Eric Delory said (later phone call) that staff on the demo sites are willing to bring up SOS. This has to be coordinated with the activities in Kiel and Bremen.

Meeting with NEPTUNE in Victoria
Andree reported that NEPTUNE is not planning to implement SWE on their site. Data as NetCDF might be accessible, unclear whether they will bring up an OAI server & corresponding catalogue for access to metadata (this was advised in an earlier communication with Benoit). Ingrid (later phone call) reported that Ifremer is currently deploying an instrument at NEPTUNE and they are hopeful that they get access to live video data streams and real time oxygen data. Unclear was how this will fit into the overall architecture.

Sensor registry
Eric Delory will bring up a showcase for a web interface for SensorML (later phone call). PANGAEA will make an estimate for the efforts needed to use GeoNetwork (Robert). Open Source as editorial environment for SensorML (sensor type specifications as well as instances).

# ANNEX B5
# Ongoing development about data management procedures and protocols on behalf of Ifremer, SeaDataNet, MyOcean, EuroSites projects

# Ongoing developments
# about data management procedures and protocols

on behalf of Ifremer, SeaDataNet, MyOcean, EuroSites projects

-

## Inputs for preparation of Esonet Data Management Council (Faro)

*G.Maudire, M.Treguer, T.Carval, Ifremer, Brest (France), 17-10-2008*

Since the first objective of SeaDataNet, MyOcean and EuroSites projects, that Ifremer is involved in, is to set up real **operational** distributed data management systems, criterions for choosing standards have been:

1) Spread of pre-existing knowledge of the standard inside the consortium and outside in the entire marine community in order to decrease the need of training;
2) Availability of well tested software tools to implement the standards.

However, second steps (research and development) have been planned (in SeaDataNet for example) to identify the most promising new standards and to encourage and participate to the implementation of these new standards.

For example, SeaDataNet operational system version 1 is compliant with the following real or de-facto standards:

- **Metadata** : **ISO/TC 211 family of standards**. Several European directories are continuously updated to describe : Cruises (Cruise Summary Report), Observatories (EDIOS), Marine Organizations (EDMO) and Projects (EDMERP), Databases (EDMED) and Datasets (Common Data Index). All 40 data centres which participate to SeaDataNet project are now able generate metadata compliant to ISO 19115 family of standards using either their own tools or OpenSource software (like GeoNetwork) or Mikado. Mikado is software developed in the framework of SeaDataNet to expose records of pre-existing non-ISO metadata bases in an ISO/XML way. Data services are described using ISO 19115 fields. Geographical information about data (measurement or sampling location, geometry of the observation systems, routes of vessels) is also included in metadata and can be accessed via **OGC protocols (WMS, WFS)**.
- **Vocabulary ontologies** : **Simple Knowledge Organisation Systems (SKOS)**. More than 75 vocabulary libraries have been set up like parameters, units, methods, instrument and platform types … An international governance of these libraries has been established on behalf of NERC/BODC (UK) in collaboration with several other initiatives. Metadata records and data files make use of the agreed vocabulary. Metadata and data are linked to vocabulary ontologies using Uniform Resource Name (URN : *RFC 2141 URN Syntax* published in 1997 by the Internet Engineering Task Force).
- **Data** : The first version of SeaDataNet project proposes only data download services using File Transfert protocol (ftp) or http. Data files can be downloaded in two agreed formats :

- ASCII spreadsheet file using Ocean Data View convention (Ocean Data View is a well known an oceanographic data processing and visualization software developed by AWI – Germany);
- Unidata – NetCDF using Climate and Forecast *(*CF*)* Metadata conventions. The vocabulary server implements translation facilities between SeaDataNet parameters and CF convention.

Development of bridges to the de-facto standards in use in the Operational Oceanography community is ongoing. These standards are mainly:

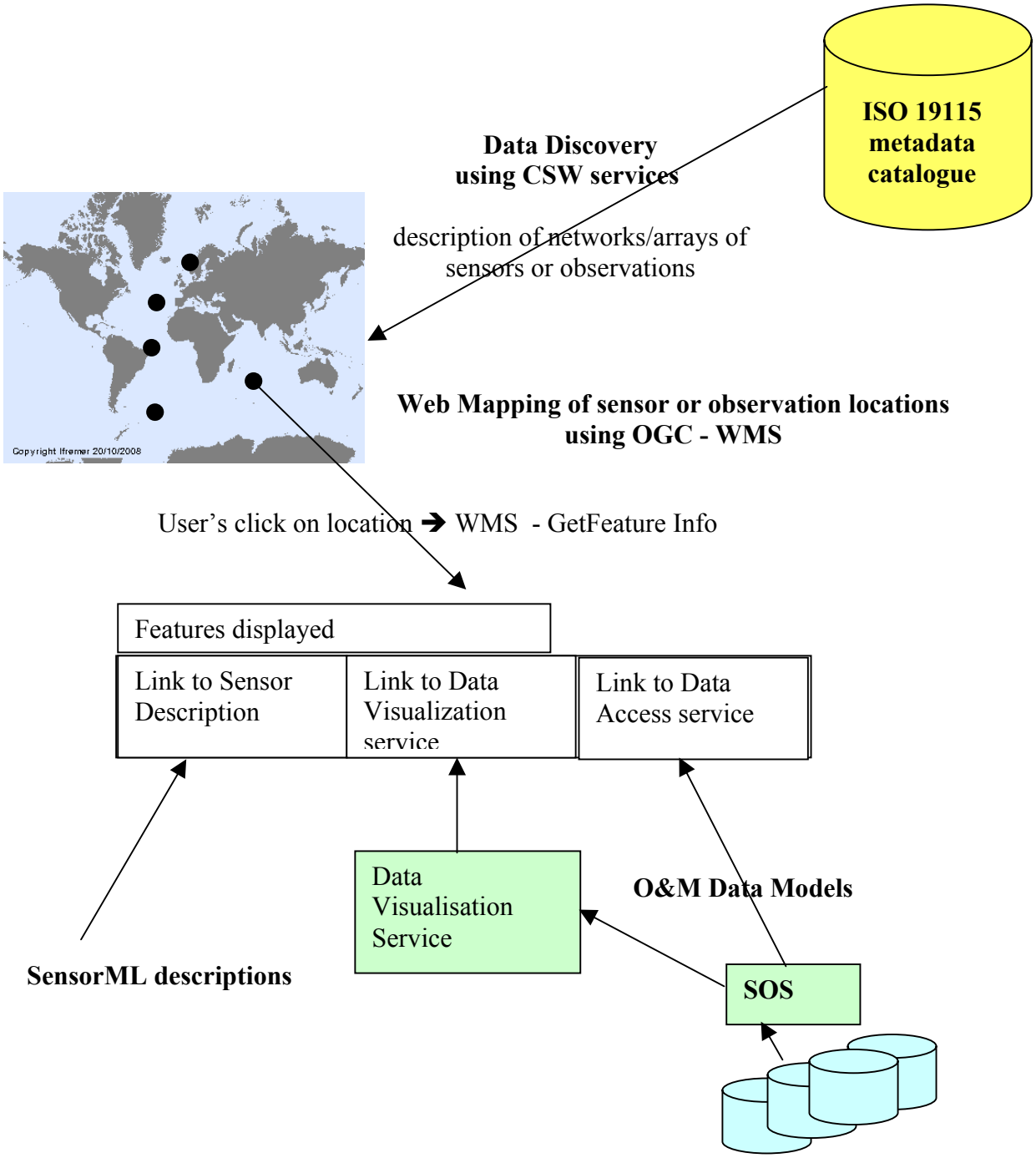
- **OpenDAP** (Open-source Project for a Network Data Access Protocol) to make data accessible, without downloading the entire data sets, from data centres which are part of SeaDataNet and are involved in the operational oceanography. The adopted data model is the DAPPER model developed by the EPIC group at PMEL. Other data models are also considered especially models proposed by Unidata and CSML. OpenDap services for in situ data are now in place at Ifremer and ENEA in cooperation with GMES/MyOcean European project (ocean forecast);

- **THREDDS** (Thematic Real time Environmental Distributed Data Services). Bridges are being studied between Thredds metadata catalogues set up by the Operational Oceanography community especially in the framework of GMES/MyOcean, Genesi DR (satellite data) project and SeaDataNet Common Data Index. A MoU is being drafted between these three groups and Unidata on behalf of Stephano Nativi (University La Sapienza). The purpose of these bridges is to allow cross-harvesting of metadata recorded in existing catalogues using ISO or Thredds standards.

In a longer term (end of 2009 – 2010), tools making use of several OGC standards will be made available:

- **metadata catalogues** : Services implementing the OGC "Catalog Service for the Web) (**CSW**, version 2) will be set up to :
  - make SeaDataNet metadata directories accessible via this protocol for external users (external use). If technical services are already in place using GeoNetwork software, some open issues need to be solved before general implementation :
    - Specifications of the different metadata records which are exported by the getRecords method : FULL record, SUMMARY record, BRIEF record;
    - Set up the GetDomain method using the vocabulary server;
    - Use of ISO 19139 XML schema instead of ISO 19115 DTD by all data centres;
  - improve the distributed maintenance of the SeaDataNet catalogues (SeaDataNet internal use) by implementing automatic procedures for metadata update and harvesting facilities within SeaDataNet using CSW protocol. These facilities must include interface to pre-existing non ISO metadata base which have been implemented by National Data Centre for a long term. Specifications of these facilities are on going. The software development of these facilities will begin in 2008, November to be released mid-2009. Development, considered as an extension of Mikado, will rely on Open Source software "Constellation" developed by Geomatys.

- **"sensors" services** (cf. "Sensor Web Enablement – OGC"): Services to retrieve information about observatories (described in OCG **SensorML** form) and to access and visualize data by implementing OGC "**Sensor Observation Services" (SOS)** using OGC "**Observation & Measurement" (O&M)** models and schemas. Work is ongoing at Ifremer to improve and standardize data portal using WMS and O&M via SOS :




The following O&M "objects" will be used : SamplingFeature / SamplingPoint / Station to match first the objectives of EuroSites : management of mooring data. Provided services will be extended to other types of data (end of 2009, 2010) : Profile, Trajectory,

Swath. These services will rely on Open Source software "Constellation" developed by Geomatys.

Some issues are open:

- SensorML, O&M, SOS are quite recent OGC standards (versions 1 from July to October 2007) and very few tools which implement them are available;
- what information have to be described using ISO metadata (using "experience", "services", …) and what information have to be described using SensorML;
- SensorML is not known in details at Ifremer;

**Summary :**

This table tried to summarized the ongoing and planned usage of standards across the projects Ifremer is involved in :

| Targeted schedule for routine work | From sensor to data centre | Data discovery | Data visualisation | Data Access |
|---|---|---|---|---|
| Up to now | **ISO 19115** family:<br><br>description of cruises, of network permanent observatories, … | **ISO 19115** family:<br><br>description of databases and data sets | Non standard except for observation locations where **OGC – WMS** is used | **Data download : ftp, http** using standardized file format (ODV, NetCDF)<br><br>except for interpolated data where **OpenDap** is used |
| 2008-2009 | | Interoperability between THREDDS and ISO 19115 family (for operational oceanography) | Extension of **OpenDap** to in-situ data (with data model from Dapper and/or Unidata and/or CSML) | Extension of **OpenDap** to in-situ data (with data model from Dapper and/or Unidata and/or CSML) |
| 2010-2011 (Prototypes end of 2009) | **SensorML** | | **OGC – O&M models**<br><br>**served by OGC SOS** | **OGC – O&M models**<br><br>**served by OGC SOS**<br><br>**OGC - WCS** for massive interpolated datasets |


ESONET Science Objectives Workshop

# V. Minutes of ESONET Science Objectives Workshop

# Minutes of ESONET Science Objectives Workshop
# Friday October 24th, 2008, Faro - Portugal

Location: Universidade do Algarve, Campus de Gambelas, Room: Library FCMA

Minutes compiled by Henry Ruhl with the assistance of Jean-François Rolin

## 1 Agenda and list of attendees

**AGENDA**

08:30 – 09:00 Introductions and outline of workshop agenda and goals to

- have representatives from recent and current programmes discuss their objectives and, in particular, how they relate to ESONET science objectives
- present the proposed ESONET science objectives with integrated discussions of the preceding external inputs, and
- make recommendations and decisions about the scope and detail of ESONET science objectives.

08:40 – 12:00 Science objectives of major ocean science research programmes
Each presenter discussed the programmes' science objectives and how they think ESONET might help achieve those objectives (15 min. presentation w/ 5 min. discussion).

- 08:40 GEO – GEOSS – GOOS (Thorkild Aarup, UNESCO)
- 09:00 HERMIONE (Phil Weaver, NOCS)
- 09:20 Eur – OCEANS (Paul Tréguer, Univ. Brest)
- 09:40 IMBER (Paul Tréguer, Univ. Brest)
- 10:00 EuroSITES (Richard Lampitt, NOCS)
- 10:20 Break
- 10:40 CARBOOCEAN (Richard Lampitt, NOCS)
- 11:00 MERSEA (Yves Desaubies, IFREMER)
- 11:20 CoralFISH (Fiona Grant, Irish Mar. Inst.)
- 11:40 DELOS & hydrocarbon industry collaborations (Henry Ruhl, NOCS)

12:00 – 13:00 Lunch

13:00 – 15:00 ESONET science objectives and their relationship to other programmes
Each presenter discussed the science objectives within each major field in ESONET & identified how they may be related to similar objectives in other programmes.
(20 min. presentation w/ 10 min. discussion)

- 13:00 Geoscience (Louis Geli, IFREMER)
- 13:30 Physical Oceanography (Johannes Karstensen, KDM)
- 14:00 Biogeochemistry (Richard Lampitt, NOCS)
- 14:30 Marine Ecology (Ana Colaço, Univ. Açores)

15:00 – 15:20 Break

15:20 – 17:00 What decisions can be made to refine ESONET science objectives?

- Is there a consensus on the ESONET-wide science objectives?

- How are the current and proposed ESONET Demonstration Missions already making links with other programmes?
- What are the needs for additional follow-up discussions?
- What further cooperation agreements are needed?
- If there is time left, what are the site-specific science objectives?

What criteria will be used to define site-specific objectives?

**PARTICIPANTS LIST**

| | Programme | Name | Institution | Country |
|---|---|---|---|---|
| 1. | European Commission | Pascal Le Grand | EC | Belgium |
| 2. | ESONET Steering Com. | Roland Person | IFREMER | France |
| 3. | | Ingrid Puillat | IFREMER | France |
| 4. | | Henry Ruhl | NOC | UK |
| 5. | EMSO & ESONET SC | Paolo Favali | INGV | Italy |
| 6. | ESONET Scientific Council | Louis Geli | IFREMER | France |
| 7. | | Ana Colaço | UAç | Portugal |
| 8. | ESONET GA | Mathilde Cannat | IPGP | France |
| 9. | | Johannes Karstensen | KDM | Germany |
| 10. | | Fiona Grant | MI | Ireland |
| 11. | | Ricardo Serrao Santos | UAç | Portugal |
| 12. | | Jean-Pierre Hermand | ULP | Belgium |
| 13. | | Joaquim Luis | Univ. Algarve | Portugal |
| 14. | | Paolo Relvas | Univ. Algarve | Portugal |
| 15. | | Stéphane Pesant | CNRS-LOV | France |
| 16. | | Jean-François Rolin | IFREMER | France |
| 17. | | Christian Curtil | CNRS - CPPM | France |
| 18. | | Michael Taroudakis | FORTH / IACM | Greece |
| 19. | | Gilbert Maudire | IFREMER | France |
| 20. | | Luis Matias | CGUL/IDL/IM | Portugal |
| 21. | | Benedicte Ferre | UiT | Norway |
| 22. | | Dominique Lefevre | CNRS LMGEM | France |
| 23. | | J. Miguel Miranda | UAç | Portugal |
| 24. | | Oliver Pot | IPGP | France |
| 25. | | Michel André | UPC | Spain |
| 26. | | Gabriela Queiroz | UAç | Portugal |
| 27. | EUR-OCEANS & IMBER | Stéphane Pesant | CNRS | France |
| 28. | EuroSITES/CARBOOCEAN | Richard Lampitt | NOCS | UK |
| 29. | | Maureen Pagnani | NOCS | UK |
| 30. | GEO - GEOSS - GOOS | Thorkild Aarup | IOC | France |
| 31. | HERMES & HERMIONE | Phil Weaver | NOCS | UK |
| 32. | | Ian Wright | NOCS | UK |
| 33. | | Ricardo Silva Jacinto | IFREMER | France |
| 34. | MERSEA (former programme) | Yves Desaubies | IFREMER | France |

## 2 Introductions and outline of workshop agenda and goals

1) to have representatives from recent and current programmes discuss their objectives and, in particular, how they relate to ESONET science objectives

2) to present the proposed ESONET science objectives with integrated discussions of the preceding external inputs, and
3) to make recommendations and decisions about the scope and detail of ESONET science objectives.

## 3 Science objectives of major ocean science research programmes

Each presenter discussed programme objectives and how they think ESONET might help achieve those objectives. Below are some of the highlights.

***European Commission (Pascal Le Grand, Project Officer for ESONET NoE, EC)***

- DEMO missions need to engage the whole range of scientific disciplines covered by ESONET.
- The main players in deep sea research should be encouraged to submit proposals (partners from HERMES, EuroSITES, CoralFISH, ACOBAR, GMES Marine Core Services, ...).
- ESONET can use the GEOSS structure for standards, services, and links to the global context.
- There is still a need to define the boundaries of what the Deep-Sea Frontier initiative should encompass.
- Suggested workshop in spring '09 to begin future plans for future funding of next phases.

***GOOS (Thorkild Aarup, UNESCO)***

- GOOS has global/open ocean/and coastal modules.
- Oil and gas companies are contributing.
- Current lack of hazard warning and high-impact real-time data streams.
- GOOS not just "operational".
- EuroGOOS important but ArcticGOOS, MedGOOS, IODE, GLOSS, Ocean Tracking Network also relevant.
- ESONET should connect to carbon observation network, incorporate GOOS guidance on "essential observing variables" that are mostly physical measurements.
- ESONET could contribute to GOOS needs in
    - Planned in-situ GOOS climate network ($)
    - Polar regions and deep ocean (technology)
    - Developing countries (capacity building)
    - Non-physical variables (biology, chemistry, …)
    - Real-time feedback of geohazard data
- Cabled observatories can contribute to GOOS in many ways (i.e. sentinel stations, infrastructure).
- GOOS is not meant to be everything to everyone neither should ESONET – focus will be essential when arguing for substantial resources for a long time horizon from governments.
- Need for clear linkage with international planning efforts and existing GOOS Regional Alliances (EuroGOOS, MedGOOS, Black Sea GOOS) and their regional observing systems (ROOSs) – no country can afford to support parallel observing activities.
- COOP tool (GOOS Rep 125 & 148) for selection of observing variables may be useful (societal benefits, phenomena of interest, needed products, required variables).

- Not only GOOS but other IOC programmes may be of interest for ESONET (Intl Carbon Cord Project, Tsunami, IODE, GLOSS, Law of Sea …).
- Linkage with Ocean Tracking Network? (GOOS pilot project and funded).
- In practical terms ESONET could connect to GOOS as a "subunit" and/or pilot project.
- American and Japanese observing reps go to the GOOS scientific board.

***HERMIONE (Phil Weaver, NOCS)***

- Seamounts are a new addition.
- Deep-sea coral ecology will be mostly addressed in CoralFISH.
- HERMIONE theme leaders could be useful science contacts.
- The Gulf of Lions Cascading deep water was given as an example of climate connections to the deep-sea and fisheries within HERMES.
- More than half of the HERMIONE regions overlap with the existing proposed ESONET sites.
- Substantial overlap also in science areas.
- Ormen Lange observatory paid by Statoil.
- HERMIONE could provide important regional information for ESONET sites.
- HERMIONE, like ESONET WP7, is using kiosks deployed in public aquariums.
- Key questions in HERMIONE that overlap with ESONET
    - Geophysics: G-6, 7, 11(for questions, see first draft of Science Objectives and Design of the European Seas Observatory NETwork (ESONET))
    - Physical Oceanography: P-4, 5, 7
    - Biogeochemistry: B-2, 5, 6, 10
    - Marine Ecology: all except E-8, 9
    - Noted as possibly difficult to address with ESONET: What is the distribution and abundance of deep-sea corals and carbonate mounds and what factors control their growth?

***ESONET Demonstration Missions***

It was clear from the discussion that cooperation between the discussed EU programmes is extensive and leading to outcomes not otherwise possible.

***Eur – OCEANS (Stéphane Pesant for Paul Tréguer, Univ. Brest)***

- An NoE like ESONET could provide an important link to upper ocean.
- Has links to GLOBEC researchers and IMBER, SESAME, METAOCEANS, BASIN, MEECE, EuroSITES, EPOCA.
- Link to EuroSITES is essentially the most direct link to ESONET.
- Has developed tools including a database within PANGEA, Model selection tool, meta-data distribution system and outreach tools.
- Focus on climate, biogeochemistry, and pelagic ecosystems with end-to-end food web analysis.
- Uses coupled physical to biological models.
- Emphasised importance of better understandings between scales, from sub-mesoscale to global.
- Given that Eur-OCEANS is an NoE and needs a VISO, the issue of ESONET VISO and EMSO goal similarities was raised, which is the subject of an upcoming workshop. An imaginative way forward may be needed.

***IMBER (Stéphane Pesant for Paul Tréguer, Univ. Brest)***

- Planning a networking programme with global-level participation.
- Interactions between biogeochemical cycles and marine food webs, sensitivity to global change, feedbacks to the Earth system, responses of society.
- Also examining end-to-end food webs.
- SOLAS/IMBER Carbon Group, IMBER/GLOBEC, LOICZ/IMBER, Climeco, Continental, E2E Ecomodel, IMBIZO conference in November.

***EuroSITES (Richard Lampitt, NOCS)***

- Represents an operation system doing science highly relevant to ESONET.
- Covers water column biogeochemistry in the deep-sea.
- Also has important co-membership with ESONET participants.
- Coastal EuroSITES were discussed but funds limited the scope.
- No EuroSITES members on US OOI Strategic or Steering Committees.

***CARBOOCEAN (Richard Lampitt, NOCS)***

- Discussed importance of scale of variation in determining what to address and how. This is of major importance for determining the ability of any system to answer scale-dependant questions.
- Models currently under-represent air-sea interface dynamics, let alone deep-sea.
- Should be viewed as a "partner" for ESONET rather than "in" ESONET.
- Funding will end soon; Global Carbon Project will address similar issues.

***MERSEA (Yves Desaubies, IFREMER)***

- Programme served as a ramp toward efforts for GMES Marine Core Services.
- MyOcean is in charge of the transition to operational status.
- Overlap with observational and research programmes such as ARGO, EuroSITES.
- Data needed for model assimilation and validation, nowcasts and forecasts.
- Idea of checkpoints or hubs was raised as important for locating ESONET.
- Kopernikus could be immediate user of ESONET, mostly for validation, and for parameters not accessible by other means such as ice thickness, waves, turbulence needing attention.
- Areas thought to overlap with MERSEA: upper ocean nutrient supply, resolution of small-scale processes, benthic storms, resuspension, BBL, arctic ice thickness.
- Marine Core Services will provide data and information useful to contextualise ESONET point observations in the larger ocean environment.

***CoralFISH (Fiona Grant for Anthony Grehan, Irish Mar. Inst.)***

- Assessment of the interaction between corals, fish and fisheries, in order to develop monitoring and predictive modelling tools for ecosystem-based management in the deep waters of Europe and beyond.
- Has links with HERMIONE and good potential to link with ESONET, especially in time-series ecology and fisheries-related areas.
- Has developing temporal contextual datasets, with indicators to be identified, and tools for modelling to be developed and refined.
- Sound science rational was emphasised in development, rather than expediency.

- Idea of hubs, or points of key horizontal fluxes, was reiterated - three high-resolution monitoring stations, off Norway, Ireland and Italy, are situated in contrasting bioregions and can be expected to give good comparative results.
- Concern was raised about lander systems damaging corals, but it was not clear what the lander impacts might exactly be, especially since deployment criteria were not discussed.

***DELOS & hydrocarbon industry collaborations (Henry Ruhl, NOCS)***

- DELOS, a pioneering partnership between science and industry, will develop new understanding of deep-water biodiversity, ecology, and the effects of energy industry activities, leading to the responsible use of deep-water resources.
- DELOS will expand both scientific understanding and public education of deep-water biodiversity and ecology, promoting the informed use of natural resources.
- Improved understanding will include evaluations of natural ecological variation, on-site industry effects, and links between climate and deep-water over timescales extending to decades at facility locations worldwide.
- First deployment in Jan. 2009 off Angolan coast with one platform within industry activity and one outside.
- Concern was raised about the fact that this system, as well as others proposed, will serve as artificial reefs, itself being a DELOS science area.
- Need for durability in industry collaborations was emphasised.
- Vesterålen-Lofoten Area Lander programme led by Olav Rune Godoe, Institute for Marine Research, Norway, is using landers to address cold water coral reef ecology and recruitment of fish, collect information in a sensitive area (oil/fisheries), evaluate methodology and technology, in conjunction with StatOil and HERMIONE.
- KONGHAU is another StatOil-ecology/geology collaboration which links HERMES and Hausgarten research sites in the Fram Straight.
- Jim Clark of BP will be at the Brussels oil and gas collaboration meeting.

After initial presentations there was a brief discussion period prior to starting the ESONET focused talks. Key points raised during this discussion included:

- Need to use existing data assimilation.
- How might ESONET get a similar level of community awareness and support, as has been garnered for GMES.
- Advantage of data centre of Marine Core service is that it is ready for taking care of the data from all sources.
- A centre has to be in charge of quality control.
- Tsunami-monitoring operational institutions are an example of QA/QC.
- ESONET and Marine Core service should eventually become one same operational centre.
- HR: There will be an abstract of the report and 3 or more high-level key questions that are cross-cutting will be put forward.

# 4 ESONET science objectives and their relationship to other programmes

***Marine Ecology (Ana Colaço, Univ. Açores)***

- Mentioned that distribution studies will have limited capability with fixed platforms/moorings.
- Limited applicability to biodiversity.
- Point source of data can be very useful in distribution studies if other contextual distribution data is available, perhaps form other ESONET nodes or other programmes or data archives.
- It could be useful to extend the spatial scale with an AUV or crawler around the site.
- LIDO was given as an example of spatial data.
- Should link into International Long-Term Ecological Research programme (LTER) and MARBEF which also has a long-term marine ecology context, as well as a socio-economic context.

***Geoscience (Louis Geli, IFREMER)***

- Many science objectives are relevant, but few are mature for immediate application across ESONET sites.
- Deep-Sea TWS should be a generic feature.
- Ocean broadband seismometers are also standard technology and can be widely used.
- Early warning of some kind should be a feasible product of ESONET ultimately, but the role of ESONET vs. other programmes needs to be clarified.
- Methane, gas bubble, gas hydrates, and sediment probes needed.
- Fluids are a cross-cutting aspect of all ESONET science objectives and this could be made clearer in the report; fluids have a relationship to seismicity, gas hydrates and chemosynthetic system functioning.
- Question added to report regarding the newly found hydrogen concentrations in hydrothermal vent waters.
- Site selection is particularly sensitive in the geosciences science theme.
- Solid state sensors were highlighted as being particularly useful to one under development for $CH_4$ at NOCS.
- Acoustic detection of gas emissions could be a powerful tool.

***Physical Oceanography (Johannes Karstensen, KDM)***

- Three key scales addressed which all need research attention, particularly in how they interact.
- Internal waves could be shaping coastal areas.
- Even persistent small-scale processes can have big, important impacts.
- Ship routing could be a potential customer.
- Links with DAMOCLES and THOR were seen as useful.
- Pressure-inverted echo sounders useful.
- Need to address aspects of physical oceanography throughout the water column reiterated.
- Noted that Argo has little/no data from > 2000 m.
- Many programmes lack deep-sea data and models are often “tied” to poorly constrained deep sea values**.**

- Although some values in deep sea have lower variance than in the upper water column, processes like internal waves do have high frequency variations that influence important properties even in the deep-sea.
- Key PO areas identified with each having spatial attributes: Boundary currents/MOC transport + properties, Deep convection, Overflow topographic mixing and associated fluxes (also local), Mixed layer properties and dynamics, Frontal regions, Exchange shelf/open ocean, all of which have some link to ESONET sites.

***Biogeochemistry (Richard Lampitt, NOCS)***

- Some aspects raised in the report are repetitive from previous sections B-8 & 9.
- Should consider Ocean Sensors 08 workshop outcomes.
- Need careful attention to rates vs. concentrations, etc., as well as what can be learned from fixed points, from networks of fixed points, and from fixed points with specialised contextual regional data.
- Tomorrow's requirements: user-friendly gear, biofouling protection, flow cytometer, ESP in situ molecular analysis, methane (mentioned that current pCO2 systems need to be sent to Montana US for processing).
- See: *Intercomparison of biogeochemical sensors at ocean observatories.*
  M. Mowlem, S Hartman, S. Harrison and K E Larkin
- See also: Research and Consultancy Report NOC (includes technology readiness table referred to by J-F Rolin in the French ocean strategic meeting in La Londe Les Maures and in the Sensor meeting in Warnemunde last spring).
- Conclusion that models are to be completed by measurement and verification.

## 5 Summary comments

- Is there a consensus on the ESONET-wide science objectives?
  - There was a broad consensus on the science objectives, but the degree of relevance in a few specific questions is still being debated.
  - Level of modelling within ESONET needs to be addressed.
- How are the current and proposed ESONET Demonstration Missions already making links with other programmes?
  - It was clear from the MOTTO Demonstration Mission presentation, as well as others, that cooperation between the discussed EU programmes is extensive and leading to outcomes not otherwise possible.
  - Acoustics (e.g. LIDO Demonstration Mission) efforts need to be incorporated into the report.
- Combining the research areas and support of many of the discussed programmes will be a complex action and concern was raised about the fact that this combination with synoptic reductions in funding is unrealistic.
- Links between ESONET and other programmes and their research objectives should focus on contemporary areas.
- Combination of cabled and standalone systems will likely emerge.
- Future funding schemes need to be re-addressed at potential meeting hosted by EU in spring 2009 after consultation at the national level.
- What cooperation agreements are needed?
  - Given that ESONET cannot make legal agreements, they may be deferred until the legal entities are created within EMSO.

# APPENDIX C:

*Appendix C: Presentation of the Science Objectives Workshop*

# ANNEX C
# Presentation of the Science Objectives Workshop

# ESONET Science Objectives Workshop

**European Commission's recommendations**

**Friday, 24 Oct 2008**

**Faro Portugal**

European Commission
Research DG
Management of Natural Resources RTD.I.4
Project Officer « Marine Resources »
Presentation : Mr. Pascal Le Grand

## 2nd call for DEMO missions (1)

- ✓ 1st call for DEMO missions successful. Received a great deal of interest from geophysics community.
- ✓ Total budget of 1st and 2nd call ~ 40 % ESONET budget → Must ensure that DEMO missions engage the whole range of scientific disciplines covered by ESONET.

## 2nd call for DEMO missions (2)

- ✓ WP3: ensure scientific priorities for demonstration are revised before the second DM call and are incorporated into the awarding criteria.
- ✓ The main players in deep sea research should be encouraged to submit proposals (partners from HERMES, EuroSITES, CoralFISH, ACOBAR, GMES Marine Core Services, ..)

## GEO workshop Sept 2008

- ✓ Was an opportunity to contribute to drafting of new **GEO Work Plan for 2009-2011**.
- ✓ Marine sciences appear to be already well coordinated compared to others.
- ✓ Several EU projects present: ESONET, EuroSITES, ACOBAR, TENATSO
- ✓ ESONET can make profit of GEOSS structure to establish standards, publicize its services (register them), contribute to wiki, etc., in the global context including the US.
  - http://www.earthobservations.org

## Deep Sea Frontier Initiative (1)

- ✓ Objective: secure funding for deep sea research for the medium term.
- ✓ Deep sea research does not always draw the attention it deserves from decision makers.
- ✓ Deep sea research requires large resources and infrastructure that decision makers will find unjustified if costs are not shared across various disciplines and activities.

## Deep Sea Frontier Initiative (2)

- ✓ Various ideas of funding schemes have been floated around (ERANET, article 169, large IP…) to support the integration of deep sea research.
- ✓ At the moment, a large IP towards the end of FP7 sounds like the most realistic approach.
- ✓ Deep Sea Frontier document drafted in 2007. Other parties have manifested their interest in the initiative (paleoceanography, …).

## Deep Sea Frontier Initiative (3)

- ✓ The idea of having an integrated approach seems to be generally accepted among the deep sea research community.
- ✓ However, still need to define the boundaries of what the DSF initiative should encompass. Are the scientific priorities identified in the 2007 document sufficiently broad and capable of catching the interest of decision makers (including funding agencies in member states)?
- ✓ The European Commission proposes to organize a workshop in Brussels (March- April 2009?) to discuss these issues.

## Deep Sea Frontier Initiative (4)

- ✓ Input of today's workshop and ESONET science objectives can contribute to the discussion foreseen in the forthcoming Brussels workshop.
- ✓ I wish you a fruitful and interesting workshop!

pascal.le-grand@ec.europa.eu


## GOOS provides

- International and intergovernmental coordination of sustained observations of the oceans for 136 IOC Member States
- A platform for the generation of oceanographic products and services
- A forum for interaction between research, operational, and user communities

## GOOS is designed to

- Monitor and better understand climate
- Improve weather and climate prediction
- Provide ocean forecasts
- Improve management of marine and coastal ecosystems and resources
- Mitigate damage from natural hazards and pollution
- Protect life and property on coasts and at sea
- Enable scientific research

## GOOS works in partnership with:

IOC, UNEP, WMO and ICSU (*Sponsored by*)

GEOSS, CEOS (*Member of*)

JCOMM, IODE, GCOS, WCRP (*cooperation within IOC*)

POGO, ICES, PICES, National Agencies, Scientific Unions (*external cooperation*)

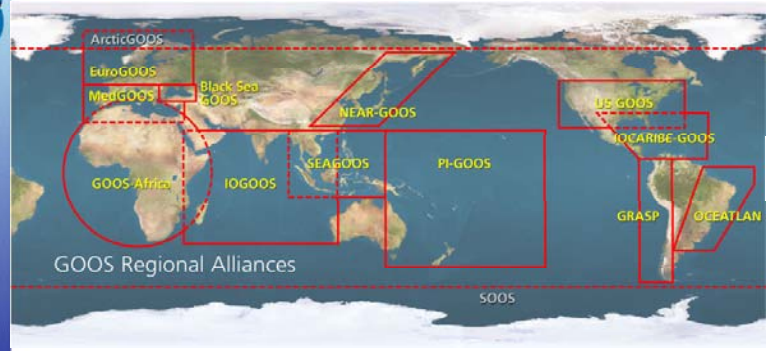
Argo, GLOSS, DBCP, OTN (contributing to)

IOC / UNESCO WMO UNEP ICSU

## GOOS is comprised of:

- **An open ocean module**
  **Advised** by the Ocean Observations Panel for Climate (OOPC) [with JCOMM/WCRP/GCOS]
  **Implemented** by member states usually cooperating through the Joint WMO-IOC Commission for Oceanography and Marine Meteorology (JCOMM)
- **A coastal module**
  **Advised** by the Panel on Integrated Coastal Observations (PICO)
  **Implemented** by member states usually cooperating through GOOS regional alliances.

## Implementing Coastal GOOS




1st GOOS Regional Forum, Athens, Greece, 2002

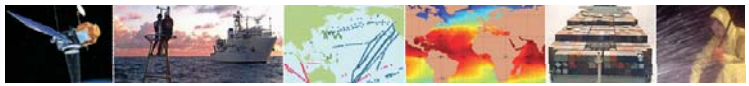
2nd GOOS Regional Forum, Nadi, Fiji, 2004

3rd GOOS Regional Forum, Cape Town, S. Africa, 2006

4th GRA Forum, Guyaquil, Ecuador, November, 2008

## Major Accomplishments to date include:

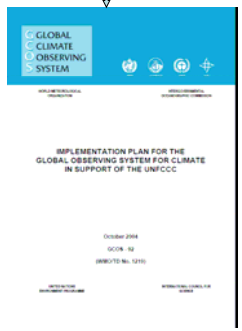
1. **Global GOOS.** The open ocean observing system for climate is more than 50% complete
2. **Coastal GOOS.** The coastal ocean observing system strategy and implementation plans are approved by IOC Assembly and Executive Council.
3. **Societal Benefits.** Relevant components of the GOOS are used for operational hazard warnings.



## GOOS Plans for Open and Coastal Ocean Modules

Open Ocean

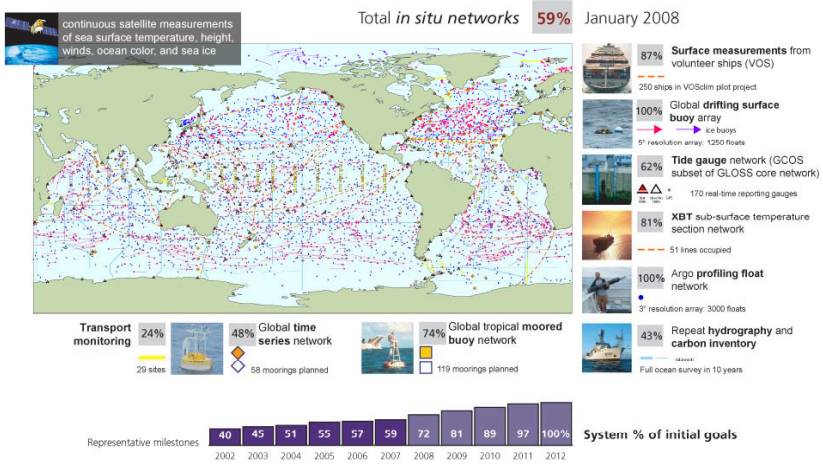
OOSDP/OOPC

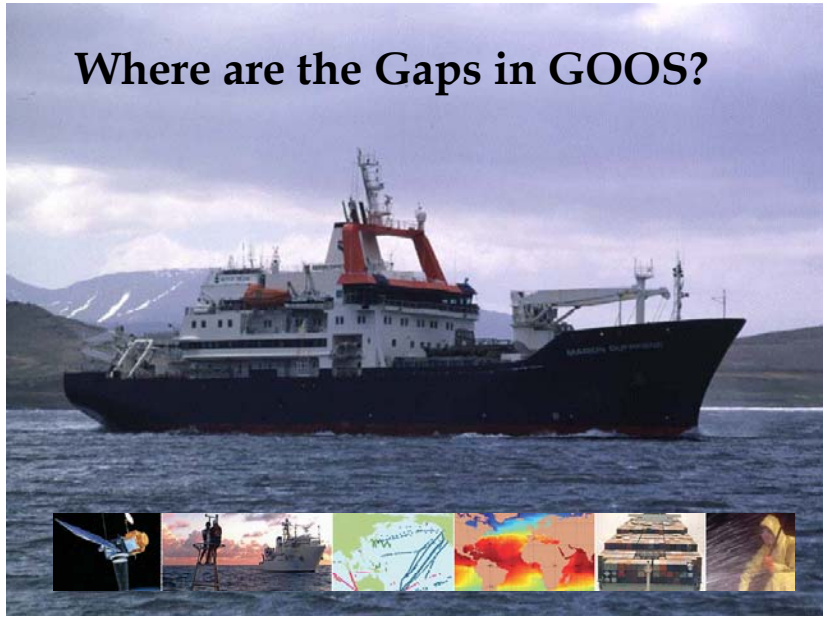



Coastal

C-GOOS
HOTO
LMR

## Global Ocean Observing System for Climate:
## Designed for and reporting to UNFCCC



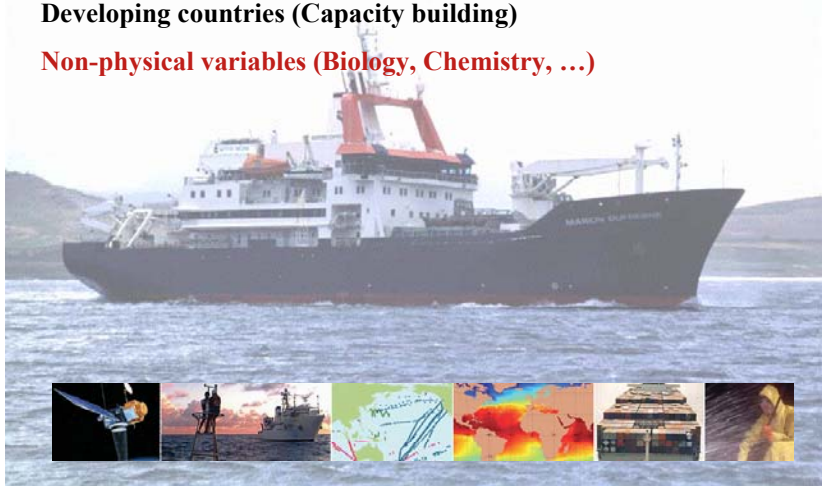




**~50% of the planned in-situ GOOS climate network ($)**

**Polar regions and deep ocean (technology)**

**Developing countries (Capacity building)**

**Non-physical variables (Biology, Chemistry, …)**

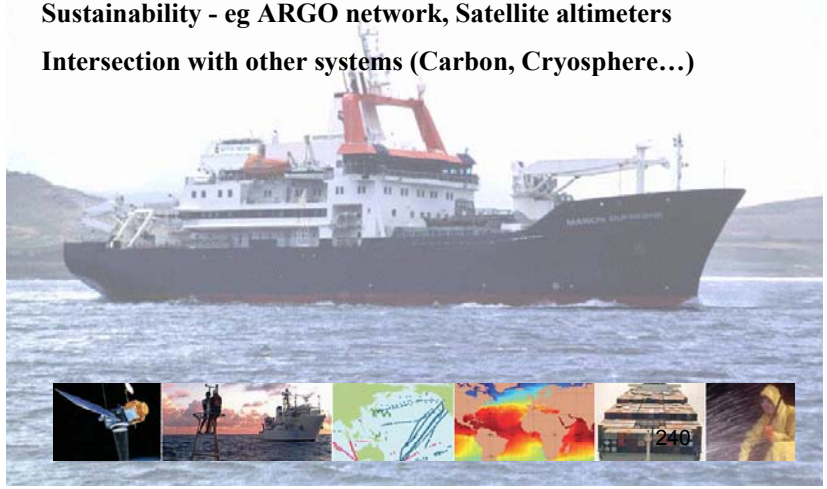


**Integrated data products (GODAE, CODAE…)**

**Real time operations (Hazard Warnings)**

**Sustainability - eg ARGO network, Satellite altimeters**

**Intersection with other systems (Carbon, Cryosphere…)**



## Bridge the research-operational divide

"A comprehensive ocean observing system simply cannot exist without the full engagement of the oceanographic research community"

- improve deployment opportunities for autonomous platforms (eg. Argo, surface drifters)
- facilitate data archiving
- Make high quality 'research' data part of the sustained data flow of GOOS (eg. CTD, XBT, underway systems)


Alverson, IOC Annual Report, 38-39, 2005

## Some Thoughts on ESONET and GOOS

- Cabled observatories can contribute to GOOS in many ways (i.e. sentinel stations, infrastructure)
- GOOS is not meant to be all things to all people neither should ESONET – focus will be essential when arguing for substantial resources for a long time horizon from governments
- Need for clear linkage with international planning efforts and existing GOOS Regional Alliances (EuroGOOS, MedGOOS, Black Sea GOOS) and their regional observing systems (ROOSs) – no country can afford to support parallel observing activities
- COOP tool (GOOS Rep 125 & 148) for selection of observing variables maybe useful (Societal benefits, phenomena of interest, needed products, required variables)
- Not only GOOS but other IOC programmes may be of interrest for ESONET (Intl Carbon Cord Project, Tsunami, IODE, GLOSS, Law of Sea …)
- Linkage with Ocean Tracking Network ? (GOOS Pilot project and funded)

# The HERMIONE Project

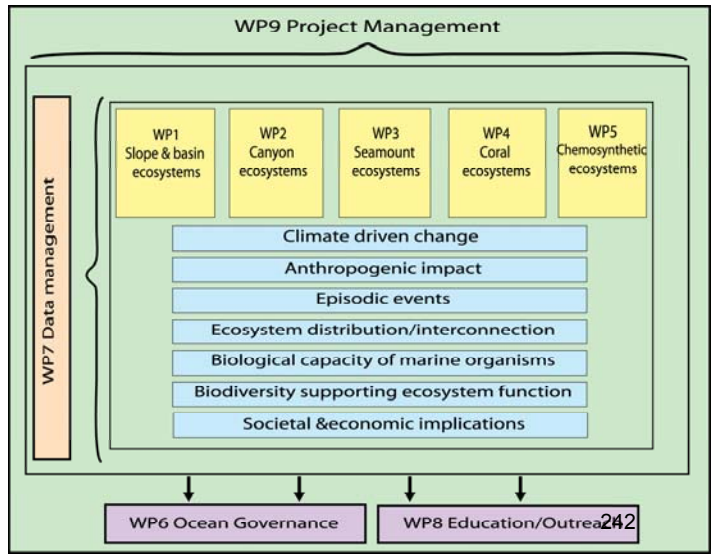
*Hotspot Ecosystem Research and Man's Impact ON European seas*

Phil Weaver

National Oceanography Centre, Southampton

## HERMIONE objectives

1. To investigate the dimensions, distribution and interconnection of deep-sea ecosystems;
2. To understand changes in deep-sea ecosystems related to key factors including climate change, human impacts and the impact of large-scale episodic events;
3. To understand the biological capacities and specific adaptations of deep-sea organisms, and investigate the importance of biodiversity in the functioning of deep-water ecosystems;
4. To provide stakeholders and policy-makers with scientific knowledge to support deep-sea governance aimed at the sustainable management of resources and the conservation of ecosystems.



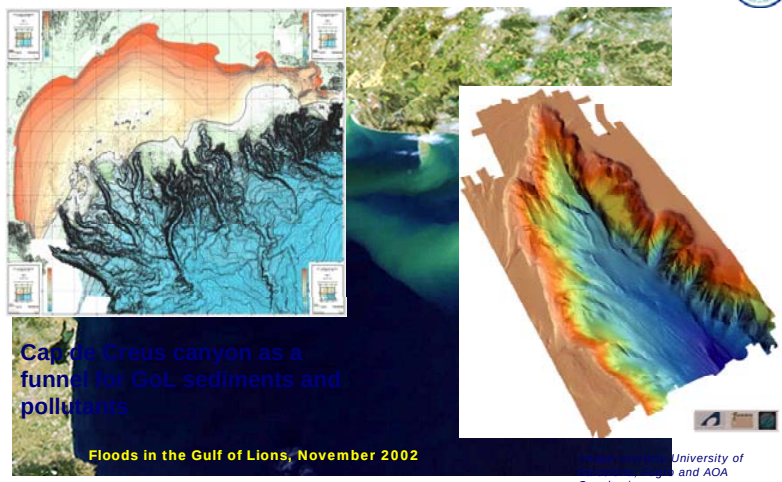
## HERMIONE Workpackage leaders

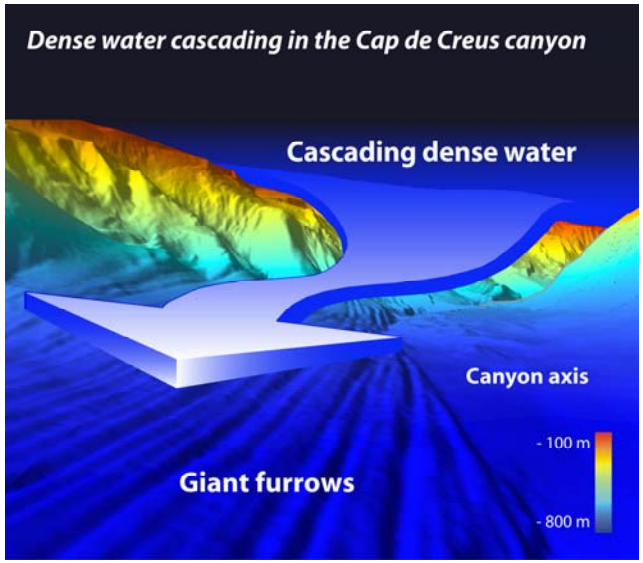
| WP | Title | Leader | Organisation |
|---|---|---|---|
| 1 | Slope and basin ecosystems | R. Danovaro | CoNISMa |
| 2 | Canyon ecosystems | S. Heussner | CNRS |
| 3 | Seamount ecosystems | R. Santos | UAzores |
| 4 | Cold-water coral ecosystems | A. Freiwald | U.Erlangen |
| 5 | Chemosynthetic ecosystems | A. Boetius | MPI |
| 6 | Socioeconomics, governance and science-policy interfaces | S. Van den Hove | MEDIAN |
| 7 | Data management | I. Schewe | AWI |
| 8 | Training and outreach | V. Gunn | NOCS |
| 9 | Project management | P. Weaver | NOCS |

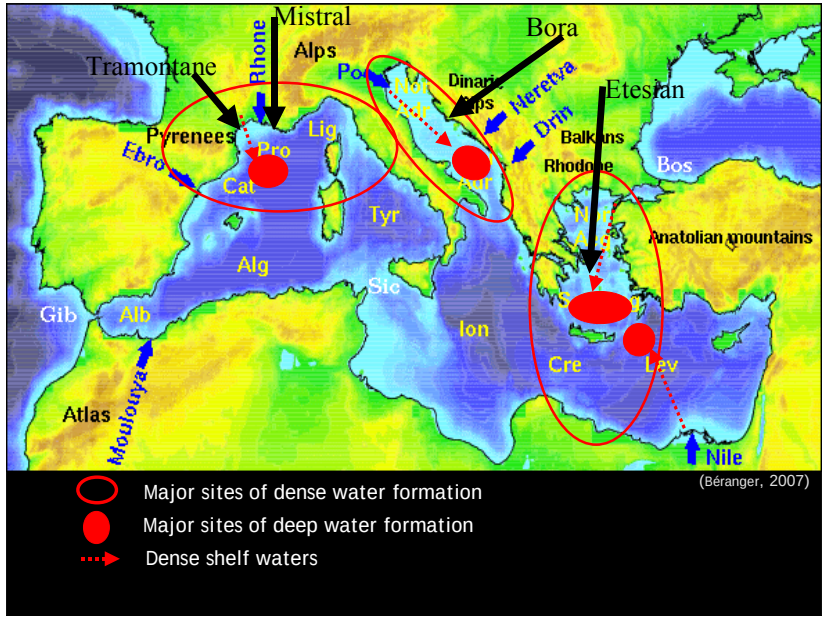
## HERMIONE Theme leaders

| Theme | Title | Leader | Organisation |
|---|---|---|---|
| 1 | Climate-driven change | P. Tyler | SOTON-SOES |
| 2 | Anthropogenic impacts | E. Ramirez | CSIC |
| 3 | Episodic events | M. Canals | U.Barcelona |
| 4 | Ecosystem distribution/interconnection | A. Vanreusel | UGent |
| 5 | Biological capacities | S. Arnaud | IFREMER |
| 6 | Biodiversity and ecosystem fubction | N. Lampadariou | HCMR |
| 7 | Societal and economic implications. | S. Hain | UNEP-WCMC |

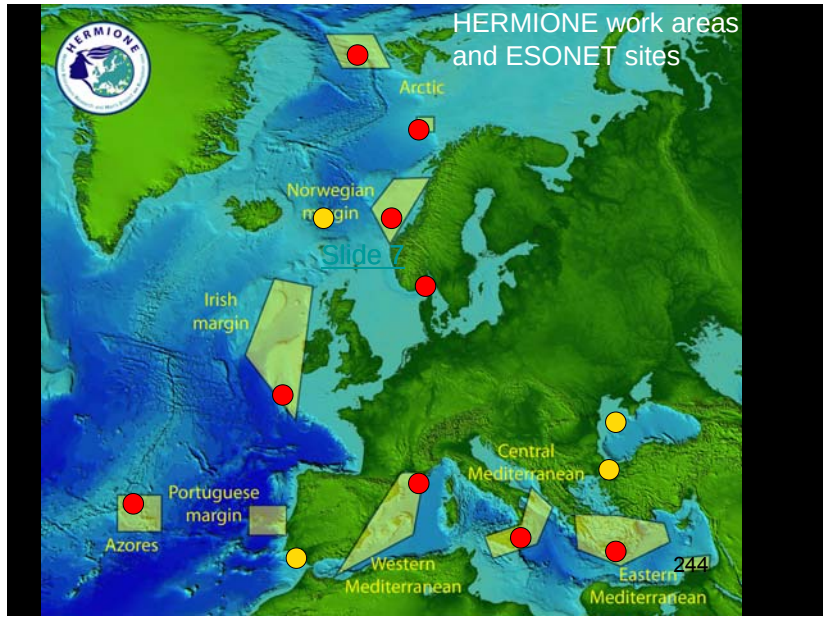

## Submarine canyons






Increasing outreach to the public

## Connections to ESONET

Geophysics

- G-6 What are the physical and chemical fluxes at hydrothermal vents and other regions of seabed fluid and chemical energy flow?
- G-7 How rapidly can gas hydrate or other hydrocarbon reservoirs release large amounts of carbon into the atmosphere to potentially influence global climate or regional safety?
- G-10 To what extent do seabed and deep-Earth processes influence ocean circulation, biogeochemistry, and marine ecosystems?

## Connections to ESONET

Physical Oceanography

- P-4 How rapidly do natural and anthropogenic changes in surface ocean conditions influence deep-sea water masses, and what are the possible impacts of shifts in deep-water mass character?
- P-5 What is the importance of precipitation, river run-off, storms, tides and internal waves and other circulation features in benthic storms resuspension and transport of sediment and its biogeochemical constituents?
- P-7 How will projected changes in the extent of Arctic sea ice, or ocean circulation influence regional and global climate, ocean circulation, and biogeochemistry?

## Connections to ESONET

Biogeochemistry

- B-2 What aspects of biogeochemical cycling will be most sensitive to climate change?
- B-5 What quantities of nutrients and/or organic material are transported with sediment in deep currents and turbidity flows and how does this transport vary in space and time?
- B-6 Are observed deficits in organic carbon input vs. respiration linked to timescales of observation, basin selectivity, or to lateral transports of organic particles?
- B-9 How is transported organic material transformed as it moves through, for example, seafloor canyon systems?
- B-12 What will the important feedbacks of potential ecological change be on biogeochemical cycles?

## Connections to ESONET

Marine ecology

All except E8 and E9

Objectives that may be difficult for ESONET to achieve

- E-10 What is the distribution and abundance of deep-sea corals and carbonate mounds and what factors control their growth?

Paul Tréguer
Scientific Director

ESONET Meeting, Faro, Portugal,
24 October 2008

## Objectives of the Presentation

1. To inform ESONET about what is going on with EUR-OCEANS

2. To highliht already existings links between EUR-OCEANS and ESONET, and explore possible links for the future.

## Objectives of the Presentation

**1. To inform ESONET about what is going on with EUR-OCEANS**

## Context: Approved Roadmap (Our Meeting of 28 February 2008)

*The following roadmap was approved by the EC and included in the revised DoW of the Network in May 2007:*

• December 2007: Vote of the General Assembly on a proposal for the structure of the EUR-OCEANS Institute, to be included in the 2007 Annual Report

• January-May 2008: Preparation of the EUR-OCEANS Institute legal documents

• June-October 2008: Signature of the EUR-OCEANS Institute legal documents : **NB: Signing ceremony, Brest, 12 July 2008.**

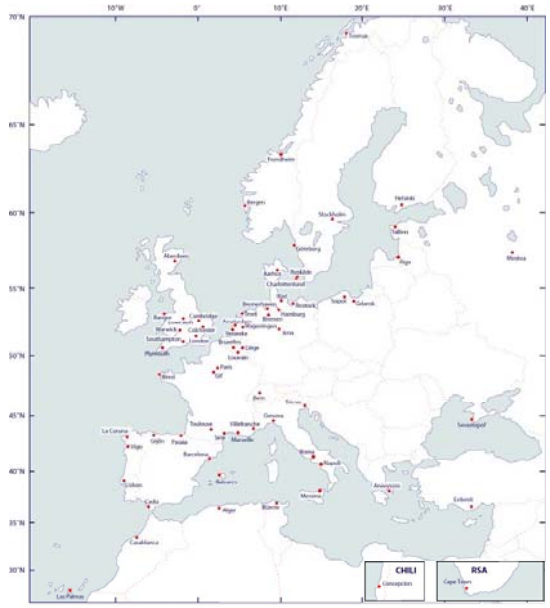
# EUR-OCEANS

- *From* the EUR-OCEANS *Network of Excellence …*
- Network of Excellence funded by the European Commission for the period 2005-2008 (total: 10 M€)
- 61 Member Organisations (ca. 80 institutes)
- 160 Principal Investigators (constituency of about 1000 scientists)

- … *to* the EUR-OCEANS *Consortium (the EUR-OCEANS multi-site institute): Signing ceremony 12 July 2008, Brest-F*
- Consortium of marine institutes to start in January 2009 (legacy of the EUR-OCEANS Network)
- October 2008: more than 20 Organisations have signed up as Core Members (with financial contribution), and additional ones (e.g. from developing countries) have applied to be granted the status of Invited Members (without financial contribution)



The EUR-OCEANS Network brings together 160 PIs from 61 Member Organisations in 25 countries



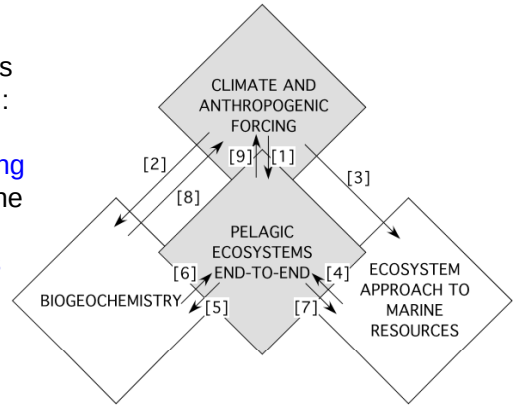

# Networking Objective

- Overall networking objective of the EUR-OCEANS Network: to achieve lasting integration
- of European research organisations on global change and pelagic marine ecosystems, and
- of the relevant scientific disciplines, i.e. pelagic ecosystems, biogeochemistry, and ecosystem approach to marine resources



# Scientific Framework

EUR-OCEANS addresses 4 aspects of the Earth System:
- climate and anthropogenic forcing on the pelagic marine environment
- pelagic ecosystems end-to-end
- biogeochemistry
- exploited marine resources




Arrows: bottom-up, top-down and feedback effects between the four major components of the Network's scientific programme

## Scientific Objective

- Overall scientific objective of the EUR-OCEANS Network is to develop models for assessing and forecasting the impacts of climate and anthropognic forcing
- on food-web dynamics (structure, functioning, diversity and stability)
- of pelagic ecosystems
- in the open ocean
- close links with GLOBEC and IMBER

- This goes through
- coupled models (physical – biogeochemical – biological)
- to simulate the interactions between climate, ocean and ecosystems
- with the view of improving the current understanding of the functioning of ocean in the past (50 years), present and future (50 years).

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## Main Achievements 2005-2008 (1)

- Funding of research and networking activities
- 20 PhD students
- 11 postdoctoral fellows
- 28 scientific workshops (+ 36 endorsed)
- 3 international symposia
- 6 summer schools
- 2 floating universities
- 13 Integration Projects (e.g. writing scientific reviews)
- 16 data rescue projects
- 4 data mining projects
- 4 PI meetings (Paris, Barcelona, Athens, Rome)

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## Main Achievements 2005-2008 (2)

- Creation of collective tools
- Biogeochemical and Ecological Database (within PANGEA)
- Model Shopping Tool*
- Sharing Facilities Meta-Data Distribution System*
- Network of Aquaria for Public Outreach* (films + education)
*available on http://www.eur-oceans.eu/

- Initiation of EU-funded projects
- Integrated Project SESAME (Mediterranean and Black Sea)
- Marie Curie Network METAOCEANS (10 PhD, meta-analysis)
- Specific Support Action BASIN (North Atlantic)
- Integrated Project MEECE (Marine Ecosystem Evolution in a Changing Environment)
- Collaborative Project EuroSITES (Deep-sea observatories)
- Collaborative Project EPOCA (Ocean acidification)

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## Main Achievements 2005-2008 (3)

- Development of international initiatives
- BASIN (Basin Scale Analysis, Synthesis and Integration, GLOBEC)
- ICED (Integrating Climate and Ecosystem Dynamics, SCOR-IMBER-GLOBEC-IPY))
- BENEFIT (Benguela Environment Fisheries Interaction and Training Programme, SADC-GLOBEC)

- Scientific publications and meeting presentations
- > 500 scientific publications co-authored by PIs
- > 400 presentations at scientific meetings co-authored by PIs

- PhD Theses co-supervised by PIs
- 20 funded by EUR-OCEANS
- several tens funded otherwise

# Consortium for European Research on Ocean Ecosystems under Anthropogenic and Natural Forcings

## EUR-OCEANS Consortium

**Paul Tréger**

*The organisational legacy of the EUR-OCEANS Network*

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## Context of the Consortium

- EUR-OCEANS Network
- created to address the fragmentation of European research in the area of science dealing with the impacts and interactions of global change on marine ecosystems
- long-term integration objective of creating a virtual multi-site institute
- EUR-OCEANS Consortium
- will address major scientific challenges in the marine environment
- will create deep and durable integration among its Member Organisations
- will make a major contribution to the strengthening of the European Research Area in marine sciences

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## Objective of the Consortium

- Overall objective: To facilitate promotion and coordination of
- top-level scientific research on the impacts of global environmental changes on marine ecosystems
- optimal use of shared technical infrastructures and scientific facilities
- activities to spread excellence that include training of scientific personnel and dissemination of knowledge to a large public and to socio-economic users

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## Activities of the Consortium

- Two types of activities: those implemented by the EUR-OCEANS Flagship Institutions, and Cluster Activities
- EUR-OCEANS Flagship Institutions
- Member Organisations selected on a competitive basis after internal calls on research topics focussed on pelagic ecosystems, biogeochemistry, and ecosystem approach to marine resources
- activities (1-2 years): host groups of researchers, organise workshops and summer schools, etc.
- Cluster Activities
- doctoral networks
- "Gordon-like" conferences,
- training workshops and exchange visits
- public outreach
- continuation of some activities of the EUR-OCEANS Network

International cooperation

# Organisation of the Consortium

- Governance
- Governing Bodies: Council, representing the Members, with participation of the scientific leaders; Executive Committee; and Scientific Steering Committee
- coordination of activities by a small-sized Project Office, rotating among Members on a competitive basis

- Membership
- Core Members: financial contribution
- Invited Members: no financial contribution

- Funding
- financial contribution (in-cash or in-kind): 5 to 40k€
- Flagship and cluster activities will be funded in part by the Consortium and in part by external resources

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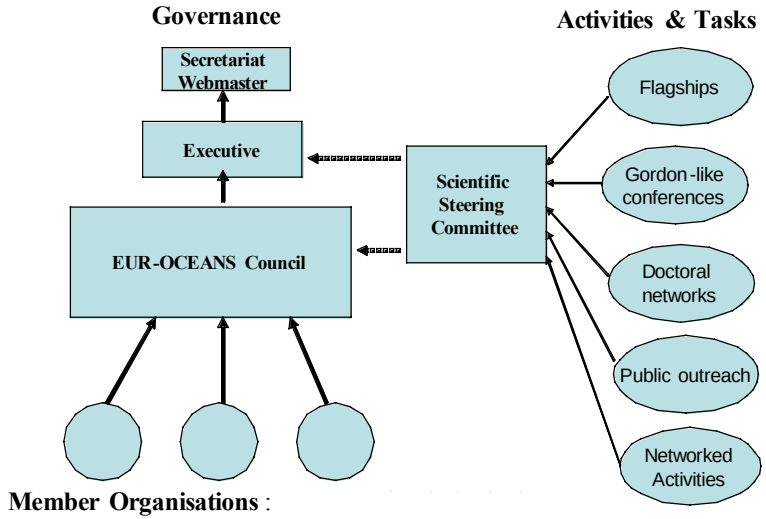
# EUR-OCEANS multisite Institute




# Objectives of the Presentation

**2. To highliht already existings links between EUR-OCEANS and ESONET, and explore possible links for the future.**

**The Joint Programme of Activities**

**Integrating Activities (IA)**
*WP1 Networking:*
*1.1 Sharing facilities* (Karin Lochte -- Arne Körtzinger (IFM-GEOMAR, D)
*1.2 Mobility and communication* (C. Duarte, CSIC, ES)
*WP2 Data Integration:*
***2.1 Observing systems* (R. Lampitt, NOC/NERC, UK)**
*2.2 Networked database, data rescue* (M. Diepenbroek, Univ. Bremen, D)
*WP3 Model Integration:*
*3.1 Model interfacing* (Olivier Aumont, IRD, F)
*3.2 Modelling the Global Ocean* (C. Le Quéré, BAS-UEA, UK)
*3.3 Large-scale Earth System modelling* (F. Joos, Univ. Bern, CH)

**Jointly Executed Research (JER)**
*WP4 Ecosystems end-to-end* (M. St John, Univ. Hamburg, D)
*WP5 Biogeochemistry* (F. Thingstad, Univ. Bergen, NO)
*WP6 Ecosystem approach to marine resources* (P. Cury, IRD, F)
*WP7 Within-system integration merges with WP 3.1* (Olivier Aumont, IRD, F)

**Spreading Excellence (SE)**
*WP8 Training for researchers and other key staff* (C. Duarte, CSIC, ES)
*WP9 Transfer to socio-economic users* (M. Barange, PML, UK)
*WP10 Public Outreach* (S. Ghiron, Océanopolis, F)

Observations has been a core part of the EUR-OCEANS NoE.

Work Package lead by Richard Lampitt, NOCS

Motivation :

-**coordination** between existing observation networks (mostly eulerian)

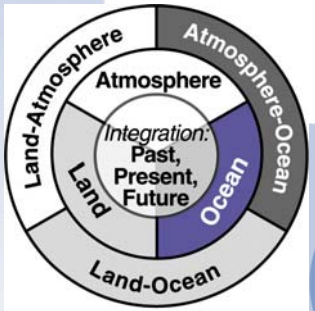
-long-term series needed to **model validation** both at regional and global scale

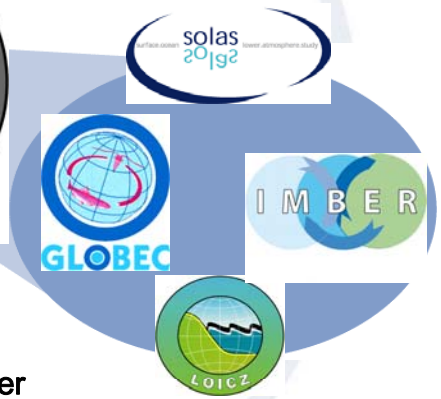
-help to prepare the response to a FP7 call: cf. **EuroSITES (R. Lampitt)**

**The EUR-OCEANS Consortium** will open soon (in early 2009) **calls for « flagship institutions » and « gordon-like conferences ».**

What about a call about the real importance of meso/submesoscale for biogeochemical fluxes at regional/global scale, (**observations** + experimental + modelling)?

## Ocean Projects in IGBP II today



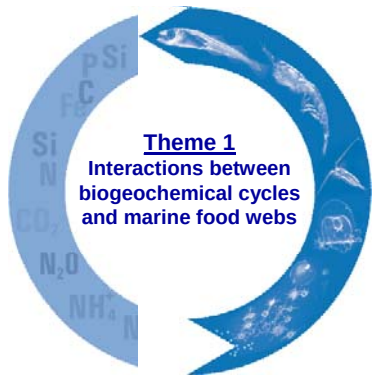

Paul Tréger

## Vision

***"to provide a comprehensive understanding of and accurate predictive capacity for, ocean responses to accelerating global change and the consequent effects on the Earth System and human society"***

## Goal

***"to investigate the sensitivity of marine biogeochemical cycles and ecosystems to global change, on time scales ranging from years to decades"***



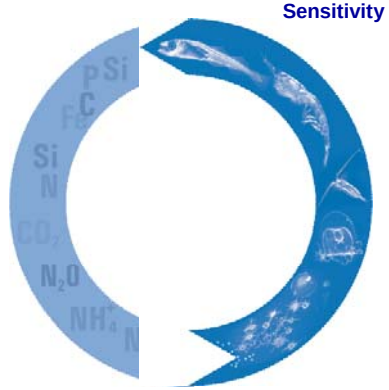

**Theme 1**
**Interactions between biogeochemical cycles and marine food webs**

**What are the key marine biogeochemical cycles, ecosystem processes, and their interactions, that will be impacted by global change?**

## Theme 1 - Issues and questions

1. **Transformation of organic matter in marine food webs**
   - What controls the stochiometry and form of "bioreactive" elements in space and time?
   - What controls production, transformation, and breakdown of organic matter in marine food webs?
2. **Transfers of matter across ocean interfaces**
   - What are the time and space scales of remineralisation of organic matter in the mesopelagic layer?
   - How does nutrients exchange between continental margins and the ocean interior impact biogeochemical cycles?
   - How exchange between the seafloor and the water column impact food web structure and function?
3. **End-to-end food webs and material flows** (IMBER/GLOBEC collaboration)
   - How do food web dynamics affect nutrient availability?
   - How do key functional groups, species, and genes affect biogeochemical cycles?
   - How do species biodiversity and species interactions affect food web functioning and biogeochemical cycling?
   - How are the interactions between biogeochemical processes and food webs recorded in palaeo-proxies?

**Theme 2**
**Sensitivity to Global Change**




**What are the responses of key marine biogeochemical cycles, ecosystems and their interactions to global change?**

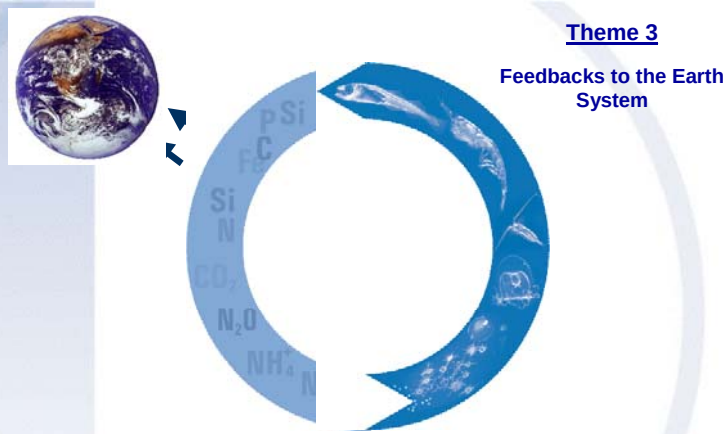
## Theme 2 – Issues and questions…

1. **Impacts of climate-induced changes through physical forcing and variability**
   - What is the impact of changes in circulation, ventilation and stratification?
   - What are the direct effects of changes in ocean temperature and light environment?
   - What are the impacts of changes in frequency and intensity of extreme and episodic events?
2. **Effects of increasing anthropogenic $CO_2$ and changing pH on marine biogeochemical cycles, ecosystems and their interactions** (IMBER/SOLAS: Joint Implementation plan)
   - What are the effects of $CO_2$ driven changes in carbonate chemistry?
   - What are the effects of pH-driven changes in nutrient and trace metal speciation?
   - Which organisms and biological processes are most sensitive to pH and $CO_2$ changes, what are the consequences, and to what extent can organisms adapt in response to these changes?

…

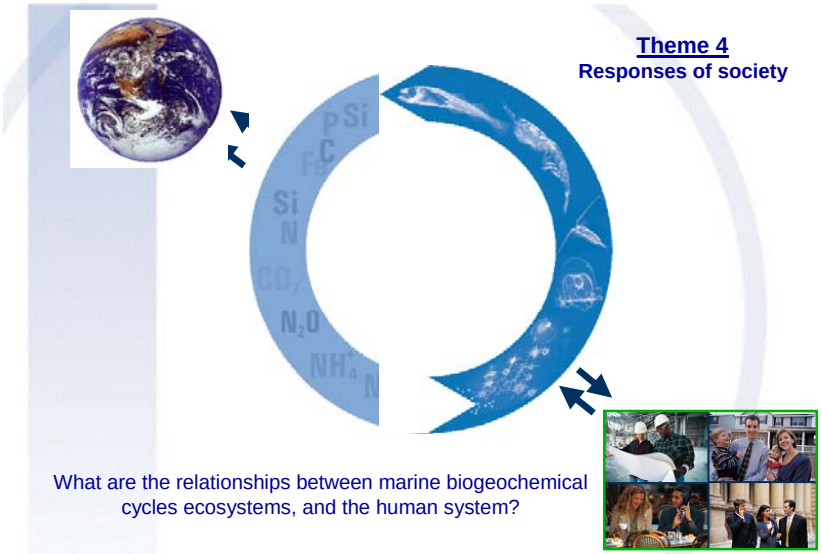
## …Theme 2 – Issues and questions

3. **Effects of changing supplies of macro- and micronutrients**
   - How will changes in macro- and micronutrient inputs to the ocean affect the cycles of these elements?
   - How will changes in the abundance, distribution, and stoichiometry of nutrient elements affect food web structure and function?
   - How will increases in hypoxia and anoxia affect food webs and cycles of key macro- and micronutrients?
4. **Impacts of harvesting of marine ressources on end-to-end food webs and biogeochemical cycles** (IMBER/GLOBEC)
   - How do harvesting-induced changes in food web structure impact biogeochemical cycles?
   - What are the impacts of harvesting living marine resources on end-to-end food webs




## Theme 3 - Issues and questions

1. **Oceanic storage of anthropogenic $CO_2$**
   - What are the spatial and temporal scales of storage of CO2 in the ocean interior?
   - What is the role of the continental margins in ocean carbon storage under global change?
2. **Ecosystem feedback on ocean physics and climate**
   - How do marine food web structure and variability affect ocean and ice physics, and large-scale climate and its variability, via the upper ocean heat budget?
   - What will be the effect of global changes in oxygen minimum zones on sources, transport and out gassing of $N_2O$?




## Theme 4 – To be developed

**The challenge**

**Bring together natural and social sciences communities to develop the issues and questions for this theme**

## Working groups

- End-to-End Food web Task Team (IMBER/GLOBEC)
- Joint SOLAS/IMBER Carbon Research Working Group (IMBER/SOLAS)
- Joint LOICZ/IMBER Continental Margins Task Team (IMBER/LOICZ)
- Capacity Building Working Group
- Data Management Committee

## End-To-End Task Team (GLOBEC/IMBER)

- The group submitted a review paper to *Trends in Ecology and Evolution* focused on the concept for end-to-end food web research.

- The Task team proposed to foster an international meeting as part of the IMBER IMBIZO in 2008. The suggested topics are biogeochemistry of high trophic level species and transformations of elements and modification of stochiometry from nutrients to top predators.

- Participation to:
  - CLIOTOP Symposium (La Paz, Mexico, December, 2007)
  - Upwelling Ecosystems symposium (Las Palmas, Spain, June, 2008)

The group was involved in the organization of a IMBER Summer School in Ankara Turkey in the summer of 2008. This activity was focussed on ***Analyses of end to end marine food webs and biogeochemical cycles*** and is organizing one of the three IMBIZO workshop entitled ***Ecological and Biogeochemical Interactions in End to End Food Webs*** co-chaired by Coleen Moloney and Mike Roman. The invited speaker is Dr Hiroaki Saito (Japan) (http://www.imber.info/imbizo)

## Joint SOLAS-IMBER Carbon group


IMBER Report No 1

Membership:
**Truls Johannessen** (Norway, Chair)
Arne Koertzinger (Germany)
Niki Gruber (Switzerland)
Nicolas Metzl (France)
Britton Stephens (USA)
Gerhard Herndl (Netherlands)
Ken Johnson (USA)
Kitack Lee (Korea)
Kevin Arrigo (USA)
Toshiro Saino (Japan)
Hermann Bange (Germany)
Dick Feely (USA)

**SIC! Sub-groups**

1. **Surface ocean systems** *Chair: Nicolas Metzl* (France)
2. **Interior ocean carbon storage** *Chair: Nicolas Gruber* (Switzerland)
3. **Carbon cycle climate sensitivities and feedbacks** This group will synthesize our understanding of climate feedbacks to the ocean so far, identify scientific issues and develop a strategy to move forward. The Ocean acidification is a very important topic that this group should address.

## Joint SOLAS-IMBER Carbon group

Sub-Group 1

**Surface ocean systems** *Chair: Nicolas Metzl* (France)

Surface $pCO_2$ variability and vulnerabilities workshop (**SOCOVV**,Unesco, Paris, 11-14 April 2007); DSR II special issue in preparation;

Surface Ocean $CO_2$ Atlas (**SOCAT**): two meetings for developing a common format dataset of all publicly available surface $CO_2$ data.

Sub-Group 2

**Interior ocean carbon storage** *Chair: Nicolas Gruber* (Switzerland)

(i) Argo-$O_2$ Task Team – to develop pilot projects and find funding at national levels;

(ii) FP7 proposal entitled "*Towards Global Observatories for Oxygen Depletion (OXYWATCH $O_2$)*".

(iii) CARbon dioxide In the North Atlantic *(CARINA)*

collect carbon relevant data sets in the North Atlantic and form a consistent, quality-controlled data base for the Atlantic (including the Southern Ocean and the Arctic)

(iv) International Synthesis Task team – to lead the international synthesis effort (membership and ToR to be established)

Preparing a ESF-VR-FORMAS Conference on *Decadal Variations of the ocean's interior carbon cycle: synthesis and vulnerabilities, Ancona, Switzerland, July 13-17, 2009.*


**The 8 planned Session topics are:**

***1. Ocean-Shelf Biogeochemical Exchanges (invited speaker: Dr Arthur Chen)***

***2. Continental Shelf Biogeochemistry and Couplings with Benthic Systems (Invited speaker: Dr Katja Kennel)***

***3. Continental Shelf Carbon in a High $CO_2$ World (invited speaker: Dr Alberto Borges)***

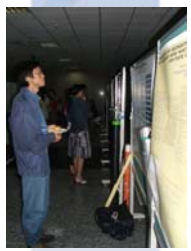
***4. Continental Shelf Ecosystems from High to Low Latitudes***

**5. Integrated Observations and Modeling: Visions and Reality**

***6. Eutrophication and Oligotrophication in Coastal Systems (Invited speaker: Dr Katja Phillipart)***

***7. Low Oxygen on Continental Shelves***

**8. *Sustainable Use of Continental Shelf Resources***



**IMBER IPO led the organisation**

**✓5 days of oral and poster presentations**

**✓Discussion groups**

**✓Best student presentation Award**

**✓Financial support to developing country scientist (SCOR/NSF)**

**✓Social events (Ice breaker, theater, banquet)**


**✓110 participants**

**✓Over 25 countries represented**

**✓Led to the preparation of an implementation plan for continental margins research**

## Capacity Building Working Group

Workshop on Climate driving ecosystem changes (CLIMECO) (Brest, France, April 21-24, 2008)
***Climate driving of ecosystem changes - making the connection***

IMBER/ EUR-OCEANS Summer School (Ankara, Turkey, August 18-22 2008)
***Analyses of the interactions between end-to-end marine food webs and biogeochemical cycles***

IMBER Summer School (Brest, France, 2010)
***Understanding climate change impacts on the biogeochemical cycles and ecosystems of continental margins and open-oceans around the world***


**Objective**:
Interactions between marine scientists on biogeochemistry and ecosystems research with climate scientists

**Collaborateurs/Sponsors**:
EUR-OCEANS, GLOBEC, CLIVAR, IUEM, UBO, Region of Brittany, and IMBER

**Four day programme**:
Combining plenary presentation, hands on and poster sessions;

**Lecturers**:
**Anne-Marie Tréguier** (France)
**Matthew Collins** (UK)
**Benjamin Giese** (USA)
**Gustavo Jorge Goni** (USA)
**Wilco Hazeleger** (Netherlands)
**Geir Huse** (Norway)
**Raghu Murtuggude** (USA)
**Geert Jan van Oldenborgh** (Netherlands)

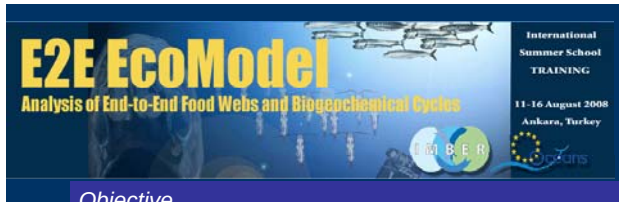
## Participants


## CLIMECO…Outcomes

- **Press conference = 2 articles in regional newspapers and 1 radio interview**
- **Evaluation forms = feedback from the participants to improve next trainings, summer schools etc…**
- **Archives = powerpoint presentation and lecturer recording available on the web site**
- **EOS article by Wilco Hazeleger**
- **Article in next IMBER Newsletter by the Student Award winner**
- **Public Outreach film (Oceanopolis)**


IUEM. Le climat change les océans aussi

« Observer sans parti pris, sans a priori »




*Objective*
provide participants with an overview of methods, models and approaches for analyzing the interactions between marine biogeochemical cycles and end to end food webs studies.

Participants:
21 students from 10 different countries.

Lecturers:
Icarus Allen (UK)
Mike St. John (Germany)
Jing Zhang (China)
Temel Oguz (Turkey)
Baris Salihoglu (Turkey)

## Data Management Committee

**The DMC recommended promoting a cooperative data management approach. This implies:**

- **to involve data specialists right from the start,**
- **to strongly recommend that a person with data management experience be appointed, delegated or hired to serve as the Project Data Specialist**
- **to train young scientists to conduct this task (useful on their CVs, educate them to do DM better) and**
- **to promote "carrots" rather than "sticks" (EG facilitating).**

- **The DMC proposed the following legacies for IMBER:**
  - **Multidisciplinary, distributed dataset (with good compatibility for each data type)**
  - **Data from each field study kept together**
  - **Data publicised and centrally accessible through an online portal**
  - **A new ethos about DM among scientists**
  - **IMBER products**

## Data Management Committee

**Victoria, Canada, June 10-11, 2007**

The main priorities for this year are:

- complete data policies, and web guides
- contact each IMBER project to encourage development of their DM policy
- develop the IMBER data portal, an initial list of agreed terminology for IMBER DIFs, template for IMBER DIFs
- develop a guide to good data practice - a "cookbook" for researchers
- BEER - Being Efficient and Environmentally Responsible :The secret to a successfull project

workshop and discussion on IMBER Data Integration Cookbook prior to the first IMBER IMBIZO (http://www.imber.info/imbizo)

## IMBER International Project Office

**Brest Institut Universitaire Européenne de la Mer**

**Elena Fily**

**Sophie Beauvais**

**Sylvie Roy**

**Supported for 3 years: (2005-2008)**

**…and renewed for 3 years: (2008-2011)**

## IMBER Products

*Website* **www.IMBER.info**

*Newsletter*


*Brochure*


*e-NEWS*


*Poster*

## Most recent Sponsored Activities

- **Sustained Indian Ocean Biogeochemical and Ecological Research (SIBER)** Science Plan Writing Workshop, Goa, India (November 27-30, 2007)
- **CLIOTOP Symposium**, La Paz, Mexico (December 3-7, 2007)
- **Austral Summer Institute VIII,** Concepción, Chile (January, 2008)
- **ICED Modeling Workshop**, California, USA (April 16-18, 2008)
- **CLIMECO Workshop**, Brest, France (April 21-24, 2008)
- **ICES/PICES/IOC Symposium Climate Change**, (Gijon, Spain, 19-23 May 2008)
- **SOCAT-2 meeting ,** Paris, France (June 16-17, 2008)
- **Upwelling Ecosystems Symposium**, Las Palmas, Spain (June 2-6, 2008
- FAO **Coping with global change in marine social-ecological systems**, Rome, Italy (July 7-10, 2008)
- **PICES XVII Annual Meeting**, sponsored session on *End-to-end food webs: Impacts of a changing ocean, Dalian, China (October 24-31, 2008)*

## Contributing Projects

**EUR-OCEANS** *European Network of Excellence for Ocean Ecosystems Analysis,* 60 research institutions and universities from 25 countries (2005-2008)

**CARBOOCEAN** *Integrated Project Carboocean – Evaluation of the sources and sinks of marine carbon,* 47 international groups(2005-2010)

## Regional activities

**ICED** *Integrated Analyses of Circumpolar Climate Interactions and Ecosystem Dynamics in the Southern Ocean*, jointly with GLOBEC and EUR-OCEANS; Science plan and implementation Strategy approved jointly by IMBER and GLOBEC

**SIBER** *Sustainable Indian Ocean Biogeochemistry and Ecosystem Research*, preparing an implementation plan

## Endorsed projects in 2007-2008

*IMBER has now 9 endorsed projects and 2 more under evaluation. Here are the latest projects endorsed:*

*Role of eukaryote pico- and nanoplankton in the biogeochemical processes of the deep sea*
Leading Applicant: Alexander B. Bochdansky (USA)

*An Early Warning System Using Seabirds to Detect Ecosystem Change in the High and Low Arctic*
*Leading applicant: William Montevecchi (Canada)*

*Pressure effects On marine prokaryotes (POTES)*
Leading applicant: Christian Tamburini (France)

*Food-web structure and carbon budget in a coastal area off central Chile (36 °S): influence of mixotrophy and omnivory*
Leading applicant: Cristian A. Vargas (Chile)

*European Project on OCean Acidification (EPOCA)*
Leading applicant: Jean-Pierre Gattuso (France)

## National Activities…

**China** 5 year funding IMBER/GLOBEC programme. Succeeded with level A grading in the mid-term evaluation administered by MOST in January 2008, which will guarantee the funding for the next three years.

**France** Currently funded for three years CYBER programme "CYcles Biogéochimiques, Ecosystèmes et Ressources". (2006-2009) the marine science component of the CNRS/INSU LEFE national program; many regional project

**Germany** Currently underway project Collaborative Research Centre "Climate-Biogeochemistry Interactions in the Tropical Ocean and two more project submitted for funding

**India** Impact of anthropogenic perturbations on oceanographic and atmospheric processes in and around India in context of global change; SIBER : Implementation plan in preparation

**Japan** IMBER-JAPAN (chair: Hiroaki Saito) held a symposium in January 2008. POMAL (Population Outbreak in Marine Life) was funded for 5 years (2007-2012). Several IMBER related studies are on-going in the western North Pacific

**New Zealand** Two funded research cruises in permanently oligotrophic regions to north west of New Zealand focused on N cycling in this region

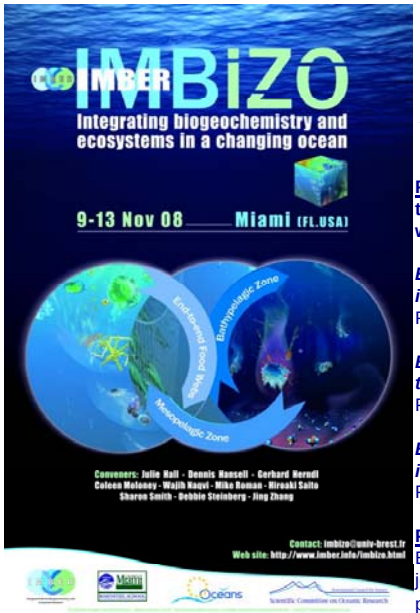
**Netherlands** Dutch funding agencies have decided to join forces and to implement a national programme for Marine and Coastal research (ZKO) incorporating applied, strategic and basic research.

**South Africa** A marine biogeochemistry workshop was held in August 2007 to try and co-ordinate local (national) biogeochemical research and to align it with international efforts.

**Spain** Many running projects and activities, which are closely related to the IMBER goals

**UK** OCEANS 2025 – The NERC Marine Centres' Strategic Research Programme was launched (2007-2012); Plans for UK IMBER meeting in January 2009.

**USA** US contribution to IMBER is through the US Ocean Carbon and Biogeochemistry (OCB) program.




## Meetings

http://www.imber.info/IMBIZO.html

***IMBIZO* means "gathering" or "meeting" in Zulu**

**Format:**
**three concurrent and interacting workshops with joint plenary and posters sessions**

***Ecological and Biogeochemical Interactions in the Mesopelagic Zone***
Plenary speaker: Dr Richard Lampitt (UK)

***Biogeochemistry and Microbial Dynamics of the Bathypelagic Zone***
Plenary speaker: Dr David Karl (USA)

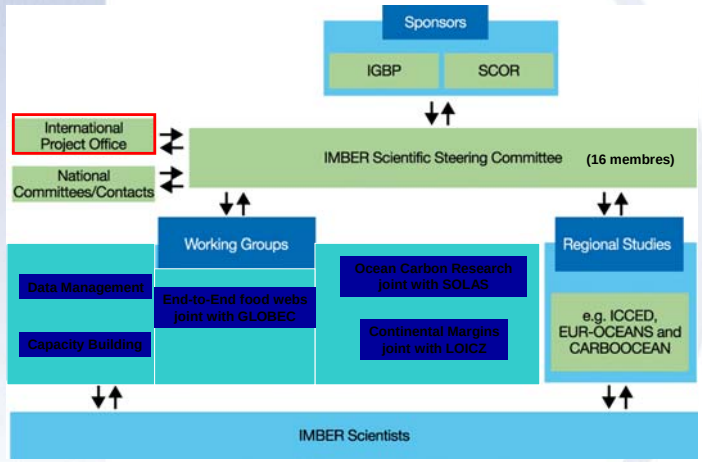
***Ecological and Biogeochemical Interactions in End to End Food Webs***
Plenary speaker: Dr Hiroaki Saito (Japan)

**Products:**
Each workshop will prepare a special issue of a journal through the contributions of the participants.

## Workshops and meetings

→ ICED Food-web Modeling workshop (Norfolk, Virginia, USA, April 16-18, 2008)
→ CLIMECO Workshop (Brest, France, April 21-24, 2008)
→ Symposium on Climate Change (Gijon, Spain, May 19-23, 2008)
→ Upwelling Ecosystems Symposium (Las Palmas, Spain, June 2-6, 2008)
→ IMBER Summer School on end-to-end food web and biogeochemical cycles (Ankara, Turkey, August16-22, 2008)
→ IMBER/GLOBEC TTT First meeting (Reading, UK, July 31-August 2, 2008)
→ First IMBER IMBIZO (Miami, USA, November 9-13, 2008)
→ IMBER/GLOBEC TTT Second meeting (Washington, USA, December 14-17 2008)
→ International conference *Decadal Variations of the ocean's interior carbon cycle: synthesis and vulnerabilities* (Ancona, Switzerland, July 13-17 2009)
→ IMBER Summer school on *Understanding climate change impacts on the biogeochemical cycles and ecosystems of continental margins and open-oceans around the world* (Brest, France, August 2010)


## IMBER: Organisation



## MERSEA

Science input for ESONET

Yves Desaubies

## Mersea Project

- Over since sept 30, 2008
  - Presently preparing final reports
- Objectives & achievements
  - Developed prototype for Kopernikus Marine Core Service
  - Architecture of the system, operating in (pre) operational mode
    - Monitoring and Forecasting Centres (Global, Arctic, North West shelves, Baltic, Mediterranean)
    - Thematic Assembly Centres (in situ, Remote sensed : SST, Ice, ocean coulour, altimetry)
  - Modeling and data assimilation
    - Physical and bio-geochemical
    - Merged data products
  - User applications
    - Indicators for environmental reporting (EEA)
    - Industry (shipping, offshore, oil spills)
    - Seasonal forecasting

## Mersea In situ observations

Contributions to

- ARGO
- Ships observations (TSG and XBT)
- Gliders
- Time series stations
  - Mediterranean
  - Porcupine Abyssal Plain
  - Canaries
  - Irminger sea
- Data management (real time and delayed mode; QC)

## Time series objectives

- Sampling: depth and time
  - Penetration of events (mixed layer, convection, carbon fluxes)
  - Statistics of processes, detection of events
  - Multiparameters
  - Typical of provinces ???
- Validation of models
- Calibration of other observations
  - Remote sensed, Argo, gliders
- Parameters not availble by other means
  - Bio-geochemistry, ice thickness, surface waves, turbulence

## Relevance for MCS ?

- Reference point for indicators
  - Long time series, climate change
- Choke points, sills, transports ???
- Open ocean vs marginal and coastal seas

- But little impact on nowcasts or forecasts
- Flip side : MCS can provide reference context of point measurements

## Key questions (some of them)

- P2 : upper ocean nutrient supply
- P3 : resolution of small scale processes
- P5 : benthic storms, resuspention, BBL
- P7 : arctic ice thickness

- Validation and tuning of models and other data

CoralFISH
Ecosystem based management of corals, fish and fisheries in the deep waters of Europe and beyond

COOPERATION

# Assessment of the interaction between corals, fish and fisheries, in order to develop monitoring and predictive modelling tools for ecosystem based management in the deep waters of Europe and beyond

**SEVENTH FRAMEWORK PROGRAMME**
**THEME 6: ENVIRONMENT**
**Activity 6.2 Sustainable Management of Resources**
**Large Scale Integrating Project**

Co-ordinator: Dr. Anthony Grehan - NUIG, IRELAND

## Policy Drivers

FP6 PROTECT/HERMES

- Identified lack of specific knowledge concerning coral/fish interactions ….
- ….. needed to better understand impact of MPAs

UNGA Resolution 61/105 on bottom fishing impacts

- Discussions with EC Unit B1 (International Policy and Law of the Sea)
- Concern at lack of tools to identify/map Vulnerable Marine Ecosystems (VMEs)



## Objectives

i) the development of essential methodologies and indicators for baseline and subsequent monitoring of closed areas

ii) the better understanding of coral habitat fish-carrying capacity through the integration of fish data into coral ecosystem models

iii) the evaluation of the distribution of deepwater bottom fishing effort to identify areas of potential interaction and impact upon coral habitat



## Objectives

iv) the use of genetic fingerprinting to assess the potential erosion of genetic fitness of corals due to long-term exposure to fishing impacts

v) the construction of bio-economic models to assess the impact on fisheries of various management measures adopted to protect coral habitat

vi) produce habitat suitability maps (based on predictive modelling of habitat distribution) both regionally and for OSPAR Region V to identify areas likely to contain vulnerable marine (coral) ecosystems

## Consortium

### Sixteen partners from 10 European countries

- Eight national research institutes
- Seven universities
- One fishing industry SME

*First major collaboration between margin and fisheries scientists*

### Budget

- €6.5m euro contribution from the Commission

### Duration

- June 1st, 2008 to May 31st, 2012 (48 months)



## Work Package Organisation

### Background studies

1. Regional cold water coral settings
2. Regional deep-water fish and fisheries review

### Development of monitoring indicators

3. Deep-water fish occurrence and fisheries impacts in cold-water coral habitat
4. Genetic fingerprinting of cumulative long-term effects of fishing impacts on corals
5. Ecosystem function, modelling and metrics

### Development of tools for ecosystem based management

6. Habitat suitability modelling
7. Identification of sensitive and essential/preferred fish habitat
8. Economic models and policy advice
9. Education, dissemination and outreach



## CoralFISH project

### Management Structure

**CoralFISH Steering Committee**

**Coordinator**
**A. Grehan, NUIG**

Data management — *M. Diepenbroeck, UBremen*

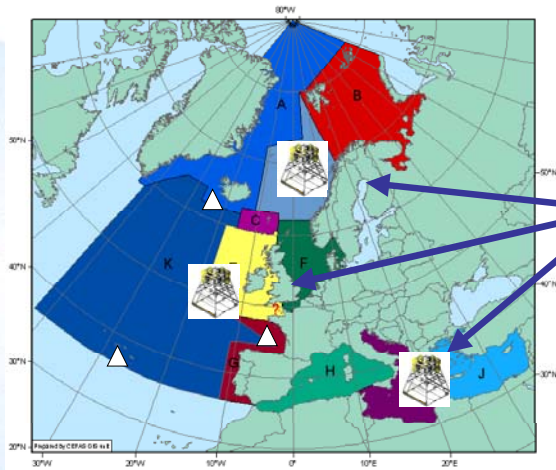
**Regional & technical coordinators**

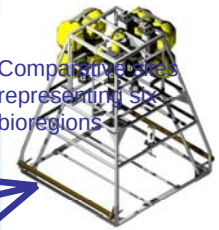
| | |
|---|---|
| Norway and Iceland | *S. Ragnarsson, MRI* |
| Ireland and Bay of Biscay | *J-F. Bourillet, IFREMER* |
| Azores | *R. Santos, IMAR- Azores* |
| Ionian Sea | *C. Smith, HCMR* |
| Lander deployments | *G. Duinveld, NIOZ* |

**Work Package leaders**

| | |
|---|---|
| Background studies | 1. Regional cold water coral settings — *A. Savini, CoNISMa* |
| | 2. Regional deep-water fish and fisheries review — *P. Lorance, IFREMER* |
| Developing Monitoring indicators | 3. Deep-water fish occurrence and fisheries impacts in cold-water coral habitat — *J.H. Fossa, IMR* |
| | 4. Genetic fingerprinting of cumulative long-term effects of fishing impacts on corals — *S. Arnaud, IFREMER* |
| | 5. Ecosystem function, modelling and metrics — *K. Soetaert, NIOO* |
| Developing tools for Ecosystem Management | 6. Habitat suitability modelling — *A. Rogers, IOZ* |
| | 7. Identification of sensitive and essential/preferred fish habitat — *V. Cummins, NUIC* |
| | 8. Economic models and policy advice — *C. Armstrong, UIT* |
| | 9. Education, dissemination and outreach — *N. King, UNIABDN* |

## Study Locations



Comparative sites representing six bioregions

Three lander deployment sites for high resolution studies

## ESONET SCIENCE SUPPORT

### High Resolution Temporal Data-sets

From a CoralFISH perspective, one of the areas that overlaps with ESONET objectives is the need to obtain temporal data.

In our case this is required to better understand habitat utilisation by fish and to improve data relating to environmental forcing conditions, to better constrain our ecosystem models.



## ESONET SCIENCE SUPPORT

### Establishment of Monitoring Networks based on sound scientific rationale - not expediency

Location of study specific reference sites is another issue that should be discussed. Our three high resolution monitoring stations, off Norway, Ireland and Italy, are situated in contrasting bioregions and can be expected to give good comparative results.

To separate local from large scale effects, and stochastic variability (often ignored in models), there is a need for well chosen monitoring sites with good geographic coverage.




For more information visit our website:

http://www.eu-fp7-coralfish.eu

Hydrocarbon industry collaborations with marine science in ocean observing

DELOS
Deep-water Environmental Long-term Observatory System

Others Include:
Collaborations between HERMES participants and Statoil

Henry Ruhl

## What is DELOS?

**Vision**

- DELOS, a pioneering partnership between science and industry, will develop new understanding of deep-water biodiversity, ecology, and the effects of energy industry activities, leading to the responsible use of deep-water resources.

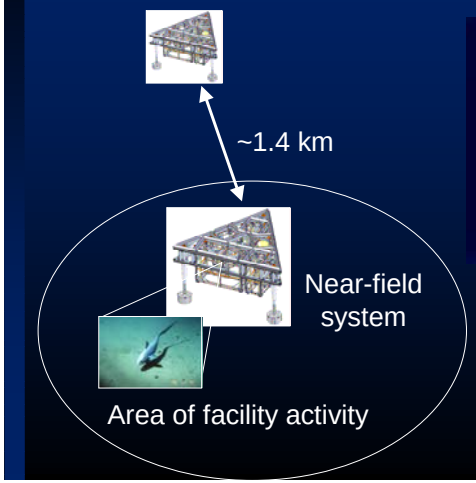
**Mission**

- The DELOS program will use cutting-edge deep-water observatories and ongoing earth science activities, such as climate research, to create a virtual window into deep water and advance human understanding of Earth's last great frontier.
- DELOS will expand both scientific understanding and public education of deep-water biodiversity and ecology, promoting the informed use of natural resources.
- Improved understanding will include evaluations of natural ecological variation, on-site industry effects, and links between climate and deep-water over timescales extending to decades at facility locations worldwide.
- Using innovation, transparency, and objectivity, DELOS activities will lead to outcomes not otherwise possible through academic or industrial research alone, demonstrating the unrealized power of such collaborations.

## Collaborators

| Name | Affiliation | Email |
|---|---|---|
| Dr. Ken Smith | MBARI, USA | ksmith@mbari.org |
| Dr. Gill Rowe | Texas A&M University, USA | roweg@tamug.edu |
| Prof. Monty Priede | Oceanlab, University of Aberdeen, UK | i.g.priede@abdn.ac.uk |
| Dr. Brian Bett | NOCS, UK | bjb@noc.soton.ac.uk |
| Jim Clarke | BP, UK | clarkej2@bp.com |
| Anne Walls | BP, UK | wallsa1@bp.com |
| Bomba Sangolay | Angola Science Institute, Angola | bsangolay2001@yahoo.com.br |
| Dr. Phil Bagley | Oceanlab, University of Aberdeen, UK | p.bagley@abdn.ac.uk |
| Dr. David Bailey | Glasgow University, UK | d.bailey@abdn.ac.uk |
| Dr. Henry Ruhl | NOCS, UK | hruhl@mbari.org |

## Experimental Design



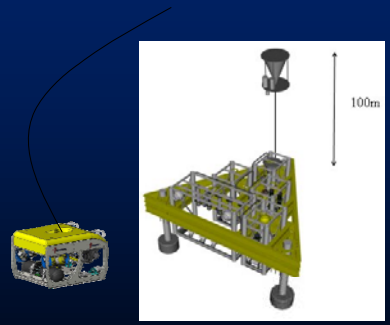

Will be deployed in Angola Block 18 at ~1,400 m depth

National Oceanography Centre, Southampton

# Design Features

- Fully independent modular design
- Onboard power and data storage
- ROV Serviced every 6 months
- Long-term service life (decades)

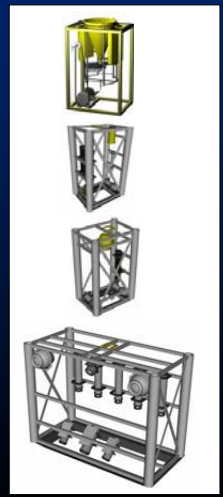
With contextual data from:
- ROV surveys and sampling
- Existing climatic and oceanographic datasets




National Oceanography Centre, Southampton

# Modules

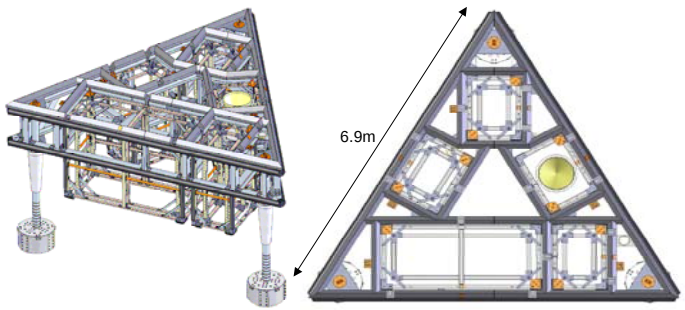
- Sedimentation Sensor
- Acoustic Module
- Oceanographic Module
- Camera Module



National Oceanography Centre, Southampton

# Observatory System

Deep-water Environmental Long-term Observatory System




- Near and far field platforms at situated off Angola, in the Atlantic Ocean in the oil and gas exploration region termed Block 18 at a depth of 1400m.

National Oceanography Centre, Southampton

# Scientific Goals

- Determine long term natural environmental conditions at deepwater site in Angola Block18
  - Comparison with any changes observed at near field monitoring sites
  - Increase understanding of mechanisms linking climate change to deep water ecology
  - Measure and monitor deep-sea biological communities
  - Understand the pace of recovery from any unforeseen impacts
  - Differentiate between natural & man made changes providing a linkage between marine biodiversity & climate change
- Determine long term effects of monitoring platform itself on natural processes
  - Understanding on reef effect of large fixed structures in deep water environment
  - Contributing to understanding of potential effects of sub-sea equipment in general
- Contribute to individual & institutional capacity development in Angola
  - Working with Angolan Scientists in international collaboration

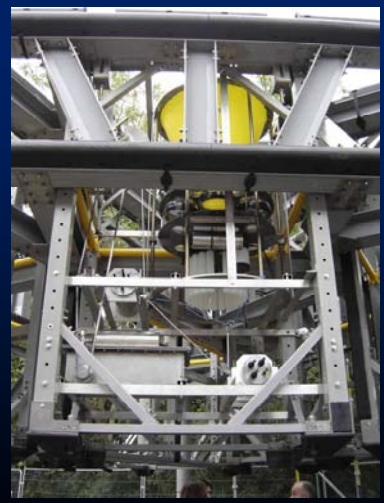
National Oceanography Centre, Southampton

## Camera System

http://www.delos-project.org/

National Oceanography Centre, Southampton

## Sediment Trap System



http://www.delos-project.org/

National Oceanography Centre, Southampton

## Durable System

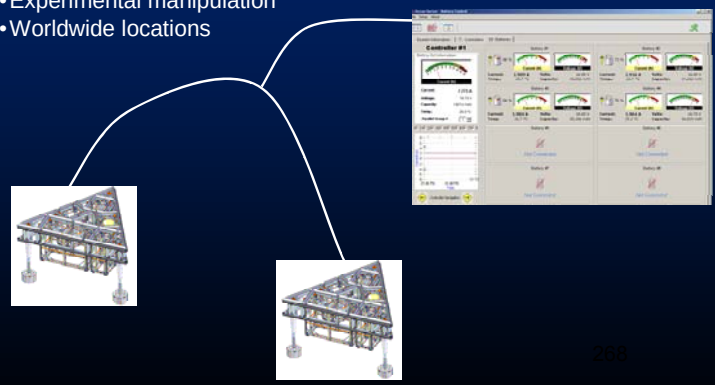
http://www.delos-project.org/

National Oceanography Centre, Southampton

## Future Directions

Delos Phase 2 and the 'Field of the Future'

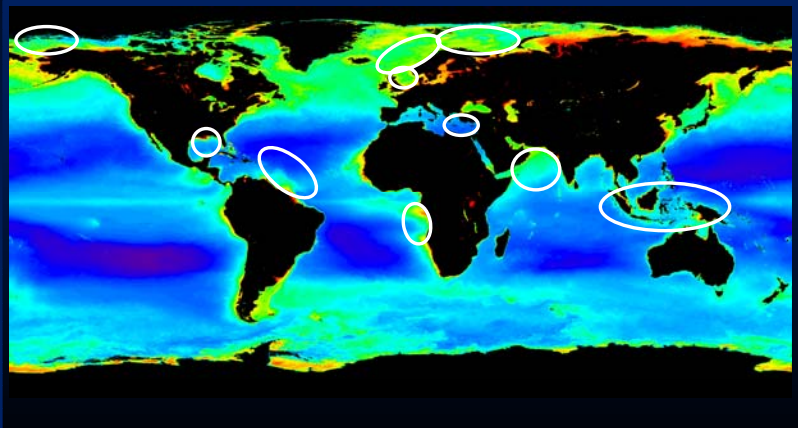
- Observatories included in new facility installations
- 'Data to Desktop' w/ real-time images and data
- Experimental manipulation
- Worldwide locations

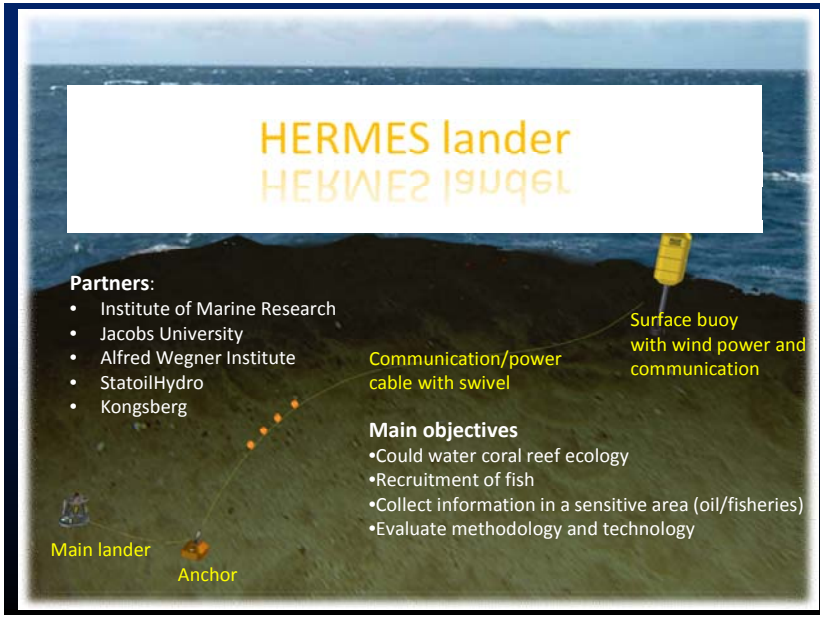


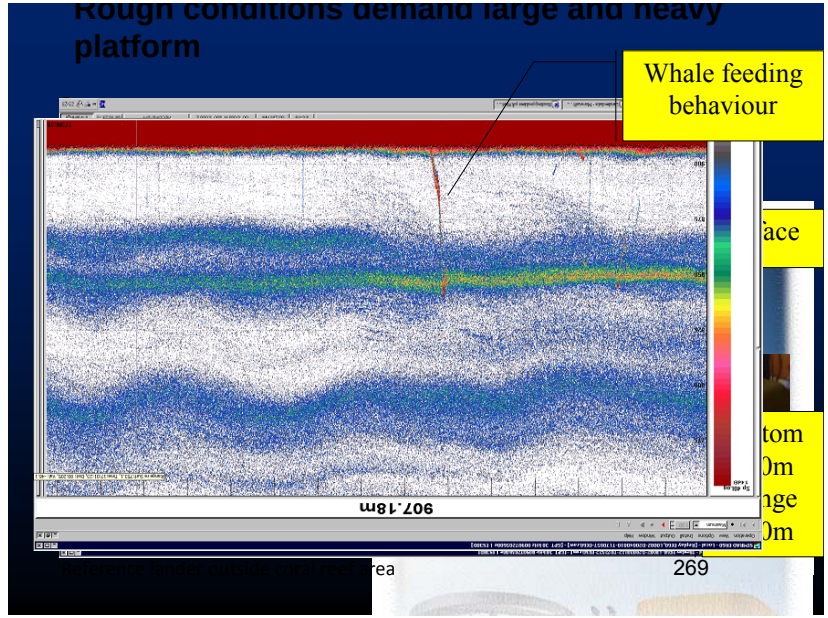
National Oceanography Centre, Southampton
University of Southampton and Natural Environment Research Council

# Future Directions

Potential 'Field of the Future' locations worldwide
Additional proposals to study changes after field decommissioning



## ESONET Science Objectives and their relation to other programs

Geoscience

Relation with :

- Physical Oceanography
- Biogeochemistry
- Marine Ecology

**Louis Geli**

## List of scientific objectives listed by Henry

G-1 How can monitoring of factors such as seismic activity, fluid pore chemistry and pressure improve seismic, slope failure, and tsunami warning?
G-2 What is the importance of oversteepening, storm and tide wave loading, sedimentation loading, gas charging, gas-hydrate dissociation, and fluid seepage in slope instability and failures?
G-3 Are there unidentified offshore areas of important seismic activity, faults, or plate separations and subunits ?
G3a Tsunami early warning systems
G-4 What are the feedbacks between volcanism, deformation, and seismic and hydrothermal activity?
G-5 How does the presence of fluid within marine faults change their dynamics relative to terrestrial fault zones?
G-6 What are the physical and chemical fluxes at hydrothermal vents and other regions of seabed fluid and chemical energy flow?
G-7 How rapidly can gas hydrate or other hydrocarbon reservoirs release large amounts of carbon into the atmosphere to potentially influence global climate or regional safety?
G-8 What are the rates of abiogenic production of hydrogene and light hydrocarbon production from ultramafic outcrops found at mid-ocean ridges ?
G8bis What are the dynamics of mineral resource formation related to hydrothermal venting at mid-ocean ridges ?
G-9 How might any changes in terrestrial hydrology lead to changes in marine sediment transport and deposition?
G-10 To what extent do seabed processes influence biogeochemistry and marine ecosystems ?

- Need to establish priorities (all objectives are not equally mature)
- Find out common factors between all these objectives

Objectives G3 (identification of active faults) and G3a (tsunami early warning systems) can be addressed using remote sensors

## For Geohazards, OBS do represent a generic package

- always needed for geohazards
- Technology fully operational
- requiring high data transfer velocity (~ 32kbits/second)

## Tsunami early warning systems (G3a) require :

- Seafloor seismometers
- Tide gauges near shores
- Deep-sea pressure gauges (for sea-level height)

Committment of national authorities
Coordination structure
Cf conclusions of NEAMTWS/IOC Working Group

=> Role of ESONET to be clarified

## => Deep-sea pressure gauges can also be considered as a generic package

## The common factor between all other listed science objectives (except G3 and G3a) is :

fluids

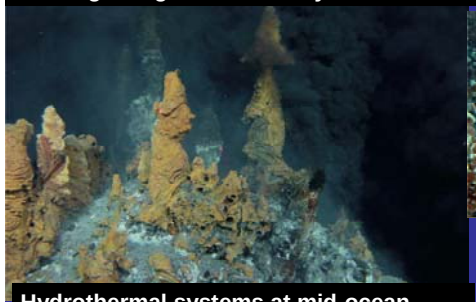
## Monitoring fluid related process require local instrumentation

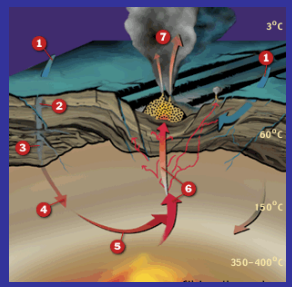
- Processes depending on local hydrogeological conditions
- Highly variable in time and space
- Related to other disciplines / other scientific fields

## Major applications (priorities)

- Fluid / seismicity relations (geohazards, cf MARMARA-DM)
- Fluid / gaz hydrates relations (geohazards, environment, resources, cf LOOME)
- Cold vents monitoring (energetic resources, associated habitats, marine ecology, cf HERMES, LOOME)
- Hot vents (hydrothermal) monitoring (energetic and mineral ressources, marine ecology, cf MOMAR)

**FLUID-CONTROLLED ECOSYSTEMS - Geosciences**
**Faulting - magmatism and hydrothermal venting at Mid-Ocean Ridges**





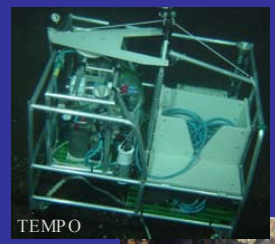

**Hydrothermal systems at mid-ocean ridges :**

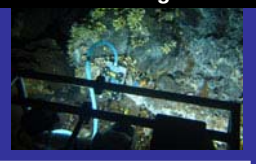
**• over 20% of the heat exchanged and a major vector for chemical fluxes between solid Earth and Ocean**

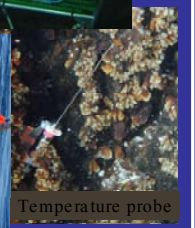
**• unique interactions between the geosphere and living organisms**

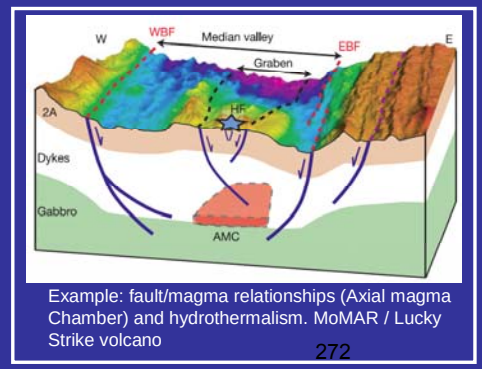
Slide : courtesy M. Cannat

**FLUID-CONTROLLED ECOSYSTEMS - Geosciences**
**Faulting - magmatism and hydrothermal venting at Mid-Ocean Ridges**



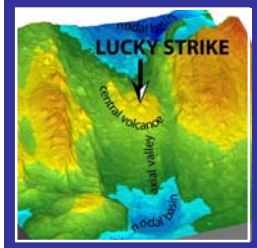



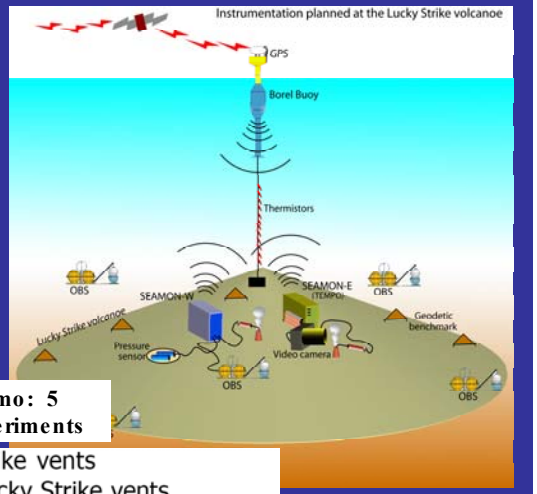




Example: fault/magma relationships (Axial magma Chamber) and hydrothermalism. MoMAR / Lucky Strike volcano

Slide : courtesy M. Cannat



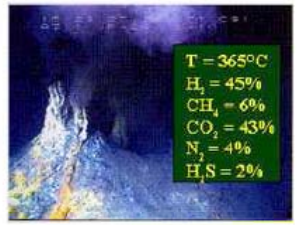




**MoMAR-ESONET demo: 5 integrated science experiments**

1. ecology at Lucky Strike vents
2. chemical fluxes at Lucky Strike vents
3. seismicity and hydrothermal activity
4. seafloor deformation at Lucky Strike volcanoe
5. physical oceanography

Slide : courtesy M. Cannat

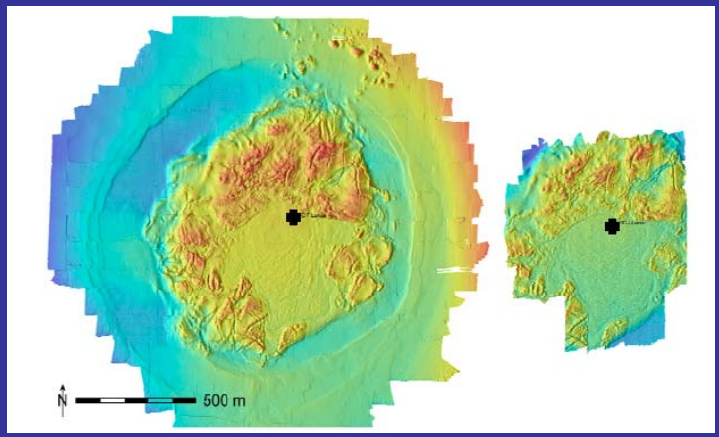
## Dissolved hydrogene in hydrothermal fluids (at concentrations of 45%, J. L. Charlou comm pers.) at ultramafic basement rocks near slow-spreading ridges likely to boost research




©Ifremer
Photo de gauche : émission de bulles de gaz (H2, CH4, CO2) d'un fumeur noir sur le site Ashaze (353°C, 408 bars).Photo de droite : Exemple de composition des gaz dans le fluide de Rainbow (36°14'N-MAR). Dans les 2 cas, l'hydrogène est produit en très grande quantité par serpentinisation.

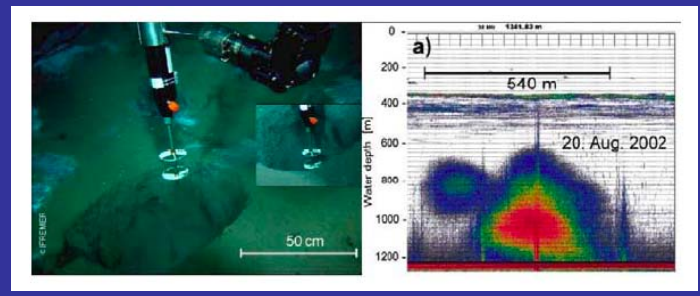
Photographs : courtesy Ifremer

## LOOME Demo Mission on the dynamics of the Hakon Moxby Mud Volcano

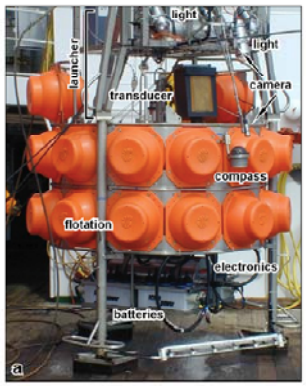



HMMV is a key site forHERMES, MARBEF as well as the ESF EuroDeep program CHEMECO.

## Acoustic detection of gas emissions : Likely to be a powerful tool




Acoustic flare above the HMMV center (right) and fluid vent (left).



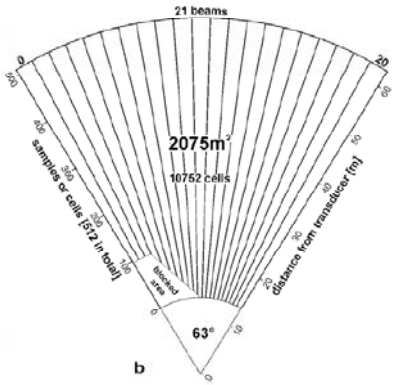



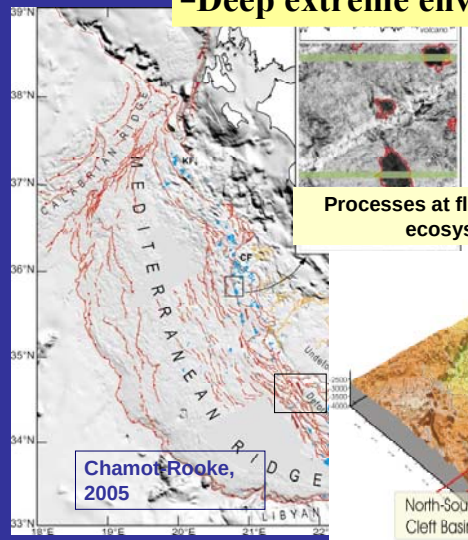

**Figure 3.** (a) Image of the GasQuant lander with launcher system ready for deployment. The lander is video-guided while being towed over the seafloor. Several lights and two cameras (one monitoring the compass) secure safe and exact positioning on the seafloor relative to the target area. (b) Size of the hydroacoustic swath showing the 21 beams and positions of the analyzed samples per beam. Owing to the block depth setting of the system (a relic of its swath mapping history), no correct data have been recorded from the blocked area.

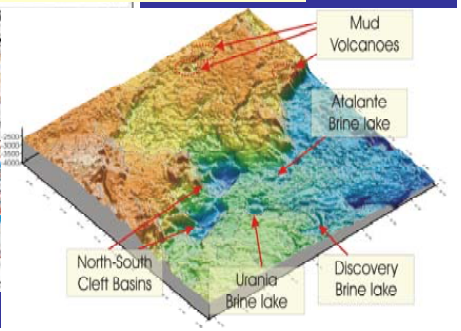
HERMES

## -Deep extreme environments

-Mud volcanoes
-Anoxic brine lakes
-Gas hydrates???

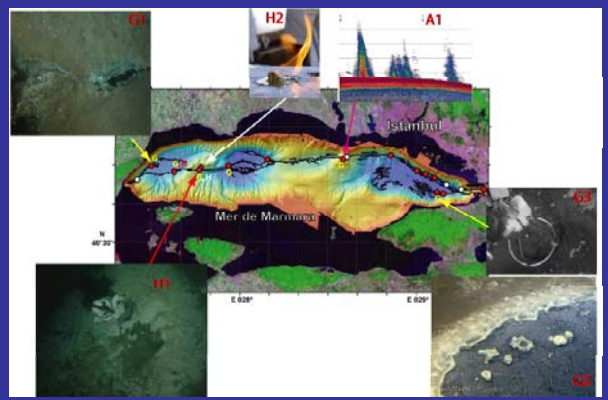
**Processes at fluid-controlled ecosystems**




Slide : courtesy V. Lykoussis

## Fluids and Seismicity : Example : the Marmara-DM project




*Location of Nautile dive sites during the Marnaut Cruise (May 12 - June 12, 2007). Red dots indicate sites where cold seeps were found ; at white dots, no cold seep was found. G and H stand for, respectively, gas bubble emissions and gas hydrates sites. G1 : gas bubble from tensional faults cutting the north-western escarpment of the Tekirdag basin. G2 : Black patch of reduced sediment with polychete tubes (3 cm length) and sulfide oxydizing bacterial colonies. G3 : in-situ gas sampling of the bubbles escaping from the black patch shown in G2. A1 : example of acoustic anomaly detected on the Eastern Ridge using the 38 kHz, SIMRAD EK-60 echo-sounder. H1 : Sediment corer pushed into bacterial mat on the Western Ridge, where hydrocarbon traces and gas hydrates (H2) were found at unexpected water depth (666 m).*

## Fluid ans seismicity : the Gulf of Corinth

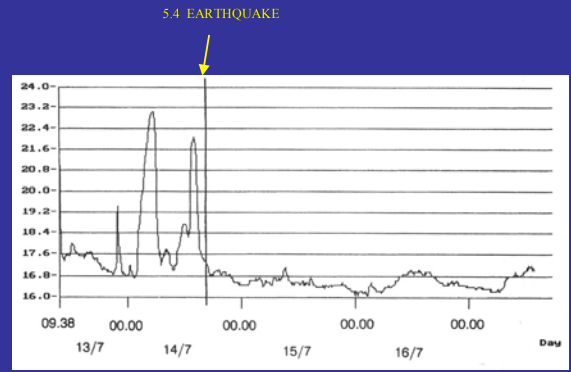



Fig. 14. Temperature variation versus time in the hydrographic station, 10m above the seabed, from July 13th (~30h before the earthquake) to July 17th (60h after the earthquake). The vertical line after the three temperature peaks indicates the time of the earthquake.



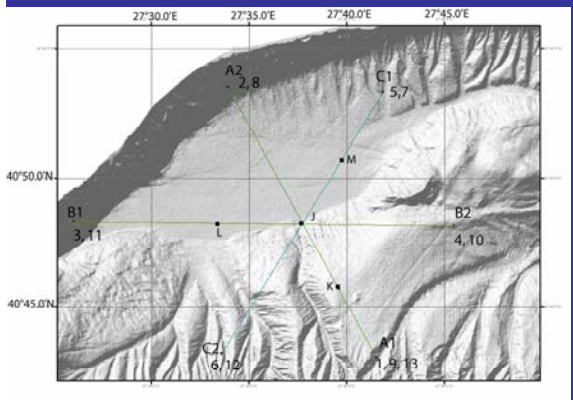
Slide : Papatheodorou

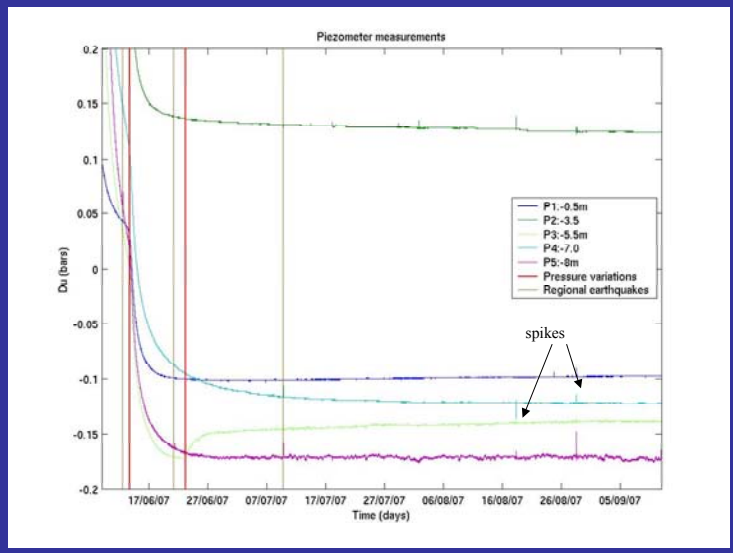
## Specific modules for fluid monitoring

- Piezometers
- Flowmeters-osmometers
- CTD
- Temperature of surficial sediments
- Chemical sensor ($CH_4$)
- Acoustic bubble emission monitoring system

Simultaneous recording within the fault zone of :

- pore pressure (piezometers)
- micro-seismicity (OBS, SN-4)
- flowmeters

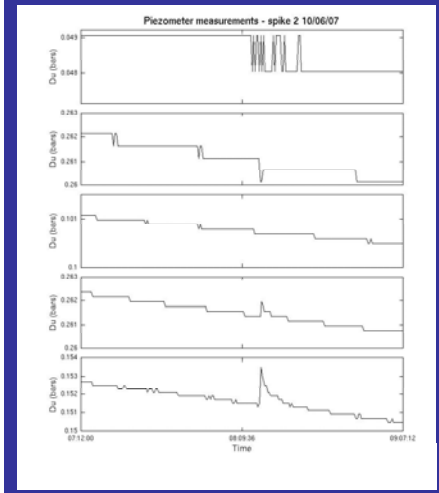



Piezometer behaviour still need to be understood

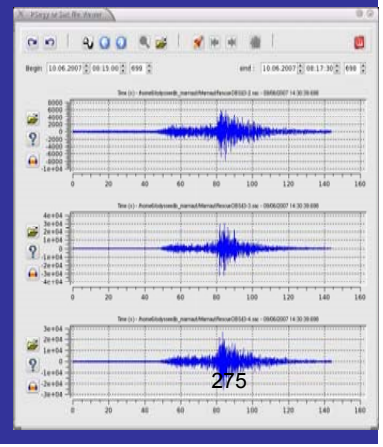
Thèse JB Tary

Correspondance spikes - earthquakes still need to be understood




Spike : 10/06/07 8:15:13

Séisme : 10/06/07 8:15:47 (ML 3,8 200 km)



Thèse JB Tary

# 3 recommandations

- High variability of fluid related processes require particular care of site selection
- Critical need to understand the measure itself for most parameters
- Encourage work on geochemical sensors (methane)
- High potential of gas bubble detectors

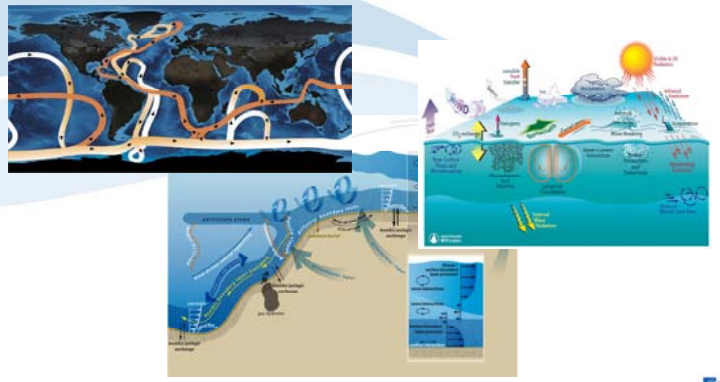
# ESONET scientific objectives workshop: Physical Oceanography

*Johannes Karstensen*
*IFM-GEOMAR, Kiel Germany*
*for KDM*



## General Picture

- Physical Oceanography is all about transport processes in the ocean – from molecular to basin/global scale.





## The framework

- Physical Oceanography is based on a set of well defined equations

$$\frac{\partial u}{\partial t} + \vec{v}\cdot\nabla u - fv = -\frac{1}{\rho_0}\frac{\partial p}{\partial x} + F_u$$

$$\frac{\partial v}{\partial t} + \vec{v}\cdot\nabla v - fu = -\frac{1}{\rho_0}\frac{\partial p}{\partial y} + F_v$$

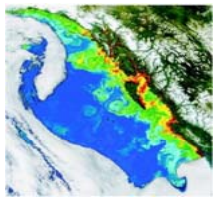
$$\frac{\partial w}{\partial t} + \vec{v}\cdot\nabla w + g = -\frac{1}{\rho_0}\frac{\partial p}{\partial z} + F_z$$

$$\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial w}{\partial z} = 0$$

$$\frac{\partial T}{\partial t} + \vec{v}\cdot\nabla T = F^T + q^T$$

$$\frac{\partial S}{\partial t} + \vec{v}\cdot\nabla S = F^S + q^S$$

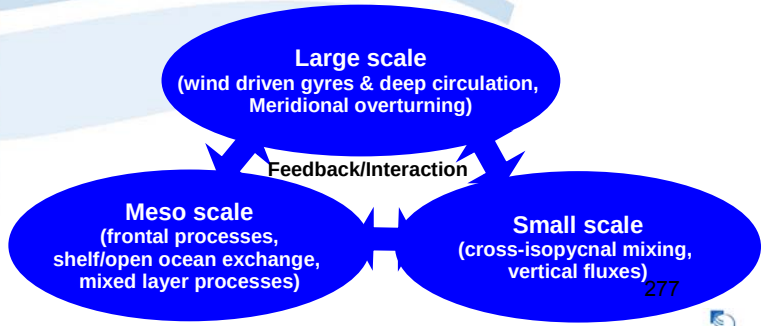
- To resolve multiple scales and processes – the equations get very complex ...



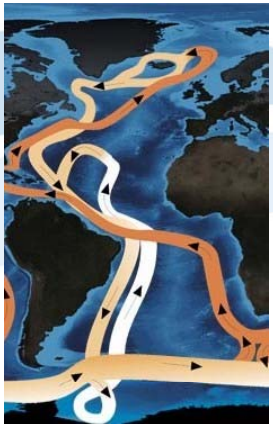


## The challenges

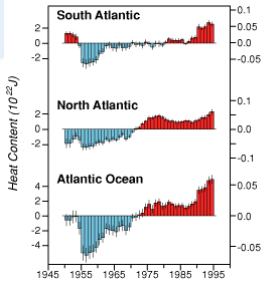
- Oceans role in shaping earth climate and climate change
- Oceans role in Carbon cycling (Physical pump)
- Interaction Physical processes and Ecosystem functioning (in general and in a changing climate)



## Large scale and climate change



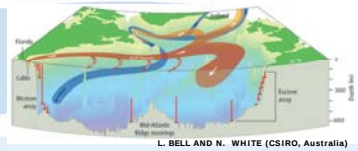
- How stable is the global conveyor belt?
- Challenge: How to observe the conveyor?

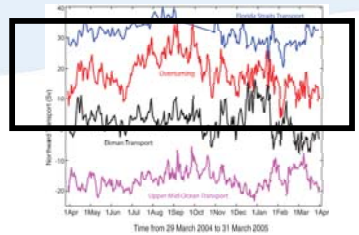



**Heat content 0-3000m depth**



## Large scale and climate change



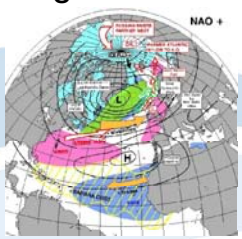




Cunningham et al. 2007, Science

- Observations on basin scale/boundary current (e.g. UK/US RAPID array)
- Surprisingly large interannual variability in overturing transport (red: 18±5Sv)
- Long (decades) time series needed for trend estimation

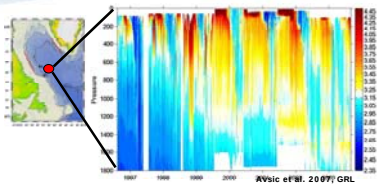


## Large scale interannual variability




Dickson, CEFAS

**Convection depth Labrador Sea:**

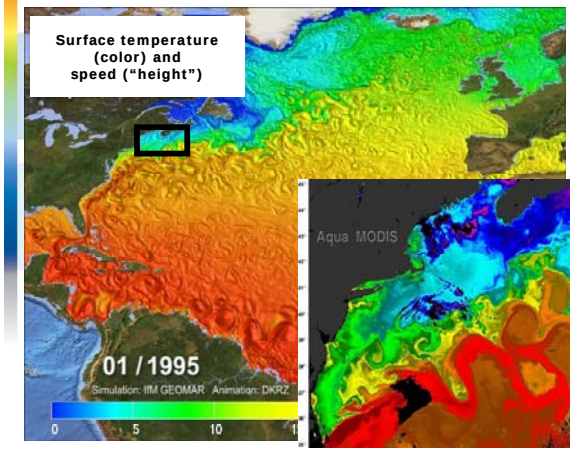


Avsic et al. 2007, GRL

- One important driver for interannual variability: North Atlantic Oscillation
- Important for European weather + socio economy (something like a European ENSO)
- Direct impact on deep water ventilation (depth, properties)



## Mesoscale



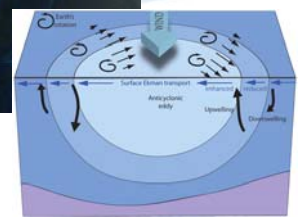

- Complex structures, forced by instabilities

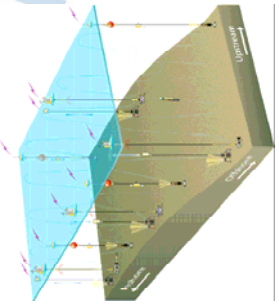
## Mesoscale Processes

- Frontal dynamcis (Subtropical/Subpolar gyre boundary)
  Mixed layer dynamics (Subduction/Obduction)
  Overflow regimes (Nordic Seas, Mediterranean)
- Important for horizontal and vertical transport and dispersion of heat, freshwater, nutrients, ...
- Processes from a few up to several hundred kilometer
- Associated with planetary waves



## Ocean physics and plankton bloom

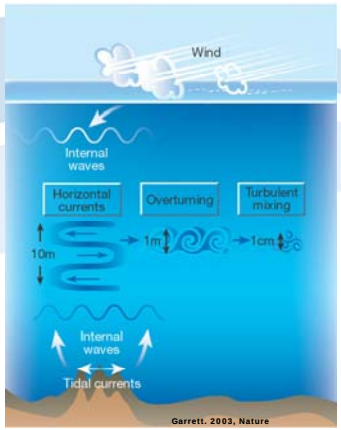




- Secondary circulation around eddies entrains nutrients
- Physical control on Phytoplankton bloom



## Small scale processes

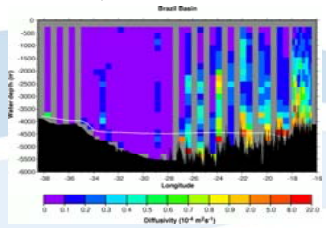


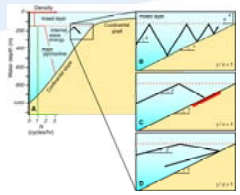

- Energy come from wind and tides
- Transfer of energy to internal waves
- Mixed layer and bottom boundary layer processes



## Small scale mixing with big impact

Polzin et al. 1997, Science



Cacchione et al. 2002, Science

- "Warming" of Bottom Water -> in part closing Meridional overturning circulation
- boundary layer mixing and sediment/material transport at slope –
  'local' deep sea ecosystems

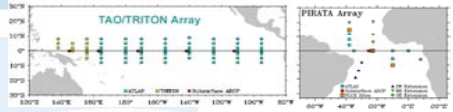
## Operational Oceanography

- Monitoring and forecasting of "ocean weather" and climate + products for marine safety and security
- Mainly a modeling effort but relies on observational data for assimilation (real time) and validation

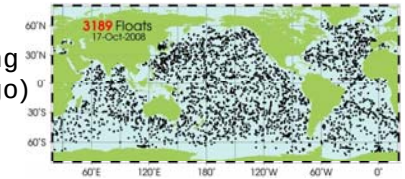


## Data for Operational systems...

- TAO buoy network for ENSO forecast (tropical Pacific); PIRATA buoy in the tropical Atlantic (US/French initiative)



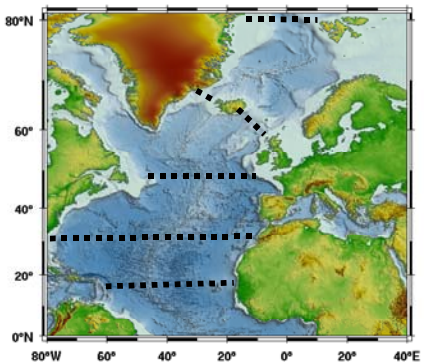

- Argo: network of drifting buoys (ESFRI EURO-Argo)




- Problem with Argo:
  **What happens below 2000m???**



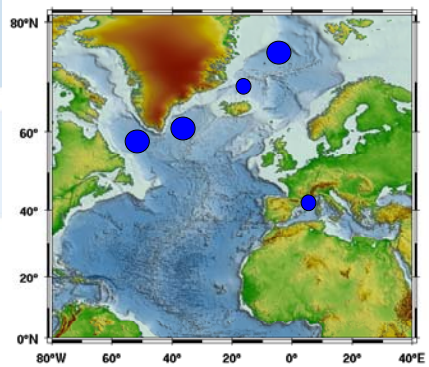
## What are key regions/processes to monitor?




- **Boundary currents/MOC transport + properties**
- Deep convection
- Overflow
- Topographic mixing and associated fluxes (also local)
- Mixed layer properties and dynamics
- Frontal regions
- Exchange shelf/open ocean

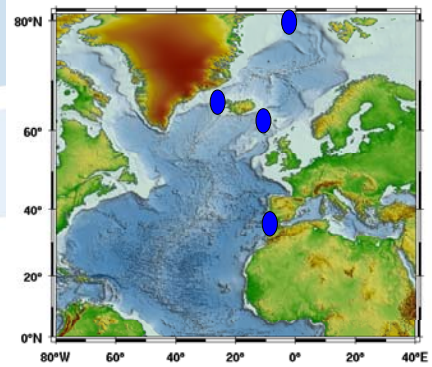


## What are key regions/processes to monitor?




- Boundary currents/MOC transport + properties
- **Deep convection DAMOCLES, THOR, IPY**
- Overflow
- Topographic mixing and associated fluxes (also local)
- Mixed layer properties and dynamics
- Frontal regions
- Exchange shelf/open ocean

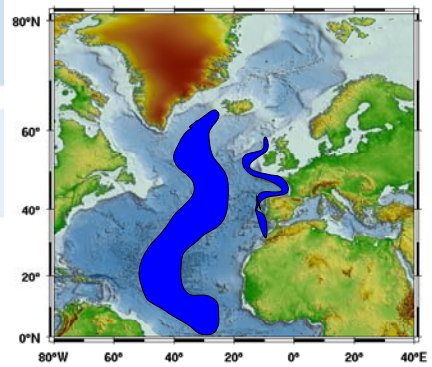
## What are key regions/processes to monitor?




- Boundary currents/MOC transport + properties
- Deep convection
- **Overflow DAMOCLES, THOR**
- Topographic mixing and associated fluxes (also local)
- Mixed layer properties and dynamics
- Frontal regions
- Exchange shelf/open ocean



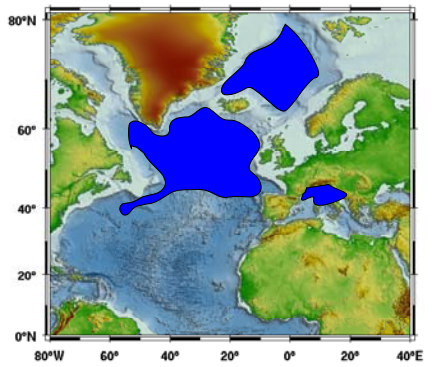
## What are key regions/processes to monitor?




- Boundary currents/MOC transport + properties
- Deep convection
- Overflow
- **Topographic mixing and associated fluxes (also local) HERMIONE**
- Mixed layer properties and dynamics
- Frontal regions
- Exchange shelf/open ocean



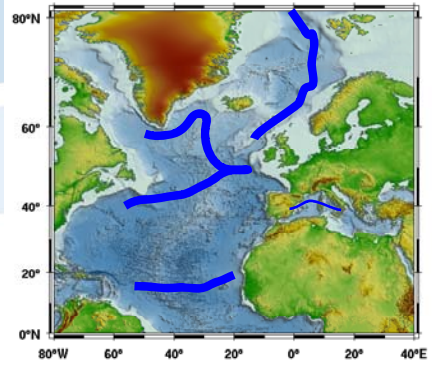
## What are key regions/processes to monitor?




- Boundary currents/MOC transport + properties
- Deep convection
- Overflow
- Topographic mixing and associated fluxes (also local)
- **Mixed layer properties and dynamics EuroSITES**
- Frontal regions
- Exchange shelf/open ocean

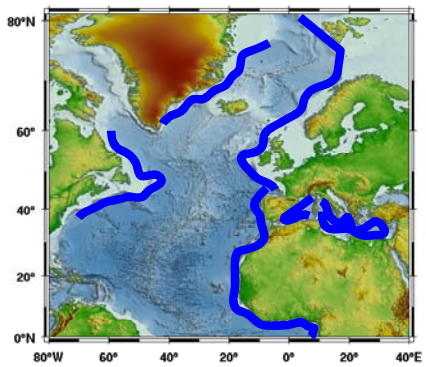


## What are key regions/processes to monitor?




- Boundary currents/MOC transport + properties
- Deep convection
- Overflow
- Topographic mixing and associated fluxes (also local)
- Mixed layer properties and dynamics
- **Frontal regions EuroSITES**
- Exchange shelf/open ocean

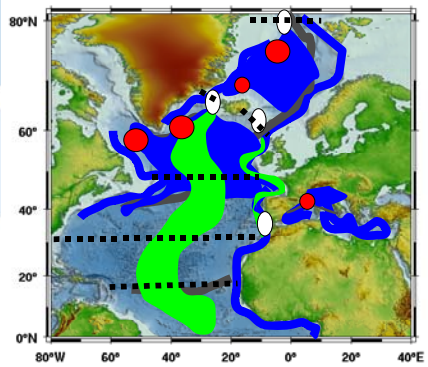
## What are key regions/processes to monitor?




- Boundary currents/MOC transport + properties
- Deep convection
- Overflow
- Topographic mixing and associated fluxes (also local)
- Mixed layer properties and dynamics
- Frontal regions
- **Exchange shelf/open ocean HERMIONE**



## What are key regions/processes to monitor?

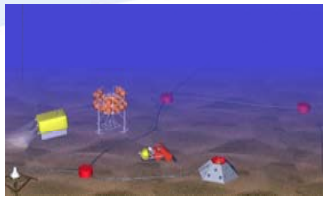



- Regional overlap of physical oceanography "hot spots"
- Synergy by merging observatories



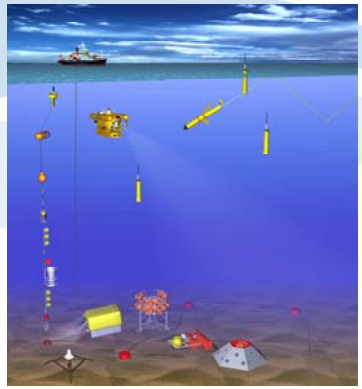
## Physical Oceanography and ESONET scientific objectives

- Historically ESONET concentrated on benthic processes





## Physical Oceanography and ESONET scientific objectives

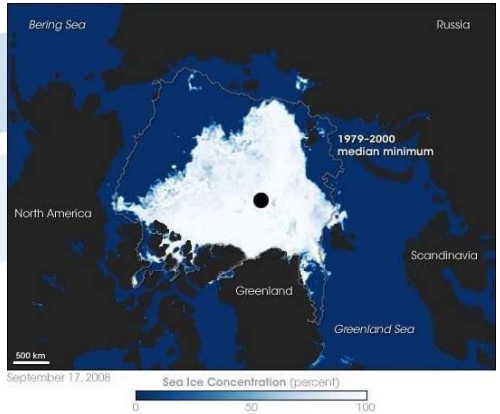


- Full water depth + benthic observatory can serve more disciplines for research as well as environmental monitoring
- Add depth - think vertical!

Thanks



## Arctic Research




**ESONET NoE Scientific Objectives: Physical Oceanography,** J. Karstensen, IFM-GEOMAR, Kiel for KDM

.Ocean Observatories will enable a transformation from largely ship based ocean science to continuous, integrated observation. **Such approach is crucial to resolve the full range of episodicity and temporal change**

# Marine ecology questions

Ana Colaço-Uaç
Science Workshop-Esonet-WP3 Faro 24 Outubro 2008

Table 1 – Concerns/policy issues of relevance to Atlantic and Mediterranean coastal states

| Topic | Issue |
|---|---|
| Global climate change (prediction and mitigation of impacts) | Ocean dynamics |
| | |
| | |
| Anthropogenic impacts | Impact of maritime transport<br>Impact of tourism and population growth<br>Coastal/marine pollution<br>Pollution related to shipping accidents |
| Resource identification and exploitation | Oil and gas resources – exploitation potential and risks<br>Gas hydrates – exploitation potential and risks<br>Seabed mineral resource – exploitation potential and risks<br>Ocean energy – wind/wave/tidal/current |
| Geo-hazards | Seafloor seismicity<br>Seafloor vulcanicity<br>Tsunami risk<br>Slope stability (marine slides etc.) |

| *Subject* | *Process* | *Parameter* | *Tools* | *Available now?* |
|---|---|---|---|---|
| **Global Change** | Productivity & Particle Flux | Export production | Sediment traps, particle camera, radio tracers (in-situ mass spectrometers), satellite imagery | Yes |
| | | Sedimentation rate | | |
| | Resuspension | Turbity | Transmissiometer, optical /acoustic backscatter, particle camera, | Yes |
| | | Bottom water velocity | | |
| | | Shear stress | | |
| | Changes in bottom water hydrography | C/T | CTD, ADCP, chemical sensors, current meters | Partially |
| | | Oxygen | | |
| | | $CO_2$ | | |
| | | $CH_4$ | | |
| | | Currents | | |
| | | Hydrostatic pressure | | |
| | | Biomarkers | | |
| | | Stable isotopes | | |
| | Remineralisation, early diagenesis & solute fluxes | Nutrients | Microsensors, in-situ analysers, peepers, optodes, flux chambers | Partially |
| | | Oxygen | | |
| | | $H_2S$ | | |
| | | $CO_2$ | | |
| | | $CH_4$ | | |
| | | pH | | |
| | | C/N | | |
| | Microbial activity | Nitrification | Microbial microsensors, camera system, planar optodes | Partially |
| | | Denitrification | | |
| | | Anaeroboic/aerobic methane | | |
| | | Oxidation | | |
| | | Sulphate reduction | | |
| | Fluid flux, dissociation of gas hydrates | Aqueous/gaseous flow | Flux chambers, flare imaging, CH4-sensors, water sampling | Partially |
| | | Stable isotopes | | |
| | | Radio tracers | | |

*2. Biodiversity and Ecosystem Function*

| *Subject* | *Process* | *Parameter* | *Tools* | *Available now?* |
|---|---|---|---|---|
| **Biodiversity** | Benthic Biodiversity | Species | Imaging | Yes |
| | | Size | | |
| | | Abundance | | |
| | | %cover | | |
| | | Functional groups | | |
| | Bio activity | Activity | | |
| | | Metabolism | Electrodes | Partially |
| | | Bioturbation | Imaging | Yes |
| | | | SPI | Yes |
| | | | Planar Optodes | Partially |
| | | Bioluminesnce | ISIT/photomultiplier | Yes |
| | Genetic diversity | Genetic fingerprint | Molecular Probes | No |
| | | | Sampling | |
| | Gene Flow | | | No |
| | Growth | Size | | |
| | | Composition | Sampling | Partially |
| | Recruitment | Larval release | Imaging/sampling | Partially |
| | | Larval settlement | Imaging/Colonisation plates | Partially |
| | Pelagic Biodiversity | Species/size | Imaging | Yes |
| | | | Passive baited | |
| | | Biomass | Acoustic backscatter | Yes |
| | | Activity (migration) | Acoustic backscatter | Yes |
| | | | Bioacoustics | Yes |
| | | Mammal species | Bioacoustics | Yes |
| **Particle Transport** | Particle Dynamics. Organic & Inorganic | Particle number | Imagery, laser | Partially |
| | | Particle size | Imagery, laser | Partially |
| | | Particle Composition | Sediment Traps | Yes |
| | | Current | Current meter | Yes |
| | | Turbidity | Transmissometer. Optical backscatter | Partially |
| | | Pigments | Fluorometer | Partially |
| **Fishery Resources** | Recruitment | Egg deposition | Imaging/sampling | Partially |
| | | Larval development | Imaging/sampling | Partially |
| | Migrations | Time/abundance | Bioacoustics | Partially |
| | | Time/abundance | Acoustic backscatter | Yes |
| **Fluid extrusion** | Seeping & venting | Fluid flow | Flow meter/acoustics/imagery | Partially |
| | | Fluid composition and properties | Sampler/in situ analyser, pH,T°,$CH_4$, $NO_x$, $SO_x$, sensors | Partially |

**2. Biodiversity and Ecosystem Function** *(Continued)*

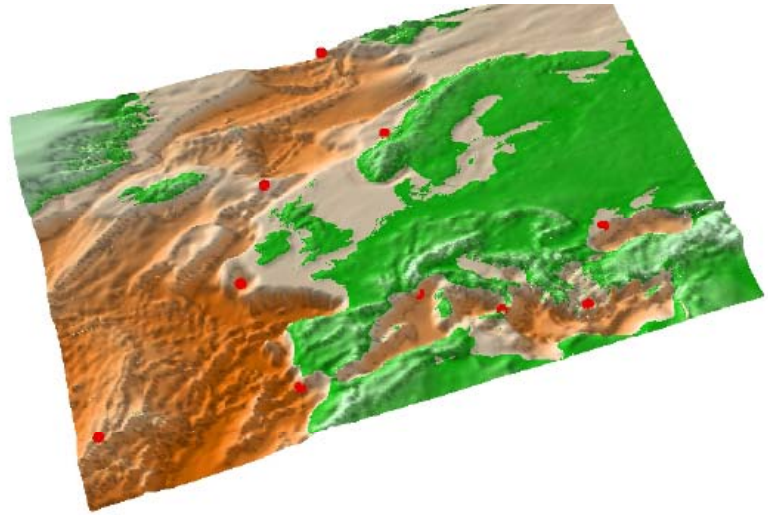
| Subject | Process | Parameter | Tools | Available now? |
|---|---|---|---|---|
| **Anthropogenic Impacts** | Hydrocarbon pollution | Concentration | Hydrocarbon sensors, sampling, fluorometer Imaging | Partially |
| | Waste dumping | Area, volume, depth | Imagery, SPI | Partially |
| | Eutrophication | Nitrates,Ammonia, OM, $PO_4$ . | Sensors, samples, *in situ.* Autoanalyser | Partially |
| | Physical disturbance & Structures | Area & depth disturbed | Imaging | Yes |
| | | Turbidity | Transmissometer | Partially |
| | Noise pollution | | Hydrophones | Yes |
| | Nuclear Energy/ discharge | Nucleides dynamics | Sensor | Yes |
| | Chemical Pollution | Anti-foulings | | No |
| | | Heavy metals | | No |
| | Persistent Organic Pollutants | PCBs | Spectrometer | Partially |
| | | PAH | | No |

**3. Geohazards**

| Subject | Process | Parameter | Tools | Available now? |
|---|---|---|---|---|
| **Geohazards** | Seismic activity | Seafloor motion | seismometer | Yes |
| | | Pressure | hydrophone | Yes |
| | | Strain | distance meter | Yes |
| | | | Tilt meter | Yes |
| | Volcanic activity | T-phase | SOFAR hydrophone | Yes |
| | | Seafloor motion | seismometer | Yes |
| | | Pressure | hydrophone | Yes |
| | | Strain | distance meter | Yes |
| | | | Tilt meter | Yes |
| | | *EM field variation* | *Magnetometer* | *Yes* |
| | | Gravity changes | Gravity meter | Yes |
| | | (Gas and fluid chemistry variation) | (In-line gas analyser, e.g. $H_2S$) | Partially |
| | | | (sampler) | |
| | | | Sensors | Partially |
| | Slope stability | Pore pressure | Pore pressure probe | Yes |
| | | Strain | distance meter | Yes |
| | | | Tilt meter | Yes |
| | | Turbidity currents | Current meter / ADCP | Partially |
| | | | transmissometer | Partially |
| | | | nephelometer | Yes |
| | | | CTD | Yes |
| | Tsunami | Seafloor motion | Seismometer | Yes |
| | | Pressure | Hydrophone | Yes |
| | | Strain | Distance meter | Yes |
| | | | Tilt meter | Yes |
| | | Gravity fields | Gravimeter | Yes |
| | | Magnetic fields | Magnetometer | Yes |
| | | Temperature | Thermometer | Yes |

The biodiversity and the nature equilibrium is affected by the geohazards; by the meteorology of the bottom of the ocean and, by human impact.

Which leads to the changing of biological resources; the function of the ecosystems and affects the global biological network



**MARBEF: Marine Biodiversity and Ecosystem Functioning**
**EU Network of Excellence**

Marbef Theme 1: Global Patterns of Marine Biodiversity Across Ecosystems

**Overall objective:** to understand how marine biodiversity varies across spatial and temporal scales, and between levels of biological organisation, in order to develop methods to detect significant change.

**8 Responsive Mode Projects (RMPs) within Theme 1**

**DEEPSETS:** May 2005 till December 2008

**Objectives:** To determine the major faunal changes that have taken place:

1) At a time series station on the Porcupine Abyssal Plain (PAP) over a 19-year period (1989 to 2008).
2) In the abyssal Eastern Mediterranean over a sampling period of 17 years (1989 to 2006) and to distinguish between spatial and temporal change, where possible.
3) At the Lucky Strike hydrothermal vent field over a 10-year period (1996 to 2006).
4) At the Haakon Mosby Mud Volcano (HMMV) and Hausgarten chemosynthetic communities over an 8-year period (1999 to 2007).
5) At a time series station in the La Ciotat 3PP Cave over a 14-year period (1992 to 2006).
6) To integrate research on time series observations in deep-sea seabed ecosystems.

EUROPEAN SCIENCE FOUNDATION
SETTING SCIENCE AGENDAS FOR EUROPE

**EUROCORES Programme**
European Collaborative Research

**EuroDEEP**
Ecosystem Functioning and Biodiversity in the Deep Sea

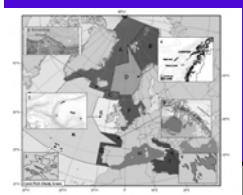
**BIOFUN**: "Biodiversity and ecosystem functioning in contrasting southern European deep-sea environments: from viruses to megafauna"
**Dr. Eva Ramirez-Llodra and Prof. Francesc Sardà (CSIC, )**

**CHEMECO**:
Colonization processes in **Chem**osynthetic **Eco**systems
**Dr. Françoise Gaill (CNRS, Paris, France)**

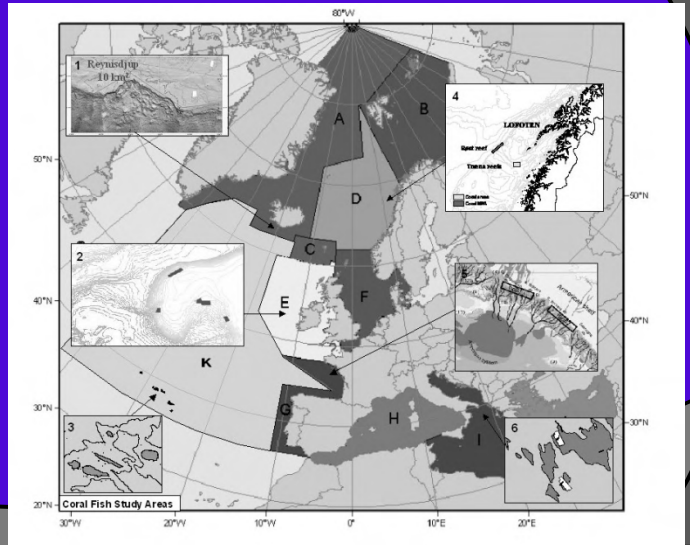
**DEECON**: "Unravelling population connectivity for sustainable fisheries in the "
**Prof. Christian Stenseth (CEES, )**

**CoralFISH, in assessing the interaction of corals, fish and fisheries on a European wide scale has** the following objectives:

- i) the development of essential methodologies and indicators for baseline and subsequent monitoring of closed areas,
- ii) the better understanding of coral habitat fish-carrying capacity through the integration of fish data into coral ecosystem models,
- iii) the evaluation of the distribution of deepwater bottom fishing effort to identify areas of potential interaction and impact upon coral habitat,
- iv) the use of genetic fingerprinting to assess the potential erosion of genetic fitness of corals due to long-term exposure to fishing impacts,
- v) the construction of bio-economic models to assess the impact on fisheries of various management measures adopted to protect coral habitat.



CoralFISH




# HERMIONE- cross cutting workcpackages themes

1. To investigate the dimensions, distribution and interconnection of deep-sea ecosystems
2. To understand changes in deep-sea ecosystems related to key factors including climate change, other human impacts and the impact of large-scale episodic events
3. To understand the biological capacities and specific adaptations of deep-sea organisms in relation to their ecology and to the investigate the importance of biodiversity in the functioning of deep-water ecosystems
4. To provide stakeholders and policy-makers with scientific knowledge to support deep-sea governance aiming at the sustainable management of resources and the conservation of ecosystems


1- Slope and basin Ecosystems 2 –Canyon Ecosystems 3 –Seamount Ecosystems 4 -Cold-water coral Ecosystems 5 –Chemosynthetic ecosystems

*Key questions in marine ecology dynamics and impacts from anthropogenic change:*

**E-1** What is the distribution and abundance of the life in the deep-biosphere and how does such life fix carbon and interact with other ocean systems?

**E-2** How do seismic and other geologic variations influence environment and resource availability on chemosynthetic organisms, and community dynamics more broadly?

E-3 What is the importance of biodiversity and what are the capacities for biological adaptations and thus limits in biological function?

E-4 What quantities of nutrients and organic carbon are transported laterally and made available to pelagic and benthic communities?

E-5 How does the abundance and distribution of marine life change seasonally to decadally and what will the influence of anthropogenic change be?

E-6 How do the variation in environment conditions and resource availability interact with differential utilization of resources, competition, and other factors to drive community change?

E-7 What communities are most influential in biogeochemical cycling and particularly sensitive to anthropogenic change?

E-7 To what extent are changes in productivity, diversity, community structure, and ecosystem function related?

E-8 How do community and ecosystem function changes throughout the water column influence sinking particle fluxes and feedbacks across trophic levels?

E-9 What is the importance of more spatially aggregated and under sampled sinking food supplies in benthic food supplies and meeting observed metabolic demand?

E-10 What is the distribution and abundance of deep-sea corals and carbonate mounds what factors control their growth?

E-11 What are the pelagic and benthic impacts of hydrocarbon, biocoumponds and mineral resource exploration and exploitation and how can they be minimized in future efforts?

E-12 What are the most influential taxa within various functional groups and which might be used as indicators of community wide change?

E-13 How can modeling efforts better incorporate biological complexity related to trophic structure, ecosystem function, sensitivities of key rates such as POC flux or metabolism to climate change?

What is the interconectivity between habitats and ecosystems

How larvae disperses and, how it will be influenced by anthropogenic and climate changes

Do the chemossynthetic ecosystem acts as a carbon sequestration on the sea floor?

## Deep-sea observatories are powerful instruments to:

- Spatial and temporal variability of deep-sea organisms
- Seasonally and interanually variation of food supply
- Shifts in populations of megafauna
- Description of unknow species of organisms

## What would not be possible without observatories?

- • Transient, episodic events, cycles, seasonality cannot be monitored without an observatory
- • Continuous, real-time monitoring
- • Rapid response to catastrophic events
- • Interactions with instruments (changing settings)
- • Acquisition of information at different temporal scales (from minutes to decades)

- Need for real-time :
- more power, interactions, risks, warning systems
- • Public outreach
- • Role of Internet in diffusing the data, science in real-time, interactions with several users, accelerating the rate of understanding
- •

## Thank you


Strategic Committee (ESONET)
Strategic Board (EMSO)

# VI. Strategic Committee (ESONET) and Strategic Board (EMSO)

# Minutes of Strategic Committee (ESONET) and Strategic Board (EMSO) Wednesday October 22nd, 2008, Faro - Portugal

Location: Universidade do Algarve, Campus de Gambelas, Room: 3.21

Minutes compiled by Jean-François Rolin

## 1 Agenda and list of attendees

**AGENDA**

17:30 Introduction

17:40 – 18:40 Strategic Committee of ESONET

- 17:40 Results from the first year of ESONET activities
- 18:00 ESONET activities for the next 18 months
- 18:20 Status of deliverables of ESONET to EMSO - PP
- 18:30 Discussion – Recommendations to ESONET

18:40 – 19:30 Strategic Board of EMSO - PP

- 18:40 Introduction
- 18:45 Project Overview
  Objectives, Activities, Governance, Time Plan
  1st year activities and deliverables
  Status of the project
- 19:00 Report on the Research Infrastructure Meeting in Brussels (29 September 08)
  Legal Framework for RIs
  New EIB financial instruments
- 19:15 Discussion and conclusion

For this second STRAC meeting, EMSO and ESONET committees have to be joined.

**PARTICIPANTS LIST - STRAC ESONET**

| Partners | Country | Delegate | Deputy | Appointed deputy |
|---|---|---|---|---|
| IFREMER | France | Bruno Goffé | Pierre Cochonat | Roland Person |
| KDM | Germany | Sören Dürr | Gerold Wefer | Excused |
| INGV | Italy | Angela Vulcano | Raffaele Pignone | |
| NOC | UK | Ed Hill | Phil Weaver | Henry Ruhl |
| CSIC | Spain | Beatriz Morales Nin | Guillermo Morales | Excused |
| Univ. Lisboa | Portugal | Mario Ruivo | Ricardo Serrão Santos | Ana Colaço |
| Marine Institute | Ireland | Peter Heffernan | Geoffrey O'Sullivan | Mick Gillooly |
| HCMR | Greece | George Chronis | Vasilios Lykousis | |
| NIOZ | Netherlands | Carlo Heip | Raymond Schorno | Excused |

Yellow: present
Blue: represented
Were excused: Sorön Dürr (DFG, Germany), Bruno Goffé (CNRS, France) and Carlo Heip (CEME, The Netherlands).

**Observers**

| Name | Institution | Country |
|---|---|---|
| Luis Matias | FFCUL | Portugal |
| Paolo Favali - Coordinator of EMSO | INGV | Italy |
| Bénédicte Ferré | University of Tromsoe | Norway |
| Juanjo Dañobeita | CSIC | Spain |
| Jean-François Rolin | IFREMER | France |
| Per Hall | University of Göteborg | Sweden |

## 2. Minutes of Strategic Board (EMSO) and Strategic Committee (ESONET)

** Presentations*
The situation of ESONET was presented by Roland Person.
Paolo Favali presented issues to be solved in EMSO – PP. The technical-economical plan was more precisely detailed during this presentation.

Mick Gillooly's presentation addressed the links between WP5 ESONET and WP3 and WP5 in EMSO. There was a clarification on the commitments of each national authority. It was noticed that setting up twelve sites is not reasonable, although the connection between the locations provides the added values. Peter Hefernan, unable to attend, was approached by Mick Gillooly prior to the meeting and said that the EMSO case must be better presented in terms of benefits for the country.

** Cabled and non-cabled observatories*
Per Hall said that some observatories will not be cabled. This position was agreed on: Juanjo Dañobeita (from Spain) further added that the observatory has now to be included in another big infrastructure, such as submarine laboratories. Standalone or not is then a technical problem.

**Decision #1**: Cabled and non-cabled observatories are complementary. The choice is made for scientific, technical and budget reasons.

The question was formulated by Henry Ruhl: Do we need a cable to respond to a scientific issue?
Non-cabled observation sites are often complementary in order to reach spatial variability in addition to time variability.

** Site selection*
Some prioritisation is needed:
At a certain stage, EMSO – PP has to better study some sites because of the limitation of budgets and the high cost of legal studies, for instance.
Vasilios Lykousis suggested that we should avoid setting priorities in EMSO. For instance, seismic monitoring is well-addressed in the Ionian Sea (Sicily and Greece). The interest of each institute to go on one site is linked to the proximity of this site. The real question is: what is the best place for such and such scientific issue?

After a debate, it was agreed that "maturity" is the right word. The main criterion is not "priority", it is the maturity of the studies on the site, in the perspective of construction decisions to be made in 2011-2012.
We must also verify that there would not be a site which would be better.
Ranking according to maturity is consequently a task to be carried out by ESONET and EMSO.

Cores Services: This part presented "how are they defined?" They are not as well-defined for biology and geology as they are for physical oceanography. The projects need to proceed with their definition.

*National positions on EMSO infrastructure*

This point was discussed during the General Assembly (See Part I: Minutes of the 6-month Meeting of EMSO-Preparatory Phase - Paragraph 2.2). Additional information is presented. EMSO is on the shortlist of national priorities in France.
An event on research infrastructures at European level, called ECRI 2008, is organised in Versailles (France) on 10 December, corresponding to the French presidency. Decision-makers will attend.

# APPENDIX D:

*Appendix D: The ESONET NoE Strategic Committee, Barcelona, Spain, 2007*

# APPENDIX D
# ESONET NoE Strategic Committee

**STRAC**
26 September 2007

# MINUTES

| Meeting | **ESONET NoE Strategic Committee #1** |
|---|---|
| Date/time | **07 September 2007** |
| Venue | **Gran Hotel Rey Don Jaime, Barcelona, Spain** |

1. Roland Person, ESONET coordinator, welcomed participants to the Strategic Committee (hereafter called STRAC), which consists of "one representative (or appointed deputy) of the Ministry or Funding Agency chosen per Core Partner" (= countries that have reached the most-achieved level of integration in the field of sea observatories).
   For this first STRAC meeting, participants included:
   - Germany: Sören Dürr (DFG)
   - France: Pierre Cochonat (IFREMER), appointed deputy of Bruno Goffé (CNRS)
   - Ireland: Peter Heffernan (Marine Institute)
   - Italy: Angela Vulcano (MIUR) assisted by Paolo Favali
   - United Kingdom: Phil Weaver (NOC), appointed deputy of Ed Hill
   - Portugal: Ricardo Serrao Santos (Horta), appointed deputy of Mario Ruivo
   - Spain: Beatriz Morales Nin
   - Greece: Vasilios Lykousis (HCMR), appointed deputy of Georges Chronis

   Carlo Heip (the Netherlands) was excused.

2. Roland Person briefly introduced the ESONET project and its complementarities with EMSO, highlighting that the STRAC enables the involvement of the main funding agencies concerned with the deep sea observatory initiative. Their involvement is crucial as EC funding will go up to 25-30% in the best case and, in the worst case, will be as low as 5% of the total budget necessary to the observatory network.

3. Being its first meeting, the STRAC had to decide the following points:
   3.1. It was decided by consensus that Germany would preside over the ESONET STRAC (Sören Dürr).
   3.2. It was decided by consensus that Sweden, Norway and Turkey would be invited to join the STRAC (the Commission has to be informed of this addition by a simple letter).
   3.3. It was further decided, for the sake of considering EMSO in coherence with ESONET, that the ESONET STRAC would be identical to the EMSO STRAC.

4. Pursuing the mission of the STRAC, which is to make recommendations to the Steering Committee to implement tools for the lasting integration of European research on deep-sea observatories, Roland Person proposed one first recommendation. Indeed, in an effort to strive for a concrete achievement in the field of deep-sea observatories, he suggested to build up a demonstrator at European level.
   This idea triggered discussions among Core Partners.

Below are the main points raised:

- It is essential to seek the full support of the EC and funding agencies.
- Highlighting what has been already achieved in North America, the need to develop such a demonstrator was questioned.
- There was a discussion about the best location where to start working, which showed diverging points of views, reflecting different interests. From discussions, it resulted that the preference goes to regional models (one for the Atlantic – climate - and one for the Mediterranean – geohazards).
- The deep sea observatory initiative should be closely considered in connection with the current political context related to the European Maritime Policy. Indeed, deep sea observatories were put forward by the marine research community as a central pillar for an integrated maritime policy (Aberdeen declaration). In this context, the maritime policy momentum creates an actual window of opportunities for underwater observatories and national governments' commitments, opportunities that should be sought by wisely coordinating a demonstrator proposal in accordance with the Maritime Policy process.
- As a response to the consultation process of the Green Paper for a European Maritime Policy, the Commission shall release the "Action Plan" by November, which shall include a set of propositions and recommendations. It should be wise, thus, to strive to fit it in this upcoming timetable. Launching an initiative at this very early stage, disconnected from the political momentum, would dilute the momentum.

**Conclusion:**
In this context, it is essential, in the following 6 to 9 months, to seek for stronger political support for deep sea observatories, and thus for stronger FP7 financial support. In order to support this overall initiative, ESONET should prepare a short strategic document outlining the costs of implementation and operation for the entire ESONET-EMSO Network. The ESONIM model could be used to provide cost estimates. Institutes that own and operate ROV should contribute and ensure their involvement. Appropriate inputs for each ESONET site have to be collected.

* * *