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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)	

CONTENTS

Executive Summary 5
1 OUTLINE OF THE GENERAL ASSEMBLY WEEK 8
2 BEST PRACTICES WORKSHOP 10
2.1 Introduction 10
2.2 Agenda 11
2.3 List of attendees 12
2.4 Debriefing of the main discussions 12
3 SCIENCES MEETING 58
3.1 Introduction 58
3.2 Agenda 58
3.3 List of registered attendees 59
3.4 Debriefing of the main discussions 59
4 ESONET 3rd GENERAL ASSEMBLY 61
4.1 Introduction 61
4.2 Agenda 61
4.3 List of attendees 62
4.4 Debriefing of the main discussions on Tuesday 14 Dec. 2010 63
4.5 Debriefing of the main presentations and discussions on Wednesday 15 Dec. 2010 102
5 VISO MEETING 205
5.1 Introduction 205
5.2 Agenda 206
5.3 List of attendees 206
5.4 Debriefing of the main discussions 206
6 SOUTHERN FRANCE REGIONAL ISSUES 208
7 AFTER ESONET MEETING : A conclusion of ESONET NoE activities 209
7.1 Introduction 209
7.2 Agenda 209
7.3 List of attendees 209
7.4 Commitment through EMSO 210
7.5 Future of activities 211
7.6 Status of sustained ESONET regional groups 215

Executive Summary

The last ESONET large meeting was organised from the 13th December to the 16th December. It aimed at presenting and discussing all ESONET activities, validating them in statutory General Assembly and building targets for the future.

It was also the opportunity to meet all ESONET partners and non-ESONET partners who are involved in deep ocean observatory initiatives to:

- share best practices (Best Practices Workshop # 3)
- update the scientific design of observatories (Science Workshop #2)
- communicate at public and scientific level the outcomes of the project after 4 years
- check the willing of the Consortium to continue the ESONET activities ("After ESONET" workshop)
- prepare the future of Open Sea observatory network in Europe defined as Virtual Institute, namely ex-VISO, now ESONET-Vi (VISO workshop #2)
- put forward the issues of the EMSO large research infrastructure

The main outputs of each workshop and session are.

- some recommendations on interoperability issued from the Best practices workshop #3
- one important statement from the Science Workshop
- two important decisions taken during the Virtual Institute workshop
- some decisions taken during the After ESONET workshop.

They are listed here above:

1. Recommendations on interoperability issued from the Best practices workshop #3:

Underwater intervention & training:

(temporary version of the text)

- Procedures for subsea intervention based on ISO 13628 are mandatory. ROV interfaces with subsea observatory are part of it.
- It is necessary to collect and share the key information to identify ROV interfaces in payload development
- Two cable operations (one for the ROV, one for the operated payload) are a powerful source may save deployment time when the ship capacities allow them (dynamic positioning necessary) and weather permits
- Rehearsal in dry conditions is requested. Written procedures are mandatory

Standards implementation for Observatory instruments:

(temporary version of the text)

- Recommend sensor registration in a standard format
- Standard metadata: functional & operational characteristics, common thesaurus/ontology
- Unique description of the sensor, e.g. via ESONET sensor registry
- Standard Interface Descriptor
- Promote Service Oriented Architecture
- Implement the mechanisms to move to SOA architecture
- Prototyping interoperable web services

Data infrastructure and data management:

Use of the standards as defined in the ESONET data management plan and infrastructure (see data policy) ESONET is recommending following points:

(temporary version of the text)

- Free and open access according to Aarhus Convention on environmental data as expressed by IOC Data Policy (International oceanographic Commission UNESCO) programmes is applied for basic [to be defined.. glossary] data, especially the data requested for risk assessment in real time and delayed mode. [GEOSS...]
- Registration of users is highly recommended for downloading
- Experimental data should follow classical scientific confidentiality rules: no more than 2 years restriction. A low resolution data set such as a display of images is proposed to the public in the meantime.
- Data classified for security and environment protection reason, exceptions as defined by the INSPIRE directive, must at least be stored and be available as soon as they will be de-classified. Access to classified data will be granted on request to agreed scientists.
- Access to citizens is facilitated by implementation of specific tools.
- Long term archiving (more than 20 years) policy and implementation has to be performed for all types of data, including classified data. Archived datasets should be citable with a mention of the observatory network.
- This archiving is assumed by data centres complying with ESONET data management plan and standards.
- Training should be provided to the various levels of staff handling subsea observatory data (recommendation).

2. Statement from the Science Workshop

A key result of the industry breakout was a statement, supported by ESONET General Assembly:

(temporary version of the text)

'Industrial operations in the deep sea are characterised by the absence of independent human witnesses.

We recommend that as a condition for licensing future deep sea drilling, mining or other exploitative activities, operators be required to install real-time observing and sensing systems at appropriate locations around the area of potential impact. The observing system should operate before and throughout the period of industrial activity. Imagery and data should be publically available for interpretation by independent scientific experts.

The ESONET NoE can advise on sensor packages and data analysis.

Such a system would have greatly aided management of the Deep Horizon incident in the Gulf of Mexico. Feasibility is indicated by the DELOS (Deep Sea Long Term Observatory System) installed by BP in an oil field offshore Angola.'

3. Decisions taken during the Virtual Institute workshop

The community voted for a new name for VISO: ESONET Vi (ESONET the Vision) which needs to be finalized and formalized to the EU. The first actions decided are to create a MoU (Memorandum of Understanding) between committed partners using the consortium agreement of ESONET NoE as a basis, and build an ERIC (European Research Infrastructure consortium) for building up the funding structures for the future.

4. Decisions taken during the After ESONET workshop

As a main result, each ESONET working group and its corresponding activities are assigned to one or several future activities in EMSO ERIC, ESONET-Vi or still running activities (EUROFLEETS for instance) after ESONET. For each ESONET site, PIs and stakeholders have confirmed their involvement.

As a conclusion:

*** the General Assembly supports the Steering Committee and coordination for the final budget transfers**

*** the General Assembly officially supports the establishment of an ESONET label. It gives a mandate to the Steering Committee to transfer its sustained use to the expected EMSO permanent legal body.**

*** the General Assembly expresses its will to continue the networking activity after the end of ESONET NoE contract, as anticipated for instance within ESONET Vi.**

Considering the media fallout from famous national newspapers such as Le Monde and Le Figaro after the conference press, we ensure that observatory initiative in Europe is well promoted in partner countries such as France. This is a proof of an efficient integration effort provided at international and national level. For this we would like to particularly thank all involved ESONET partners and colleagues from non-ESONET initiatives for their support.

1 OUTLINE OF THE GENERAL ASSEMBLY WEEK

The yearly ESONET meeting aimed at presenting and discussing all ESONET activities. It was also the opportunity to meet all ESONET partners and non-ESONET partners who are involved in deep ocean observatory initiatives. The observatory community share its knowledge and its points of view. The Meeting was open to non-European institution, and as usually representative of Canada, USA and Japan were invited to participate. Next to the General Assembly meeting *per se*, several other meetings and workshops, associated with the ESONET activities were also organised in the same location: the Best Practices workshop #3, the Science workshop #2, the VISO (now) ESONET-VI workshop #2, and an afternoon meeting dedicated to the "After ESONET" was organised at the end of the Week.
Aside from these workshops, the steering Committee of ESONET met twice and a one-hour time slot was dedicated to the French press.

These workshops were organised from the 13th December to the 16th December. An overview of the Agenda is given here after.

ESONET NoE General Assembly – 13 to 16 December 2010 – Marseille (France)

Monday 13 December Palais du Pharo				Tuesday 14 December MPM Pharo Palais du Pharo		Wednesday 15 December MPM Pharo		Thursday 16 December MPM Pharo	
				08:00 08:30	Registration	08:00 08:30	Registration	08:00 08:30	Registration
				08:30 10:30	**Sciences meeting** *Meeting room 50p Palais Pharo* **Best Practices Workshop #3** *Hémicycle*	08:30 10:50	**General Assembly** *Hémicycle*	08:30 10:00	**VISO meeting** *Hémicycle*
10:00 12:00	**Steering Committee meeting** *Meeting room n°2*			10:30 11:00	*Coffee break*			10:00 10:30	*Coffee break*
11:00 14:00	**Welcome & Registration**			11:00 11:30	**Sciences meeting** *Hémicycle*	10:50 11:05	*Coffee break*	10:30 12:30	**VISO meeting** *Hémicycle*
				11:30 12:00	**Best Practices Workshop #3** *Hémicycle*	11:05 12:30	**General Assembly** *Hémicycle*		
13:00 14:00	**Best Practices Workshop #3** *Meeting room 92p*			12:00 13:15	*Lunch*	12:30 13:45	*Lunch*	12:30 13:45	*Lunch*
14:00 16:00	**BPW#3 – WG#1** *Meeting room 36p*	**BPW#3 – WG#2** *Meeting room 50p*	**BPW#3 – WG#3** *Meeting room #2*	**Sciences meeting** *Meeting room 92p*	13:15 16:45	**General Assembly** *Hémicycle*	13:45 14:45	**General Assembly** *Hémicycle*	13:45 15:45	**After Esonet** *Hémicycle*
					16:45 17:15	*Coffee break*	14:45 15:15	*Coffee break*		
16:00 16:20	*Coffee break*				17:15 19:15	**General Assembly** *Hémicycle*	15:15 17:00	**Poster session**	15:45 16:15	*Coffee break*
16:20 18:00	**BPW #3 – WG#1** *Meeting room 36p*	**BPW#3 – WG#2** *Meeting room 50p*	**BPW#3 – WG#3** *Meeting room #2*	**Sciences meeting** *Meeting room 92p*			17:00 19:00	**Steering Committee** *Hémicycle* **Poster session**	15:45 16:15	**LOOME meeting** ***(Dirk de Beer)*** *Hémicycle*
							20:00	***Social dinner*** MPM Pharo		

2 BEST PRACTICES WORKSHOP

2.1 Introduction

The 3rd Best Practices Workshop was the final event in the series of technological oriented workshops within the ESONET project. It summarizes the outcome from the project and gives recommendations for future technical implementations of ocean observatories around Europe. Within ESONET a number of groups have been informally established dealing with these issues. These groups successfully worked on the evaluation of different standard architectures and the concretization of the interoperability concept on different levels. A very significant contribution came from the cooperation with groups outside Europe like NEPTUNE Canada, and the people in charge for the MARS observatory in the US. The aim for the technical domain is to continue with these activities and keep a core group together beyond the formal end of ESONET. This core group will continue to work on issues like standardization, underwater intervention and similar issues.
The groups of people that are to be addressed with the 3rd Best Practices Workshop are not just the engineers and technicians of the individual institutions but also the future operators of ocean observatories in Europe. With an active contribution to the discussions they can ensure the continuation of the work and impact that is necessary to have a harmonized approach to ocean observatories in Europe.
The workshop features invited keynote presentations from Europe and Overseas, and in depth discussions on the relevant topics. These discussions were open to all interested scientists and technicians from both academia and industry and by that it offers a unique opportunity to shape the architecture of scientific ocean observatories.

Participants were informed that a technological workshop was organized in Aberdeen the 3-4 Nov. 2010 (see Deliverable D61"*Report to EMSO on logistical, engineering and technical aspects of observatories*"). The main topics covered: infrastructure, mechanical issues; standard implementations for acoustic sensors were concluded and debriefed as introduction of the Best practices workshop #3.

Main Workshop Themes

- General overview of the experience gained during the Demonstration Missions on
  +Underwater intervention
  +Calibration and metrology
  +Time series analysis (data processing for scientists)
- Demonstration of standard implementations (generic sensors, physical and chemical sensors, smart sensors)
- Data management

2.2 Agenda

Best Practices Workshop 13-14 December 2010 Palais du Pharo / MPM Pharo			
Monday 13 December Palais du Pharo (13:00/19 :00)			
Time	**Topic**		
13:00 14:00	Plenary session: Presentation of the workshop and work in 3 parallel sessions		
	Introduction Debriefing from previous meetings on : - Infrastructure (cabled and standalone) - Mechanical issues Standard implementations for acoustic sensors		
14:00 16:00	Working Group 1: Session 1ed by Jérôme Blandin – "Best Practices from Demonstration Missions" - Underwater intervention and training - Calibration, metrology and testing - Time series analysis	Working Group 2: Session 1ed by Eric Delory – "Standard implementations for observatory instruments" - Case of generic sensors - Physical and chemical sensors - Smart sensors	Working Group 3: Session 1ed by Robert Huber – "Data infrastructure and data management"
16:00 16:30	*Coffee break*		
16:30 19:00	Working Group 1: Session 2 by Jérôme Blandin – "Best Practices from Demonstration Missions" - Underwater intervention and training - Calibration, metrology and testing - Time series analysis	Working Group 2: Session 2 by Eric Delory – "Standard implementations for observatory instruments" - Case of generic sensors - Physical and chemical sensors - Smart sensors	Working Group 3: Session 2 by Robert Huber – "Data infrastructure and data management"
Tuesday 14 December Palais du Pharo (08:30/12:30)			
08:30 10 :30	Plenary session Best Practices from Demonstration Missions Standard implementations for observatory instruments Standards for information exchange-Data portals		Jérôme Blandin Eric Delory Robert Huber
10:30 11:00	*Coffee break*		
11:00 12:00	Plenary session common with the Science Workshop Goal: to share the conclusions and discuss the next steps		Jérôme Blandin Eric Delory Robert Huber Henry Ruhl Arne Boering and Joaquim del Rio

2.3 List of attendees

Group	First Name	Last Name	Institution	Country	email
Group 1	Dursun	Acar	ITU	Turkey	dursunacaracar@hotmail.com
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	Jean-François	Drogou	IFREMER	France	jfdrogou@IFREMER.fr
	Louis	Géli	IFREMER	France	geli@IFREMER.fr
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	Julien	Legrand	IFREMER	France	julien.legrand@IFREMER.fr
	Manolis	Ntoumas	HCMR	Greece	mntou@her.hcmr.gr
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	Ingrid	Puillat	IFREMER	France	ingrid.puillat@IFREMER.fr
	Pierre-Marie	Sarradin	IFREMER	France	Pierre.Marie.Sarradin@IFREMER.fr
	Barry Feng	Tao	NERC-NOCS	United Kingdom	bt@noc.soton.ac.uk
	Elena	Torrecilla	CSIC	Spain	torrecilla@utm.csic.es
Group 2	Yannich	Aoustin	IFREMER	France	Yannick.Aoustin@IFREMER.fr
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	Joaquin	Del Rio	UPC	Spain	joaquin.del.rio@upc.edu
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	Jesper	Zedlitz	University of Kiel	Germany	jze@informatik.uni-kiel.de
Group 3	Thierry	Carval	IFREMER	France	Thierry.Carval@IFREMER.fr
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	Joaquim	Del Rio	UPC	Spain	joaquin.del.rio@upc.edu
	Henko	De Stigter	NIOZ	Netherlands	henko.de.stigter@nioz.nl
	Fawzi	Doumaz	INGV	Italy	fawzi.doumaz@ingv.it
	Bénédicte	Ferré	UiT	Norway	benedicte.ferre@uit.no
	Robert	Huber	KDN-UNIHB	Germany	rhuber@uni-bremen.de
	Stefano	Vinci	INGV	Italy	stefano.vinci@ingv.it

2.4 Debriefing of the main discussions

2.4.1 Introductory talk from Christoph Waldmann (UniHB/Marum)

Christoph Waldmann reminded the objectives of the workshop and the results of the previous Best practices workshops (#1 and #2). A focus was also given on the WP2 main results.
A summary can be read from the slides here after.

Results of the 1st and 2nd ESONET Best Practices Workshops ('08,'09)

Christoph Waldmann
MARUM, Bremen
waldmann@marum.de

Objectives of the WS

Contribute to the finalization of the ESONET label description

Summarize results achieved during ESONET

Suggest ways to perpetuate the activities (VISO)

WS Structure

Room # / Responsible	Monday 13th December 14 :00 – 18:30	Documents
WG 1 : Session 1 Jérôme Blandin « Best Practices from demonstration missions"	* Underwater intervention and training	D27: Specification report for demonstration actions – sub sea interventions D50: Best Practices workshop report (p34 to 41) D1.1 from the LIDO DM
	* Calibration, metrology and testing	D50: Best Practices workshop report (p7 to 8 and Annex C p57 to 76)
	* Time series analysis	D50: Best Practices workshop report (p14 to 29 and Annex F6 p143 to 158)
WG 2 : Session 2 Eric Delory "Standard implementations for observatory instruments"	* Case of generic sensors	?
	* Physical and chemical sensors	D50: Best Practices workshop report (p7 to 8)
	* Smart sensors	D50: Best Practices workshop report (p29 to 34)
WG 3: Session 3 Robert Huber " Data infrastructure and data management"	Data infrastructure and data management	Deliverable D1.3 from the AOEM DM

Definition of terms

An Observatory is a permanent **infrastructure** providing a certain number of **services** to underwater instruments, allowing their long term operation.

Royal Observatory Greenwich

Definition of terms

The **list of services** includes

- energy supply
- data transmission to/from shore or to/from a vessel,
- time distribution
- Instrument control
- Etc.

OBSERVATORIES ARE SERVICE ORIENTED!

Royal Observatory Greenwich

Definition of terms

Best Practices can be defined as the most efficient (least amount of effort) and effective (best results) way of accomplishing a task

Best Practices in this case means that methods and procedures are discussed and identified to provide a coherent and efficient approach in the context of ocean observatory systems

Attendance

1st BPW January 2008
2nd BPW October 2009

had both about 80 attendants from ESONET member states

and

USA - MBARI
Canada – NEPTUNE Canada
Japan - DONET

Technology Workshop in Aberdeen had 25 attendants

Results – Aberdeen WS

Action items

Wet Pluggable Connectors - ODI, Tronics, Gisma, Seacon. **Establish a European group** on wet mateable connectors for exchange of experience and sharing of qualification procedures. It should share expertise with deep offshore oil and gas providers and users.

A **request for funding** to allow meetings similar to this Technical Workshop will be launched.
One of the potential funding body could be European Science Foundation.

Criteria ESONET Label

The first level is the **infrastructure level**. This means that these criteria have to be taken in account in the implementation phases. These criteria are supposed to assume a minimum of compatibility between the ESONET observatories and to minimize implementation by reducing specific development studies. This level include **deployment procedures**.
A second level is **generic and scientific modules**. For example, minimum sensitivity andprecision will required for generic sensors. A third level refers to **maintenance procedures**. The last one address **data management and data policy access**, in coherence with other European project (SeaDataNet, Eurosites,…)

Criteria GEO Label

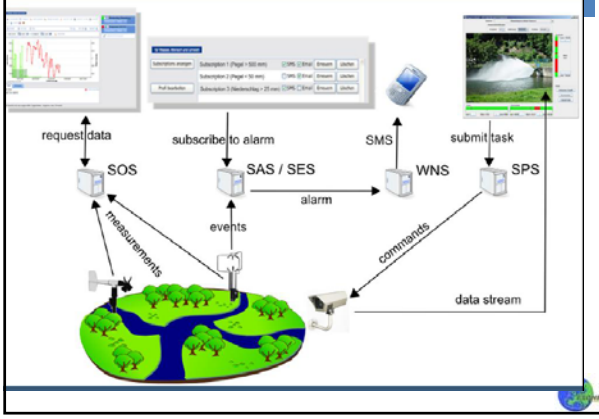
Broad usability of the label should be a design criterion for the GEO label. …….. The proposed label combines objective and subjective components in a distinguishable way. It is based on:
1. an objective assessment measuring quality, reliability, accessibility, interoperability, etc.
2. a subjective assessment scaling relevance, usability, etc.
3. a combined assessment objectively weighing the match between the entity and somewhat subjective user needs published in the GEOSS User Requirement Registry.

An important indicator of the data quality is the level to which data was reviewed. While reviewing of scientific papers is well established, procedures to determine what constitutes “really good” data are far less developed (Parsons et al., 2010).
Although good data have always undergone some level of peer reviewing, there is no formally recognized or established process.

Vision

- *World Wide Web* is for **websites**
  - HTTP
  - HTML
  - …
- *Sensor Web* is for **sensors**
  - O&M
  - SOS
  - SPS
  - …

Arne Broering - broering@52north.org



Instrument qualification

Aspects to ensure quality and reliability as regards to instrumentation have been identified

- a standard interface control document format
- a standard test procedure for each individual instrument or instrument type.
- a standard method of recording and archiving the results of these tests and
- a standard procedure for logging and accessing all maintenance performed on a given sensor (i.e. all historical data).

Quality assurance

1. Subcontractor/Manufacturer Equipment
Define minimum quality requirements that third party or manufacturers need to meet or demonstrate they have met for inclusion on an ESONET deep-sea observatory.

2. Design and Technology Reviews
Define the mechanism to be implemented for conducting reviews .....of deep-sea observatory infrastructures

Quality assurance

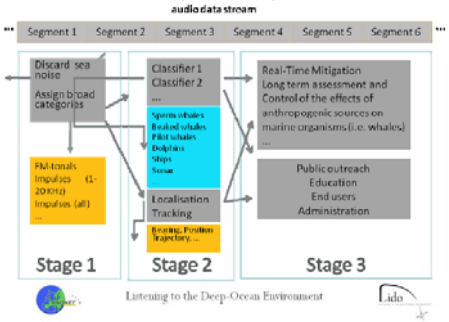
3. Reliability Engineering
Define the procedures for evaluating component failure rates or equivalent analysis methods.

5. Risk Analysis

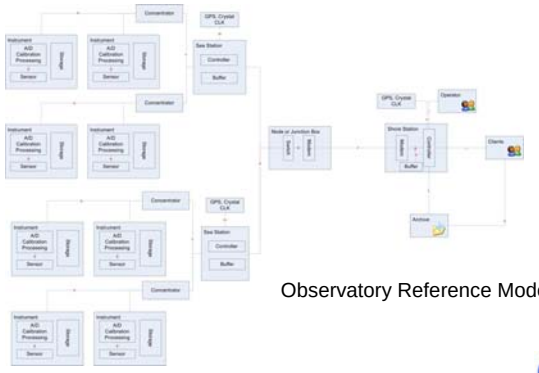
6. Documentation Control

Results from previous WS

Audio data processing work flow

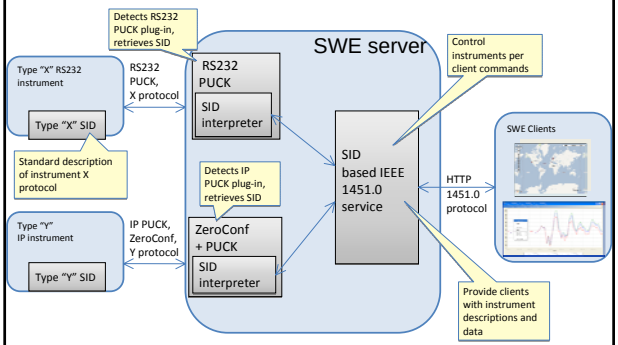


Results from previous WS



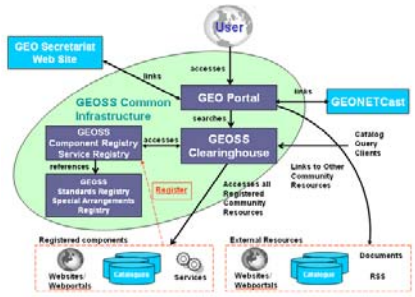
Observatory Reference Model

PUCK + SID + IEEE 1451 Approach

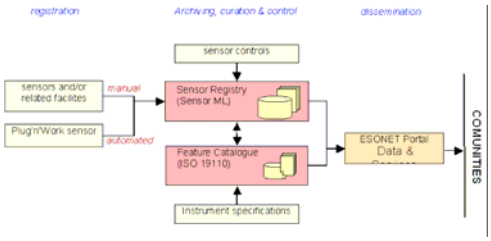


2/8/2011 K. Schleisiek (kschleisiek@send.de)

Results from previous WS

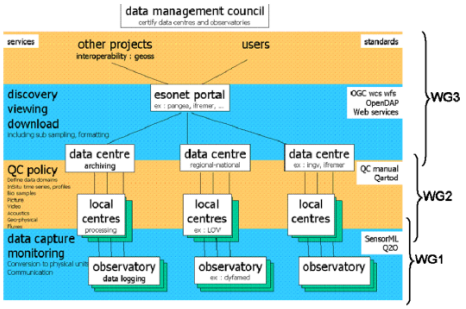


Results from previous WS



Sensor registry

Results from previous WS



2.4.2 Debriefing of the WG 1 "Best practices from demonstration missions"

The main objective of this session was to draw recommendations from the experiences of the past and on-going demonstration missions, according to three axes:

- Underwater intervention and training
- Calibration, metrology and testing
- Time series analysis

The work was made uneasy by the unbalanced representation of the various Demo Missions within the attendance (MoMAR-D had five representatives, LOOME had two, MODOO one, while the three others were not represented). Some DM leaders were not present at this session.

*2.4.2.1 **Underwater intervention & training***

(topic led by Jean-François Drogou, IFREMER)

Beside the demonstration missions, most recommendations regarding underwater intervention were written in Deliverables D27 "Recommendations for marine science observatory intervention" and D51 "Training and simulation manual". They were reminded as an introduction by Jean-François Drogou. He also presented the results from the recent TEXREX tests mission offshore Toulon. The main conclusions of the discussion that followed are summarized below:

- Procedures for subsea intervention based on ISO 13628 are mandatory. ROV interfaces with subsea observatory are part of it.
- It is necessary to collect and share the key information to identify ROV interfaces and trends in payload development
- Two cable operations (one for the ROV, one for the operated payload) are a powerful source of time saving when the ship capacities allow them (dynamic positioning necessary) and weather permits
- Rehearsal in dry conditions is requested. Written procedures are mandatory

Not all DM used underwater intervention; consequently a feedback was not always available on this topic.

Main conclusion: it is important to collect and share all information before starting the development.

Again testing on shore is also fundamental (1 experience is not enough to conclude)

*2.4.2.2 **Calibration, metrology & testing***

(topic led by Lee Hastie, University of Aberdeen)

Independent from the demo missions, the main recommendations for this topic are written in deliverables D36 "Report of testing facilities survey" and D50 "Report on second Best Practices Workshop".

Four types of environment tests are identified. Those related to deployment, return to operation base, operation base storage and home storage.

In the MODOO DM, the calibration methods were imported from EuroSITES protocols. Within MoMAR-D, O_2 and CTD calibrations were performed according to existing calibration and standards.

As a conclusion, we agreed and stated that

- Standards important but may vary considerably according to user's requirements, involving a dose of flexibility vis-à-vis standards, **but**
- Traceability and transparency remain essential

Discussions in plenary session also focused on

- How to force users to choose a level: 3 different levels for application/calibration ?
- It is also explained that generic sensor package was also discussed on Monday: it is requested just give advice on. According to J. Karstensen we need to know the accuracy of each sensor and if this accuracy is good or not (as well as the sensor) and for each application.

Eric Delory underlined that there is a difference between « knowledge » and « requirement »

*2.4.2.3 **Time series analysis***

(topic proposed and led by Ingrid Puillat, IFREMER)

This topic was not built on the direct feedback from the demo missions but rather proposed a future workgroup for sharing and improving methods for a better and more efficient data analysis according to defined scientific goals.

- Objective: to share the methods and know-how of observatory scientists, starting with « simple » things first
- To write a handbook for scientists
- This is a long term work (select 3-4 scientific topics to start)
- Explain what are the methods used for data analysis according to these topics.
- Examples: analysis of CTD time series for global change studies, analysis of CTD time series for study of mesoscale phenomena, analysis of passive acoustic data for seismology, analysis of passive acoustic data for mammals monitoring.

In plenary session objective was summarized: "to initiate a handbook or a manual? How do we proceed or not proceed for time series analysis according to each scientific topic."
Ingrid Puillat proposed to organise a dedicated workshop

The slides presented here after deals with the topics listed here above

- Underwater intervention and training
- calibration, metrology and testing
- debriefing of the WG discussions

OBSERVATORIES UNDERWATER INTERVENTION

ESONET D27 propositions

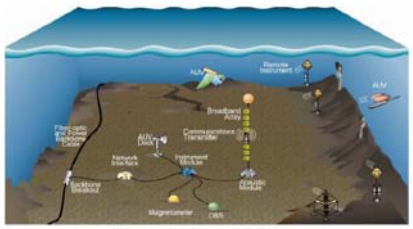


Figure 1. Deep-ocean observatory concept showing cabled and local wireless access from fixed and mobile sensor systems.

Deploy and maintain a network of observatories around Europe

Tasks within WP2

- Precise technical conditions for enlarging/increasing the number of welcoming vessels
- Facilitate exchanges of sensors, equipments, payloads on the different vehicles, by standard interfaces.
- Provide the scientific users and operators with standard qualified procedures or recommended practices to operate equipment in a safe and productive way.
- Provide recommendations for training (crew) and testing (procedures)

D27: Recommendations for marine science observatory intervention

D51: Training and simulation manual

D27 two first tasks

Activity mainly covered now by EUROFLEETS initiative

- A document makes a review of a minimum set of compatibility specifications of installations on different vessels available in EU.
- A common specification form to collect and share the key informations to identify ROV interfaces and trend in payload development will be a first step to prepare necessary adaptations between vehicles

standard qualified procedures or recommended practices

D27 recommendations

Load deployment & Recovery

- - The main scientific observatory equipments, except the backbone cable and branching units, may be deployed with existing scientific vessels and technical means;
- - Concerning deployment of the different modules of the observatory, as opposed to the offshore philosophy, more light methods will be proposed, according to the kind of vessel and equipment, insofar as the operation can be done by good weather conditions;

Ex: Cable deployment with flexible arch, Direct use of the ROV, Dynamically positionned power pod, free falling mode...

D27 recommendations

Cable laying & connexion

- - For cable laying, specific tools (including drum, toolsled..) will be designed to be compatible with the different European vehicles, or easily configurable;
- - Efforts may be combined and coordinated between the partners to study, developp, or buy “on the shelf”, qualify needed subsea connectors, in connection with existing manufacturer and new other observatory developments in the world (USA, Canada,..);

D27 recommendations
Inspection & maintenance work (IMR)

- Collect and share the key informations to identify ROV interfaces and trend in payload development
- ROV interfaces with subsea observatory: initiation of standardisation based largely on ISO 13628-8, adapted to the existing ROV caracteristics;

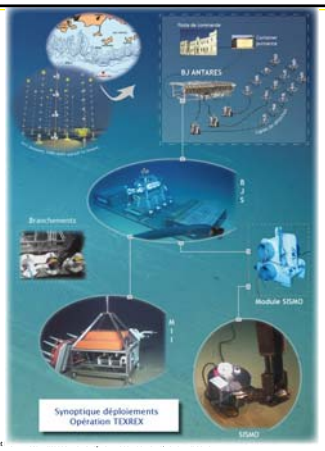




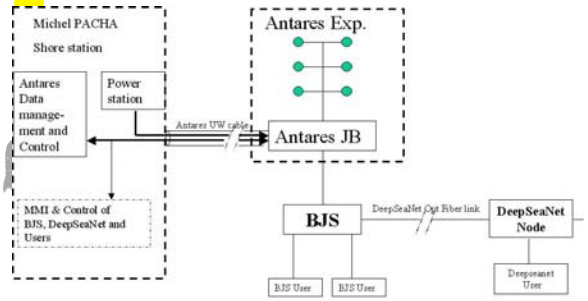
D27 - Summary

- Proposition for a common specification form to collect and share the different operational procedures, detailed and comprehensible for the different ESONET partners, will help them in selection, tests and training
- In fine, the choice will be submitted by the operator in charge and evaluated by members of network “Test and Operation Council”, and steering committee.

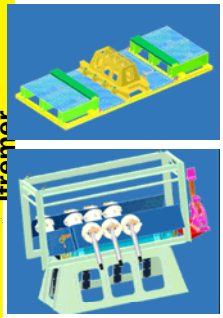
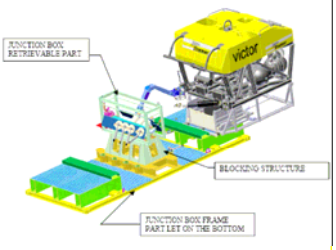
TEXREX: A demo mission for qualified procedures on OFM generic tasks



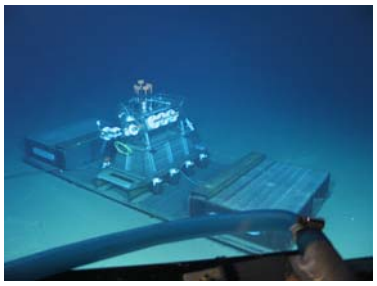
BJS: Offer several underwater ports for science instrumentation & propose **cabled access** by great depth to scientific, technological and industrial tests and demonstrations, with remote control from the shore



BJS design according to ISO 13628 process

Dimensions: 6m x 2,4m x 0,90m
Weight in air:2984 daN – in water : 2590 daN



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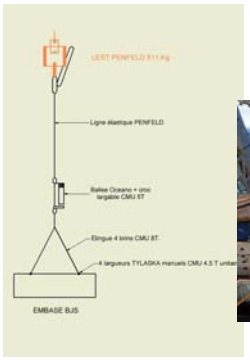
BJS deployment by cable



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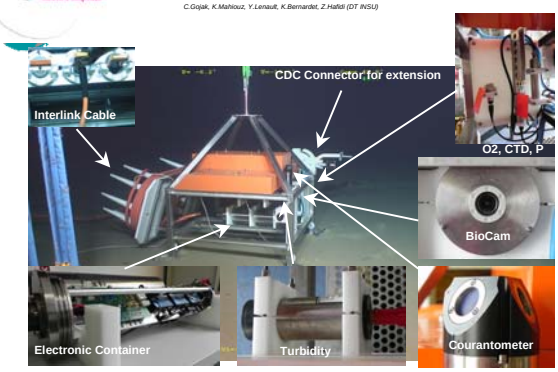
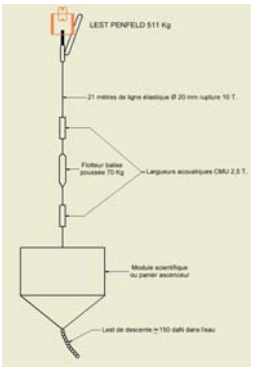
Instrumented Interface Module

C.Gojak, K.Mahiouz, Y.Lenault, K.Bernardet, Z.Hafidi (DT INSU)



MII deployment



Dimensions: 2m x 1,5m x 1,9m
Weight/air: 428 daN
Weight/water: 65 daN

Deployment by cable
Precise positioning & orientation by ROV

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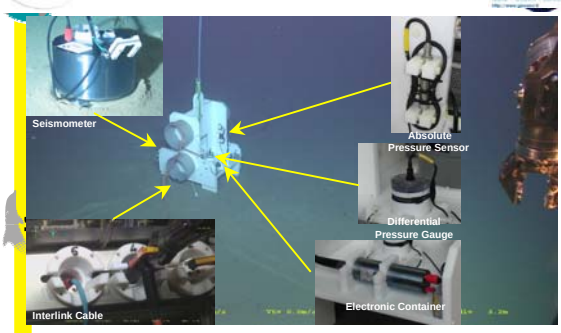
Seismometer

A.Deschamps (GéoAzur), Y.Hello (GéoAzur), C.Gojak (DT INSU)



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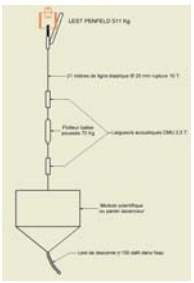
Module sismo deployment



Dimensions: 1,8m x 1,4m x 1,4m
Weight/air: 405 daN
Weight/water: 69 daN

Deployment by cable
Precise positioning & orientation by ROV

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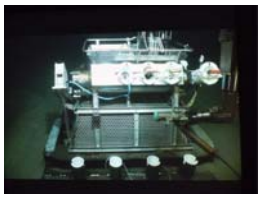
Cable deployment & connexions



Conclusions

- **Adaptation of existing standards:**
  - ISO 13 628-8 process concerning design and ROV interfaces with the elements of subsea module
  - DNV and ISO 13 628 for cable deployment and lifting loads calculations
- **Operational procedures according to D27 specification form**

D27 recommendations
Observatory design
ISO 13628-8 process

- **a) definition of tasks;**
- **b) compilation of specification for interfaces, generally in association with the relevant ROV operator and observatory supplier;**
- **c) choice of docking and tool deployment or manipulator philosophies;**
- **d) definition of intervention interfaces**
- **e) definition of the host subsea observatory detail design for ROV interfaces for tool operation;**
- **f) definition of the ROV tools, interfaces, power supply and controls;**
- **g) documentation (design, maintenance and operating philosophy;**
- **h) final design stage with periodic reviews of the design for compliance with the recommendations and guidelines;**

ESONET NoE

Best Practices Workshop #3

Marseille, Dec 13–14, 2010.

Calibration, Metrology & Testing

Lee Hastie nhi646@abdn.ac.uk

Calibration, Metrology & Testing

Outline

- Background (summary)
- Discussion (issues)
- Recommendations
- Report (plenary session, 14 Dec)

Calibration, Metrology & Testing

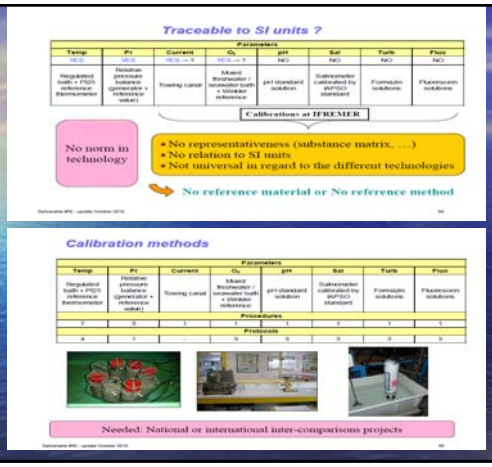
- D36 Report of Testing Facilities Survey
- D50 Report on Best Practices Workshop No 2
- Calibration methods need to be discussed again in order to determine additional tests or inter-comparison workshops to be performed.

Issues

- Standards (calibrations) for Demo Missions.
- Access to data (availability/privileges)
- Overall responsibility (command structure)
- Other issues (Demo Missions)?

Calibration

- Smart sensors
  Calibration details stored within instrument are sent each time sensor is contacted.
- Conventional sensors.
  Minimum requirements for calibration data?
- Standards.
  Quality control, Data screening?



Salinity

- The SCOR/IAPSO WG 127 (UNESCO) decided that :

- Absolute salinity S_A must be used to process thermodynamic properties of seawater.
- S_A is recognise to be more accurate that practical salinity S.
- A reference salinity has been defined from a determined composition of dissolved substances. It is calculated with :

  S_R = (35,165 04/35). S en g/kg
- S is always derived from conductivity measurements and from the PSS-78.
- Absolute salinity is defined by :

$S_A = S_R + \delta S_A(\varphi, \lambda, p)$

Where : φ = latitude, λ = longitude, p = pressure.

Salinity

-Mc Dougall, Jackett et Millero published an algorithm to calculate $\delta SA(\varphi, \lambda, p)$ for Atlantic, Pacific, and Indian ocean from density analyses, S and SiO_2, of 811 oceanic samples.

They assessed a typical uncertainty of 0,0048 g/kg to this approach, but it is very rough because :

- In some areas, correlation between SiO_2 and the other non-ionic molecules (CO_2, dissolved organic matter…) is bad ;
- There are oceanic areas where SiO_2 concentrations are not well known : Arctic ocean, limits between oceans …
- 811 samples, that's not a lot, compared to the ocean volume. Atlas are needed to extrapolate in depth…
- Silicates concentrations varies with organic matters dissolution, rivers sediments transports. Then, what behave these corrections ?
- Do we make samples and analyses for each salinity measurement ?

-'The refractive index of seawater is the currently most promising parameter to be measured for this purpose. The resolution achieved with prototype instruments, the accuracy of related experimental data and the feasibility of constructing in-situ optical field sensors support this approach. The refractive index can recognise the presence of non-dissociated dissolved species like organic silicate which do not influence the conductivity of seawater.'

-This document gives the requirements to built refractometers:

-'The resolution of refractive index measurements as well as the corresponding uncertainties of theoretical formulas are required to be 1 ppm at atmospheric pressure, and 3 ppm at high pressures…'.

-But, it is written also that, relations index – S – pressure – Temperature must be improved.

-And more : it misses a sensor usable in situ.

Testing

Process

- Home base storage
- Transportation (road)
- Operation storage
- Transportation (ship)
- Deployment (activity/recovery)
- Return to Operation Base
- Operation Base storage
- Home Base

Environmental Parameters

- Temperature
- Air Humidity
- Pressure
- Solar radiation

Operational Parameters

- Vibration
- Acceleration/mechanical shock
- Thermal shock

Testing

Equipment

- Materials
- Components
- Sub-assemblies/Sub-systems
- Complete product/system

Types of tests

- Deployment (activity/recovery)
- Return to Operation Base
- Operation Base storage
- Home Base

Testing

- Guidelines, checklists/tables, documentation
- Definition of TEST PLAN (scope, terms)
- Implementation of TEST PLAN
- Review of TEST TYPES (updated, feedback)

Issues

- Standards (calibrations) for Demo Missions.
- Access to data (availability/privileges)
- Overall responsibility (command structure)
- Other issues (Demo Missions)?

Issues

- Calibration
- Metrology
- Testing
- General

Recommendations

- Calibration
- Metrology
- Testing
- General

Best Practices from Demo Missions

Best Practices addressed

Session 1 : Best Practices from DMs

- *Underwater intervention and training* — Jean-François Drogou
- *Calibration, metrology and testing* — Lee Hastie
- *Time series analysis* — Ingrid Puillat

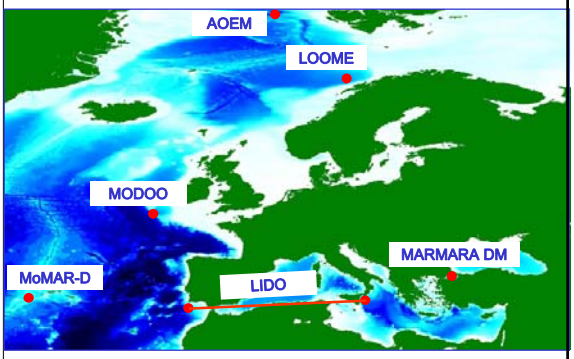
Demo missions

Session 1 : Best Practices from DMs

	AOEM	LIDO	LOOME	MARMARA-DM	MODOO	MoMAR-D
Underwater intervention & training						
Calibration, metrology & testing						
Time series analysis						

Demo mission locations

Session 1 : Best Practices from DMs



Demo mission representatives

Session 1 : Best Practices from DMs

- AOEM ?
- LIDO ?
- LOOME Julien Legrand, Jérôme Blandin
- MARMARA-DM?
- MODOO Johannes Karstensen
- MoMAR-D Pierre-Marie Sarradin, Julien Legrand, Jérôme Blandin, Céline Rommevaux-Jestin, Romuald Daniel
- TEXREX Jean-François Drogou

Underwater intervention & training

Session 1 : Best Practices from DMs

Recent TEXREX (Esonet Test Experiment) intervention around Antares SJB

- Deliverable D27: Recommendations for marine science observatory intervention
- Deliverable D51 : Training & simulation manual

Underwater intervention & training: D27

Session 1 : Best Practices from DMs

- Inspection & maintenance work (Esonet Label)

  Procedures for subsea intervention based on ISO 13628 are mandatory.

  ROV interfaces with subsea observatory are part of it.

  Collect and share the key informations to identify ROV interfaces and trend in payload development

  two cable operation highly recommended when the ship capacities allow it (dynamic positioning) and wheather permitting

  Rehearsal in dry conditions requested. Written procedures are mandatory

Calibration, metrology & testing

Session 1 : Best Practices from DMs

- Standards important but may vary considerably accordingto user's requirements → perhaps some flexibility with standards, **but**

(Esonet Label)

- **Traceability and transparency essential**

  → overlap with the data management issue (metadata management)

Time Series analysis

Session 1 : Best Practices from DMs

- Objective: to share the methods and know how of observatories scientists, starting with « simple » things first
- To write a handbook for scientists
- This is a long term work, to start
- Firstly: To select 3 or 4 scientific topics
- Explain what are the methods used for data analysis according to these topics.

Time series

Session 1 : Best Practices from DMs

- Exemples:
  - Analyse of CTD time series for global change studies
  - Analyse of CTD time series for study of mesoscale phenomena
  - Analyse of passive acoustic data for Seismology
  - Analyse of passive acoustic data for Mamals monitoring
- A workshop?

2.4.3 Debriefing of the WG 2 "Standards implementation for Observatory instruments"

This session intended to deal with standard implementations for observatory instruments in the case of:

- Generic sensors
- Physical and chemical sensors
- Smart sensors

Arne Broering presented an overview of the sensor interface descriptors and Joaquin Del Rio presented PUCK, SID and OGC Sensor Web Enablement. Their two presentations are included here after.

The main conclusions included the following recommendations for the ESONET Label:

- Core capabilities:
  - Recommend sensor registration in a standard format
  - Standard metadata: functional & operational characteristics, common thesaurus/ontology
  - Unique description of the sensor, e.g. via ESONET sensor registry
  - Standard Interface Descriptor
  - Promote Service Oriented Architecture
  - Implement the mechanisms to move to SOA architecture
  - Prototyping interoperable web services

- Future needs
  - Ocean observation technical expert working group
  - Support to test observatories
  - Address mobile platform sensor services
  - Quality of service
  - International participation
  - Definition of a clearinghouse role for ESONET-EMSO
  - Implement quality of service procedures from sensor to data presentation

Then discussions were opened for

- Creation of an ocean instrumentation/sensing standards working group
  - Background
  - Scope, terms of reference
  - Activities
    * Establish and disseminate best practices
    * Identify standardization needs/opportunities
    * Define /refine standardisation projects
  - Initial working group
  - Global vision and international participation
  - Use of international channels and contribution to GEOSS best practices

- Coordination with ocean data management strategy at EU level:
  - Motivation for an ESONET-EMSO Clearinghouse with clear strategy with respect to data and sensor metadata policy
  - Observing infrastructure harmonisation with respect to Quality of Service
  - Sensor registration

Sensor Interface Descriptors

Describing instrument protocols in a standard way with SensorML

Arne Broering
Talk @ ESONET Workshop
Marseille, 13.12.2010

Agenda

- 52°North
- OGC's Sensor Web Enablement
- Sensor Interface Descriptors

52°North Company

- Based in **Münster**, Germany
- **Non profit:** Revenues are re-invested
- *Research*, *Implementation*, *Standardization*
- *Open source* **GEO** software
- Cooperation of *research institutes* and *enterprises*

52°North Partner Initiative

OGC's Sensor Web Enablement

Sensors Are Everywhere

How can we make use
of all those sensors?

Arne Broering - broering@52north.org

Vision

- *World Wide Web* is for **websites**
  - HTTP
  - HTML
  - ...
- *Sensor Web* is for **sensors**
  - O&M
  - SOS
  - SPS
  - ...

Arne Broering - broering@52north.org

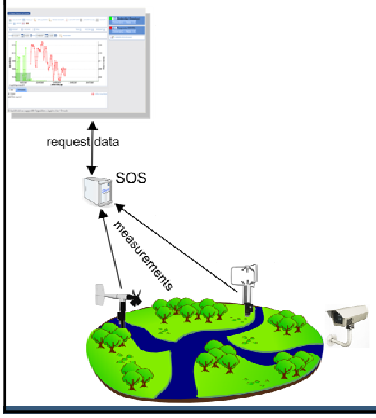
Sensor Web Enablement (SWE)

OGC®
Open Geospatial Consortium, Inc.

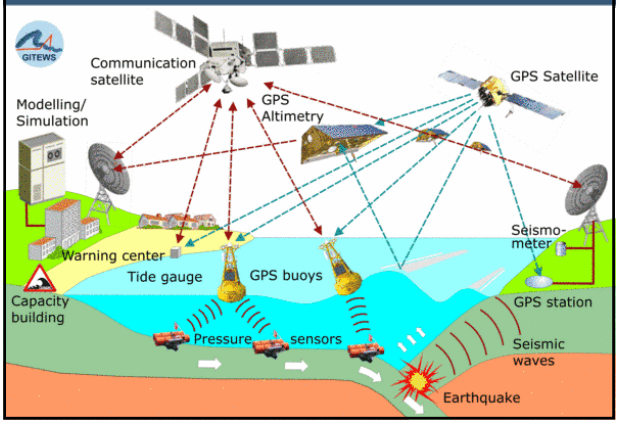
- **http://www.ogcnetwork.net/swe**
- Web Service interfaces & data encodings
- Used to build a **Sensor Web**
- Integration of (geo)sensors on application level

Arne Broering - broering@52north.org

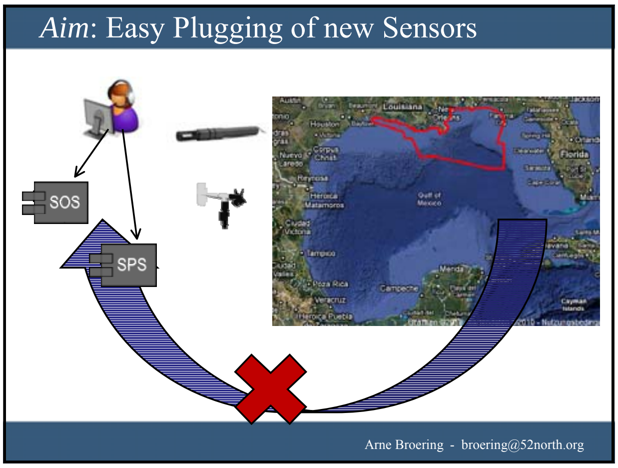
Sensor Web Enablement (SWE)

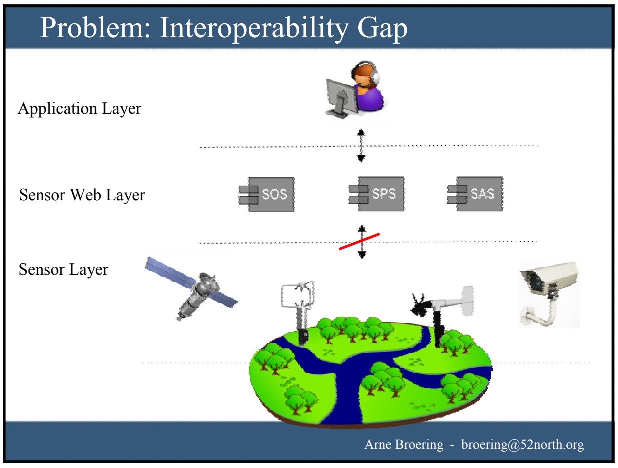


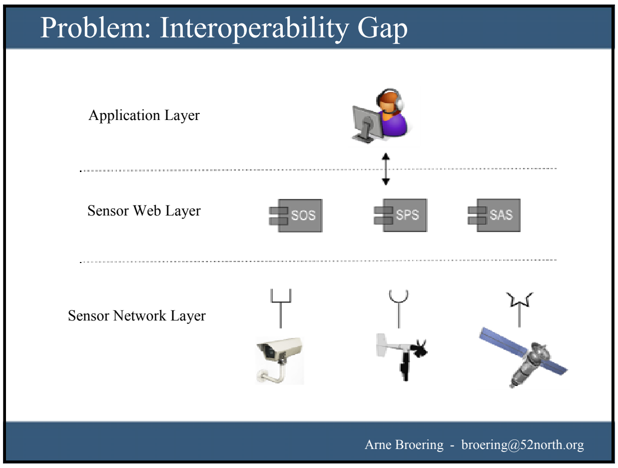
Example Project – Tsunami Early Warning



Sensor Interface Descriptors


Aim: Easy Plugging of new Sensors
SOS
SPS
Arne Broering - broering@52north.org


Problem: Interoperability Gap
Application Layer
Sensor Web Layer
SOS
SPS
SAS
Sensor Layer
Arne Broering - broering@52north.org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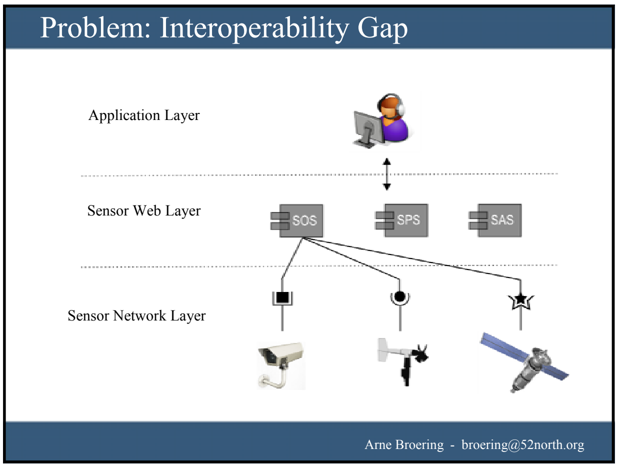
Problem: Interoperability Gap
Application Layer
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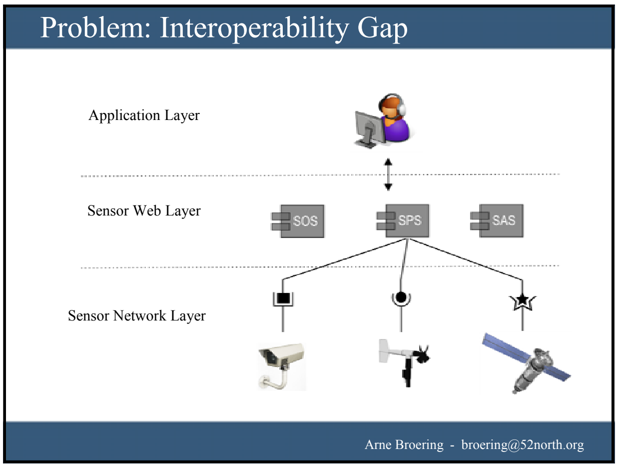
Sensor Network Layer
Arne Broering - broering@52north.org


Problem: Interoperability Gap
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SAS
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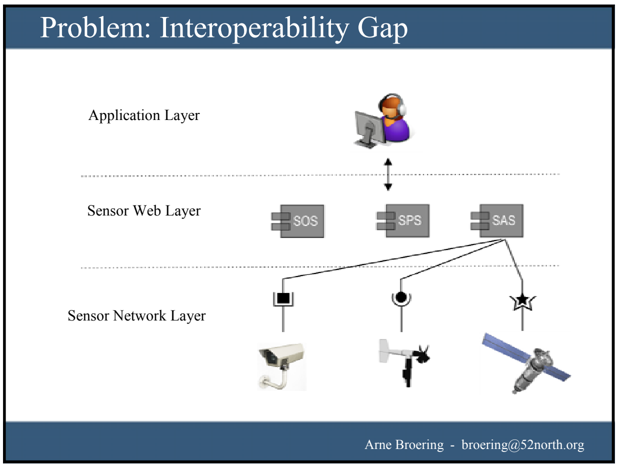
Arne Broering - broering@52north.org


Problem: Interoperability Gap
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SOS
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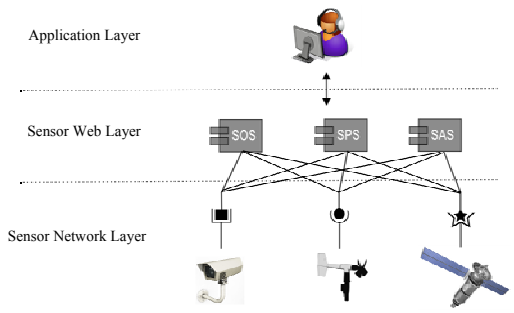
SAS
Sensor Network Layer
Arne Broering - broering@52north.org

Problem: Interoperability Gap



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Sensor Interface Descriptors (SID)

- Bridging Sensor Protocol <-> SWE Protocol
- Model to declaratively describe sensor interface:
  - Communication protocol
  - Sensor commands
  - Processing steps
  - Metadata association
- **SID instances**: re-usable and exchangeable
- Generic **SID Interpreter** translates:
  Sensor protocol ← → *Sensor Web* protocol

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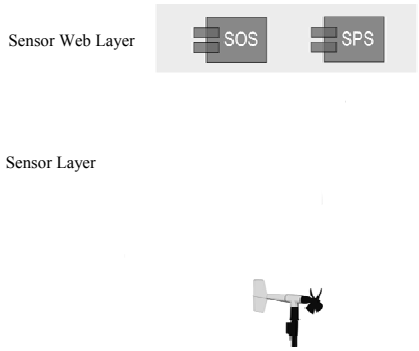
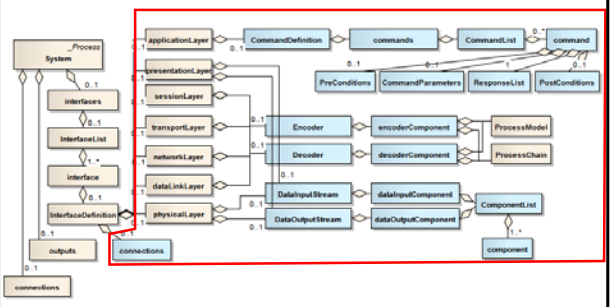
Sensor Interface Descriptors (SID)



Arne Broering - broering@52north.org

SID Model - Overview



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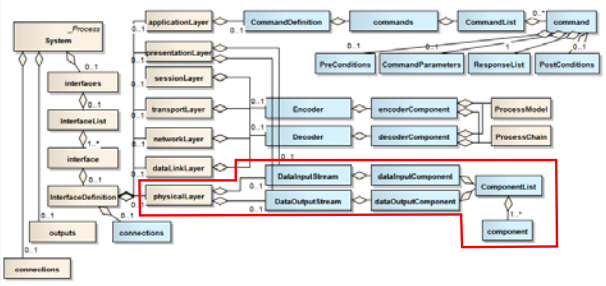
SID – Protocol Definition



Arne Broering - broering@52north.org

SID – Protocol Definition

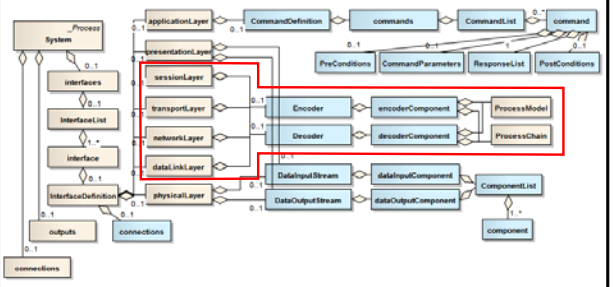
> TS

→20.1829, 0.00006, 0.070, 0.0100, 482.931, 01 Feb 1980, 14:44:02

```
<encoding
    decimalSeparator="." tokenSeparator="," blockSeparator="\n"/>
</encoding>
:
<DataRecord>
  <field name="temperature" />
  <field name="conductivity" />
  <field name="pressure"/>
  <field name="salinity"/>
  <field name="sound velocity"/>
  <field name="date"/>
  <field name="time"/>
  :
```

Arne Broering - broering@52north.org

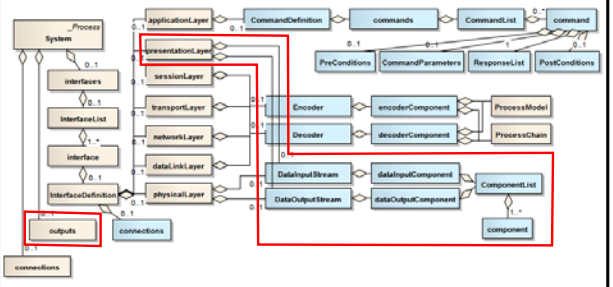
SID – Protocol Processing



SID – Protocol Processing

- Native Process Types
  1. *Checksum Computation & Validation*
     - `urn:ogc:def:process:OGC:checksum`
  2. *Character Escaping*
     - `urn:ogc:def:process:OGC:escCharacter`
  3. *Interpolation*
     - `urn:ogc:def:process:OGC:interpolation`
  4. *Date Conversion*
     - `urn:ogc:def:process:OGC:dateConversion`
- Content MathML

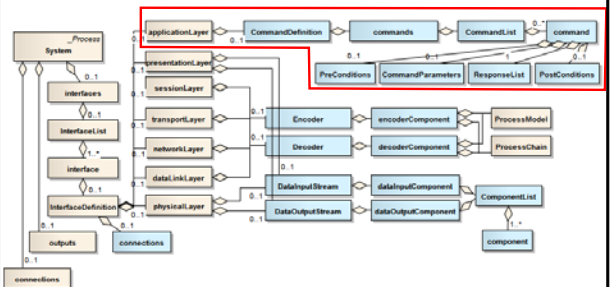
SID – Definition of Observation Metadata



SID – Definition of Observation Metadata

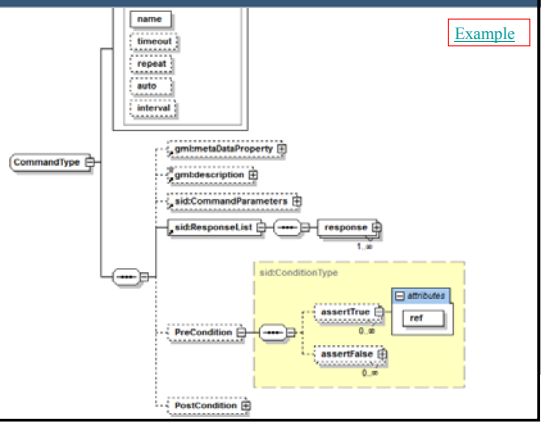
- **<presentationLayer>** defines:
  - Data type (e.g. *numeric*)
  - Unit of measure (e.g. *m/s*)
- **<outputs>** defines:
  - Feature of interest (e.g. *Gulf of Mexico*)
  - Observed property (e.g. *wind speed*)
- → ***InsertObservation*** operation calls

SID – Command Definition

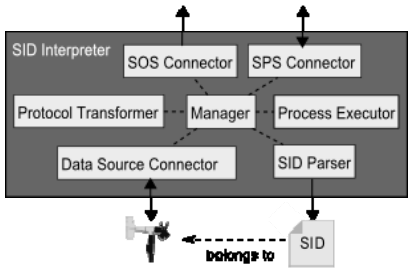


SID – Command Definition

Example



SID Interpreter Implementation

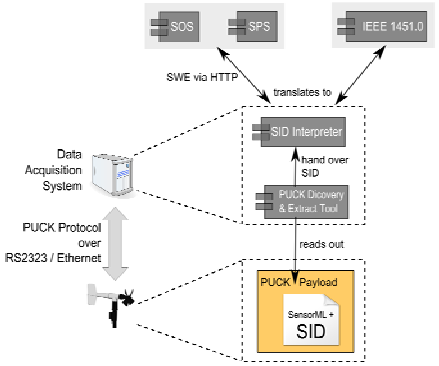


http://52north.org/sid

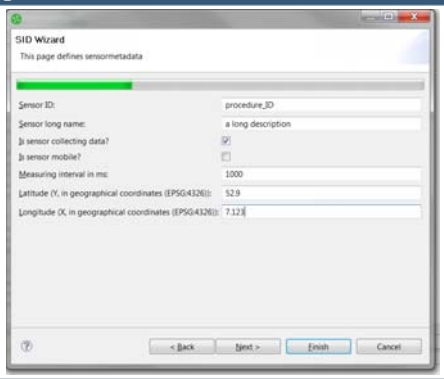
SID in Practice

- We‘ve built SIDs for these *marine* sensors so far:
  - RBR XR 420 CTD
  - Seabird SBE 37 CTD
  - WETlabs Triplet
  - Hobilabs Hydroscat
- SID Interpreter
  - Prototypical implementation
  - Evaluation with more sensor types needed

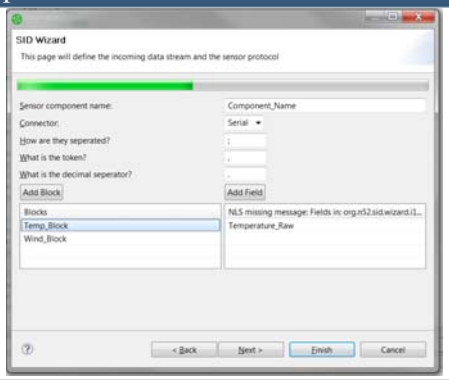
SID + PUCK + IEEE 1451.0



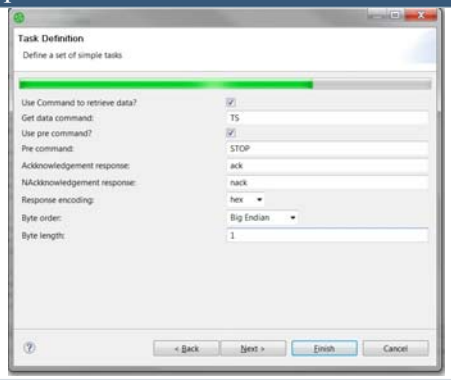
Graphical SID Creator



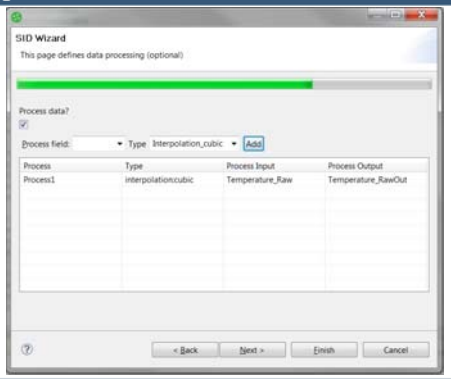
Graphical SID Creator



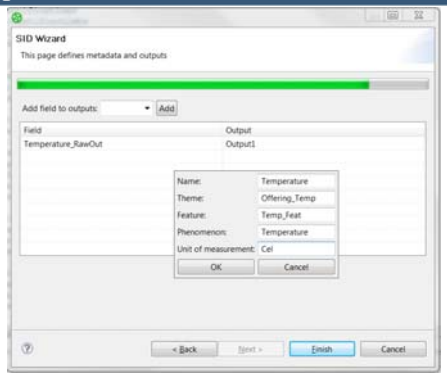
Graphical SID Creator



Graphical SID Creator



Graphical SID Creator



Further Reading

Broering, A. & S. Below (2010): **Sensor Interface Descriptors**. OGC Discussion Paper. Open Geospatial Consortium. OGC 10-134.
Link: http://ifgi.uni-muenster.de/~arneb/10-134%20Sensor%20Interface%20Descriptors.pdf

Broering, A., S. Below & T. Foerster (2010): **Declarative Sensor Interface Descriptors for the Sensor Web**. WebMGS 2010: 1st International Workshop on Pervasive Web Mapping, Geoprocessing and Services. 26.-27. August 2010. Como, Italy.
Link: http://ifgi.uni-muenster.de/~arneb/Broering%202010%20-%20Sensor%20Interface%20Descriptors.pdf

Questions?

Thank you!

Arne Broering

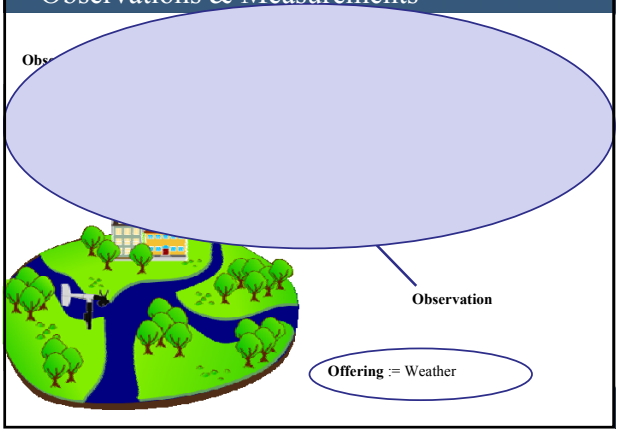
broering@52north.org

52°North SID project: **http://52north.org/sid**
52°North Sensor Web community: http://52north.org/SensorWeb
IfGI Sensor Web lab: http://swsl.uni-muenster.de

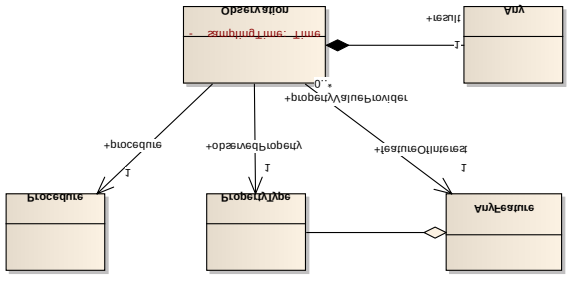
Sensor Data / Metadata

ACCESS

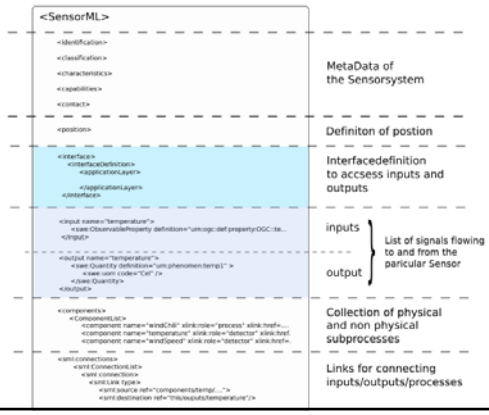
Observations & Measurements



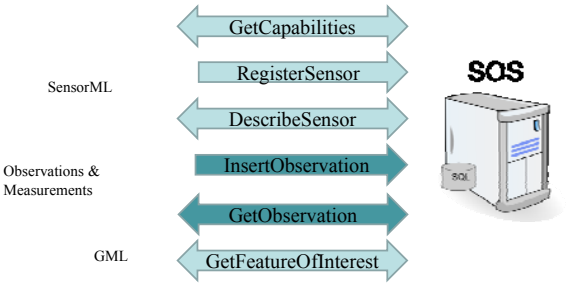
Observations & Measurements



SensorML



Sensor Observation Service



PUCK, SID and
OGC Sensor Web Enablement

Arne Broering
Joaquin del Rio, Dan Toma,
Tom O'Reilly

Collaborators

- Kent Headley, Duane R. Edgington - MBARI
- Felix Bache – 52North
- Luis Bermudez – Open Geospatial Consortium
- Greg Johnson – RBR Ltd
- David Dana – WETLabs
- Jesper Zedlitz – Christian Albrechts University Kiel

Agenda

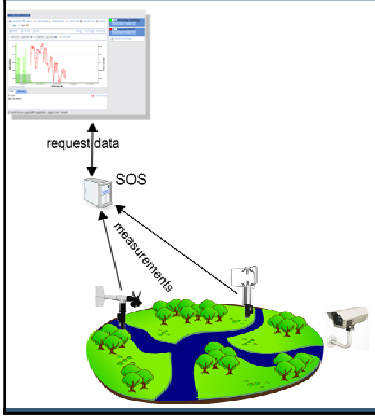
1. OGC's Sensor Web Enablement
2. PUCK protocol status - Tom
3. Sensor Interface Descriptors - Arne
4. Demonstration – Joaquin and Dan
5. IFREMER Smart Sensor – Joaquin and Yves

Sensor Web Enablement (SWE)

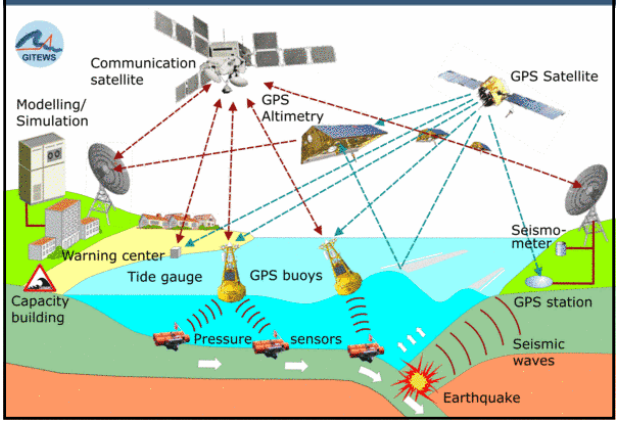
- **http://www.ogcnetwork.net/swe**
- Web Service interfaces & data encodings
- Used to build a **Sensor Web**

→ **Integration of sensors on application level**

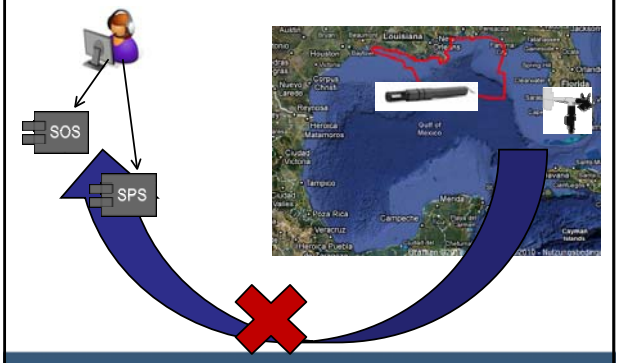
Sensor Web Enablement (SWE)



Example SWE Project – Tsunami Early Warning

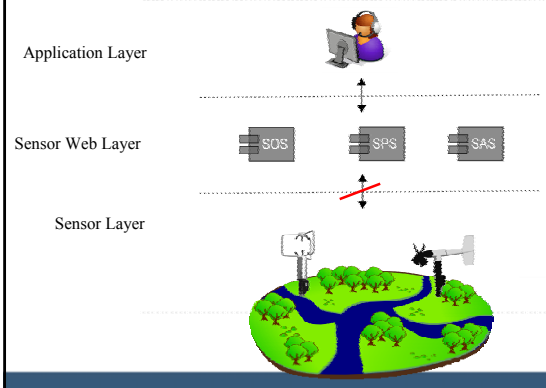


Motivation: Easy Plugging of new Sensors

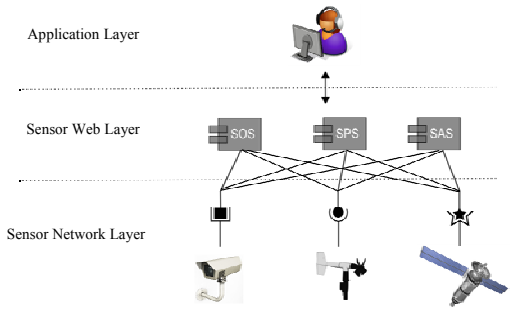


Problem: Interoperability Gap

Problem: Interoperability Gap



Problem: Interoperability Gap



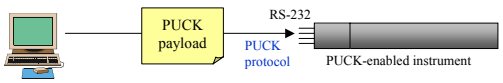
Arne Broering - broering@52north.org

Solution Step 1:

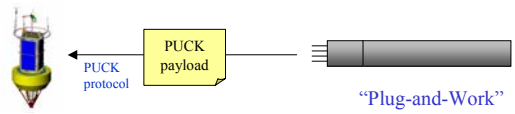
PUCK

What is PUCK?

- PUCK provides a protocol and "container" to store instrument-related information ("payload") with the instrument itself



- Observing system retrieves and utilizes information through instrument's serial interface



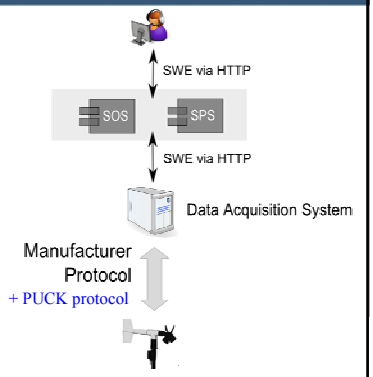
"Plug-and-Work"

12

How PUCK closes the Gap

SWE standards are at network application level

PUCK provides standard at sensor protocol level



Consortium support for PUCK

- Smart Ocean Sensors Consortium (SOSC) - Manufacturers and users dedicated to utility, reliability and cost-effectiveness of sensor networks
- SOSC and OGC have signed Memorandum of Understanding to support PUCK standardization

PUCK as an OGC SWE standard

- OGC *Ocean Science Interoperability Experiment II*
  - Retrieved 1451 TEDS from instruments
  - Retrieved SensorML documents from instruments
  - Presented results at OGC Technical Meeting (Google campus, December 2009)
- OGC PUCK Standard Working Group ("PUCK SWG")
  - Refining PUCK specification before submitting to OGC vote

IP PUCK ("Ethernet PUCK")

- PUCK v1.4 draft
  - Drafted with assistance of SOSC and PUCK SWG, manufacturers and users
- Uses Zeroconf standard
  - Auto IP address, name assignment
  - Service discovery protocol
- PUCK commands via TCP on "PUCK port"
  - Port number advertised via Zeroconf

IP PUCK implementation

- Implemented by Dan Toma, Polytechnic University of Catalunya
- Luminary DK-LM3S9B96 development kit
- ARM Cortex™-M3 controller core
  - 4.5 mWatt @ 50 MHz
  - 256 kB flash, 96 kB SRAM and ROM
- Platform for IFREMER *Smart Sensor*

Solution Step 2:

Sensor Interface Descriptors (SID)

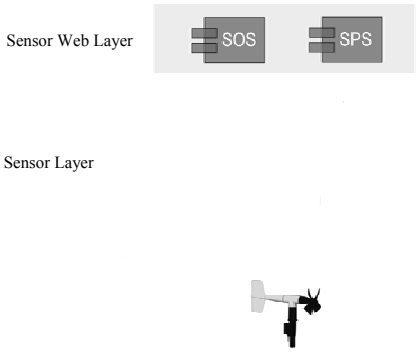
Arne Broering - broering@52north.org

Sensor Interface Descriptors (SID)

- Bridging Sensor Protocol <-> SWE Protocol
- Model to declaratively describe sensor interface:
  - Communication protocol
  - Sensor commands
  - Processing steps
  - Metadata association
- **SID instances**: re-usable and exchangeable
- Generic **SID Interpreter** translates:
  Sensor protocol ← → *Sensor Web* protocol

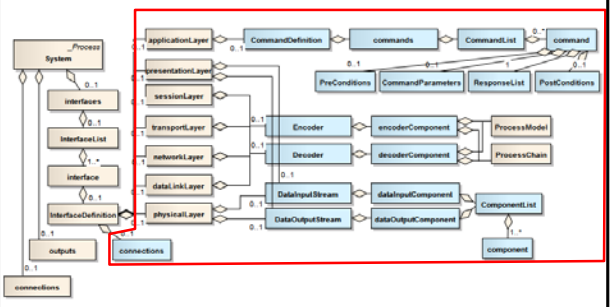
Arne Broering - broering@52north.org

Sensor Interface Descriptors (SID)



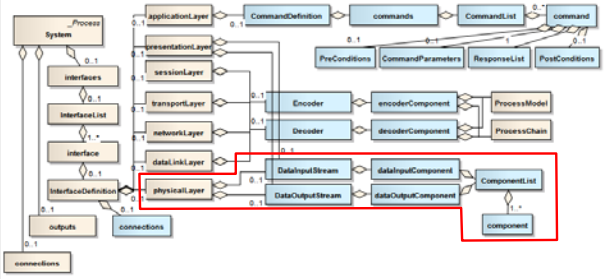
Arne Broering - broering@52north.org

SID Model - Overview



Arne Broering - broering@52north.org

SID – Protocol Definition



Arne Broering - broering@52north.org

SID – Protocol Definition

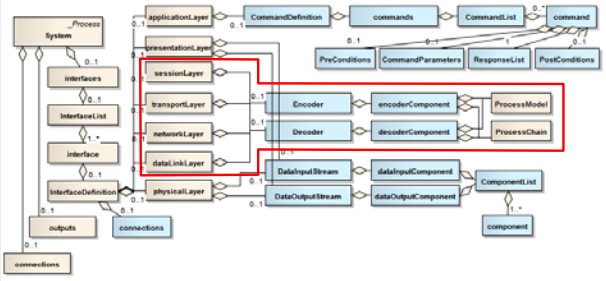
> TS

→20.1829, 0.00006, 0.070, 0.0100, 482.931, 01 Feb 1980, 14:44:02

```
<encoding
    decimalSeparator="." tokenSeparator="," blockSeparator="\n"/>
</encoding>
:
<DataRecord>
  <field name="temperature" />
  <field name="conductivity" />
  <field name="pressure"/>
  <field name="salinity"/>
  <field name="sound velocity"/>
  <field name="date"/>
  <field name="time"/>
  :
```

Arne Broering - broering@52north.org

SID – Protocol Processing



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- Content MathML

Arne Broering - broering@52north.org

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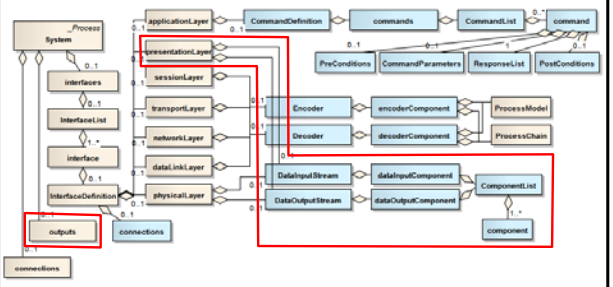

Arne Broering - broering@52north.org

SID – Definition of Observation Metadata

- **<presentationLayer>** defines:
  - Data type (e.g. *numeric*)
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- **<outputs>** defines:
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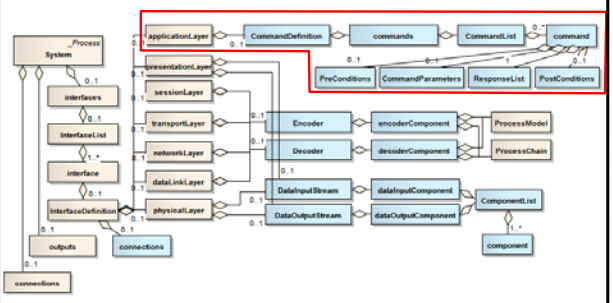
- → ***InsertObservation*** operation calls

Arne Broering - broering@52north.org

SID – Command Definition



Arne Broering - broering@52north.org

SID in Practice

- We‘ve built SIDs for these *marine* sensors so far:
  - RBR XR 420 CTD
  - Seabird SBE 37 CTD
  - WETlabs Triplet
  - Hobilabs Hydroscat
- SID Interpreter
  - Prototypical implementation
  - Evaluation with more sensor types needed

http://52north.org/sid

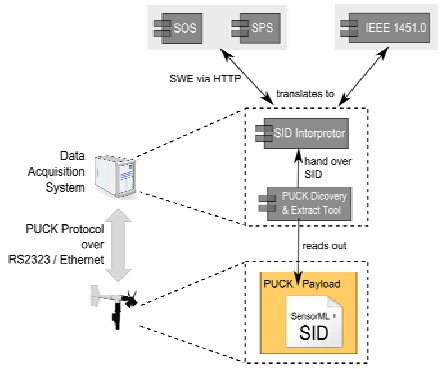
Arne Broering - broering@52north.org

Solution Step 3:

Integration of SID and PUCK

Arne Broering - broering@52north.org

SID + PUCK + IEEE 1451.0



Arne Broering - broering@52north.org

Demo Script

Total demo run-time: 30 min (includes overview presentation, questions and answers), to include:
PUCK overview and update (Tom)
SID overview (Arne)
SID creator demo (Arne)
PUCK-SID interpreter demo (Joaquin and Dan)

Here are the basic steps in the demo:

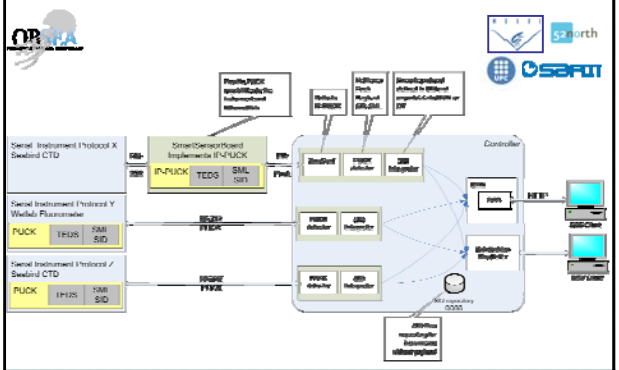
1. Start with no instruments plugged in. Laptop monitors serial port for serial PUCK-enabled instrument plug-in, monitors network for IP PUCKenabled plug-in

2. Arne uses SID creator to describe instrument Seabird SBE37 protocol.

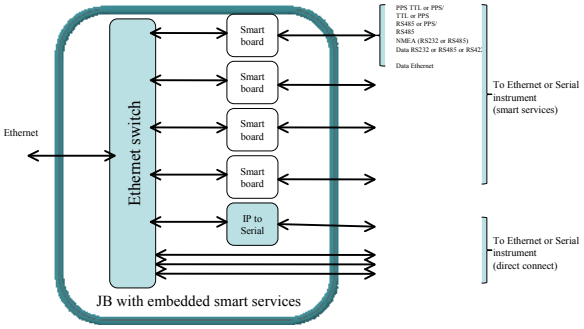
3. SARTI guy plugs WETLabs Triplet into laptop serial port
PUCK detected on serial port; SID interpreter #1 retrieves SID from WETLabs PUCK payload
SID interpreter #1 registers WETLabs with SOS, begins acquiring WETLabs data; writes data to SOS and DataTurbine ring buffer
WETLabs location appears on 52North SOS client
WETLabs data appears in Realtime Data Viewer (RDV)
SARTI guy pours Diet Coke into WETLabs water bucket; flourescence signal on RDV display

4. SARTI guy plugs SmartSensor with attached Seabird into network
IP PUCK service appears in ZeroConf browser
SARTI guy selects IP PUCK service in browser, triggering retrieval of Seabird SID from SmartSensor PUCK payload by SID interpreter #2
SID interpreter #2 registers Seabird with SOS, begins acquiring Seabird data; writes data to SOS and DataTurbine ring buffer
Seabird location appears on 52North SOS client (
Seabird data appears in Realtime Data Viewer (RDV)
SARTI guy pours cold/warm water into Seabird water bucket, data changes on RDV display

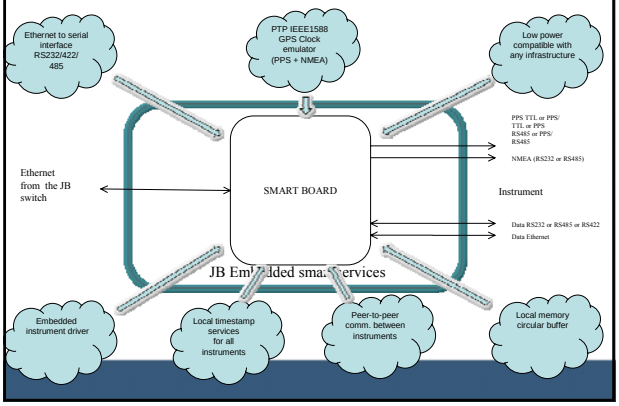
Demonstration components



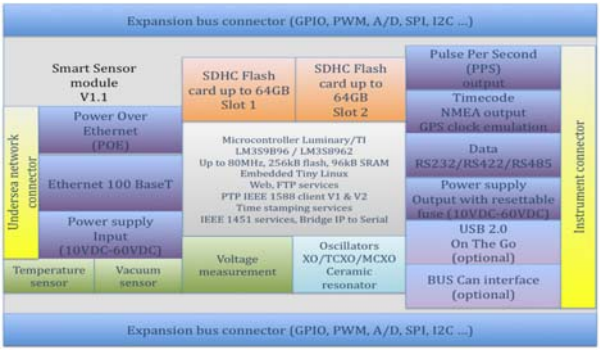
Cabled Junction Box



Smart Board Hardware capabilities



Bloc Diagram of the Smart Board



Smart Sensor Board Hardware

Final release is expected in 2011/Q1

Research and corporate partners are warmly welcome to join us!

Ifremer ENSIETA SARTI

ESONET Best –Practice Workshop 3

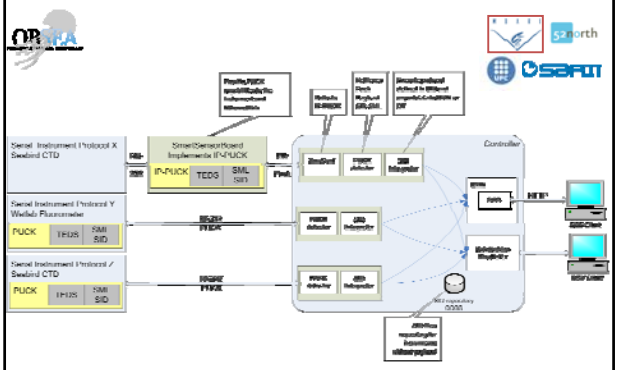
Standard Implementations for observatory instruments

C:\D...

PUCK, SID and OGC Sensor Web Enablement

Arne Broering
Joaquin del Rio, Dan Toma,
Tom O'Reilly

Demonstration components



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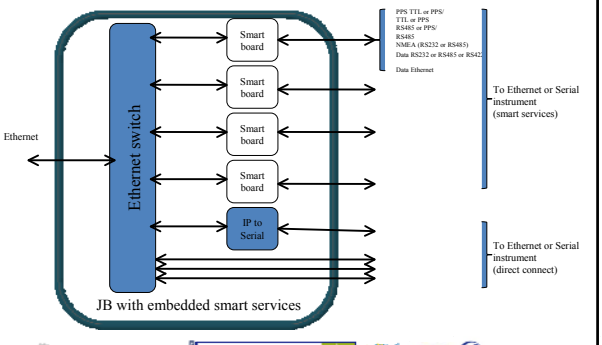
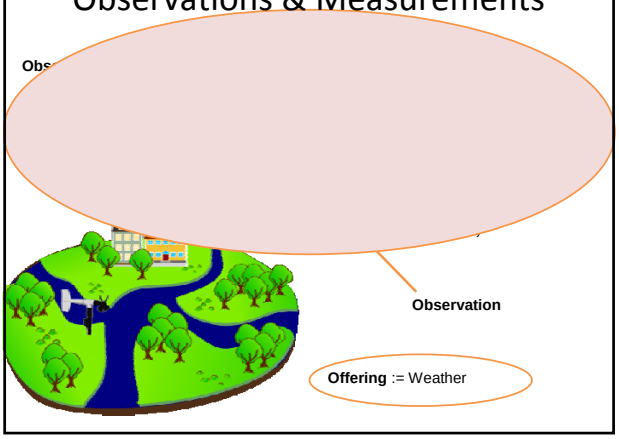
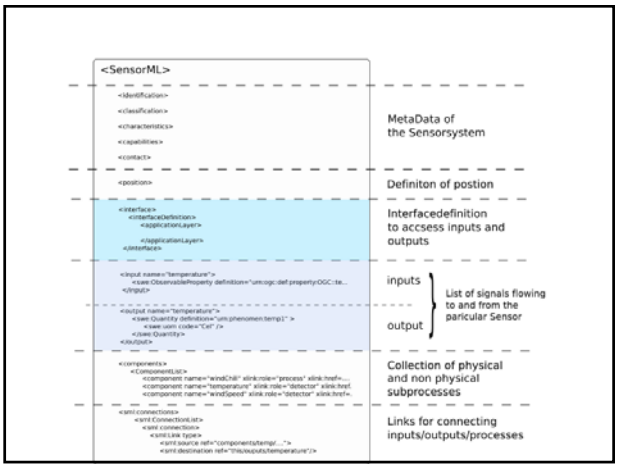


Sensor Data / Metadata

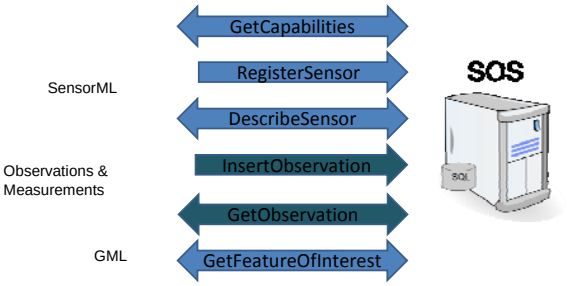
ACCESS

Observations & Measurements





Sensor Observation Service



Generic sensor

Type of sensor	Range	Accuracy	Sampling frequency
Conductivity	0 to 9 S/m	0.001 S/m	4 Hz
Temperature	-5 to +35°C	0.01 K	4 Hz
Pressure	0 to 600 bar	0.1 % FSR	4 Hz
Dissolved oxygen	0 to 500µM	5%	0.01 Hz
Turbidity	0 to 150 NTU	10%	1 Hz
Currents	0 to 2 m/s	2%	1 Hz
Passive acoustics	50 to 180 dB re 1 µPa	+-3dB	96 KHz

ESONET Sensor requirements

Variable	Geosciences	Physical Oceanography	Biogeochemistry	Marine Ecology
Temperature	X	X	X	X
Conductivity	X	X	X	X
Pressure	X	X	X	X
Dissolved O_2	X	X	X	X
Turbidity	X	X	X	X
Ocean currents	X	X	X	X
Passive acoustics	X			X

Generic ESONET variables in the water column and at the seafloor surface.

ESONET Label

- Core capabilities:
  - Recommend sensor registration in a standard format
    - Standard metadata: functional & operational characteristics, common thesaurus/ontology
    - Unique description of the sensor, e.g. via ESONET sensor registry
    - Standard Interface Descriptor
  - Promote a Service Oriented Architecture
    - Implement the mechanisms to move to an SOA architecture
    - Prototyping interoperable web services
- Future needs
  - Ocean observation technical expert working group
    - Support to test observatories
    - Address mobile platform sensor services
    - Quality of service
    - International participation
  - Definition of a clearinghouse role for ESONET-EMSO
  - Implement quality of service procedures from sensor to data presentation

To be discussed

- Creation of an ocean instrumentation/sensing standards working group
  - Background
  - Scope , terms of reference
  - Activities
    - Establish and disseminate best-practices
    - Identify standardization needs/opportunities
    - Define /refine standardisation projects
  - Initial working group
  - Global vision and international participation
  - Use of international channels and contribution to GEOSS best practices
- Coordinate with ocean data management strategy at EU level:
  - Motivation for a ESONET-EMSO Clearinghouse with clear strategy wrt data and sensor metadata policy
  - Observing infrastructure harmonisation wrt Quality of Service
  - Sensor registration

2.4.4 Debriefing from WG– "Data infrastructure and data management"

2.4.4.1 WG introduction

R. Huber introduced the four main topics of the session:

- Demo mission data management examples
  * INGV (F. Doumaz)
  * LIDO (M. Van der Schaar and R. Huber)
  * ANTARES (C. Curtil)
  * …
  * Discussion

- Standard implementations and data exchanges: SWE Standards, „where to follow, where to leave"
  * Standards and the ESONET Data Portal (R. Huber)
  * NetCDF (T. Carval)
  * Discussion

- ESONET Label
  * Data management requirements
  * Sensor Registry
  * Mandatory – recommendations

- Future of ESONET data infrastructure

- Then the presentation started with Mr. F.Doumaz (INGV), followed by M. Van Der Schaar (UPC) and R. Huber (Marum), C. Curtil (CNRS/CPPM), T. Carval (IFREMER). Here after is a short debriefing. The presented slides are included in the following pages.

2.4.4.2 Short debriefing and Recommendations

- Summary of the parallel session:

  - F. Doumaz: MOIST database "Multi disciplinary Oceanic data Information SysTem"

All data are stored in a relational MySQL database.
MOIST can host other data and be considered among the starting points for the EMSO data infrastructure. MOIST may also receive real-time data coming from deep-sea observatories (ex. SN1)
+ DIF is used to provide a description of data sets.
+ SensorML is used to provide sensors metadata
+ Data can be downloaded in several formats (Json, CSV, NetCDF, etc...)
+ Metadata are provided to aliment search engines such as OpenSearch
+ Next step: SOS should be used to provide data
A working website for MOIST can be visited at this link http://moist.rm.ingv.it

  - Robert: ESONET data portal

An issue ticketing system is under study in Pangaea to answer to the question "how **to manage issues reported by users on data?**"
We have to manage on real-time data and calibrated data.

Regarding the O&M specification for ESONET SOS:
+ The SensorML schema was provided by IFREMER
+ The OGC SOS and databases distribute data.
But, we also need to provide long term archive of data, consequently open data and metadata formats have to be studied by ESONET. NetCDF and CF are an option for long-term archive management.

Interoperability is supported by implementing SensorML, SOS, DIF.

- T. Carval: NetCDF and CF

Presentation of NetCDF as a medium to store data and metadata, preserve it for the long term.
Within oceanographic data centres and the scientific community, a consensus is growing on NetCDF for data and metadata management. NetCDF format provides a solution for long term archiving of observations in auto-descriptive data files.
OceanSITES-EuroSITES, Argo, MyOcean and others are promoting an implementation of NetCDF data and metadata formats for oceanographic observatories.
The OceanSITES NetCDF format is available at: http://www.oceansites.org/data/index.html
CF standard names and SeaDataNet parameter vocabulary and define the physical parameters description.
More on: http://cf-pcmdi.llnl.gov/documents/cf-standard-names
http://seadatanet.maris2.nl/v_bodc_vocab/welcome.aspx

- Summary of the plenary session:

In plenary session, some recommendations were done: to transfer data from DM as for example the Marmara-DM. Then examples of DMs data management (LIDO, INGV and ANTARES…) were given.
Discussions went on standards and the transfer from ESONET to EMSO (where to follow and where to leave?)
Presentation by Thierry Carval on NetCDF (as a medium to store data and metadata)

-Recommendations on interoperability

Use of the standards as defined in the ESONET data management plan and infrastructure (see data policy) e.g. SensorML, SOS, DIF, ISO19XXX, OAI-PMH...
Propose a definition of a long term Archive format for ESONET

* The archive data format has to be open (fully documented) and self-descriptive

* Scalability

+ Can manage data with different sampling schemes -> high sample rate, filtered or averaged data.
+ Offer different levels of processing, record the different calibrations and history records

*Citation statement

+ Archived datasets should be citable
Use a citation statement, a DOI when possible
+ Licence for comments: interactive comments?

*Usage of proven metadata standards (DIF, ISO19139)

-Recommendations on YellowPages

http://www.ESONETyellowpages.com/sensor.php?id=179

The data management group issues a recommendation to describe ESONET metadata with SensorML. Ideally, the sensor description should come directly from manufacturers. These suppliers would have an ESONET label.

-Recommendations on Data policy: Agreement on 8 statements

ESONET is recommending following points:

1- Free and open access according to Aarhus Convention on environmental data as expressed by IOC Data Policy (International oceanographic Commission UNESCO) programmes is applied for basic [to be defined.. glossary] data, especially the data requested for risk assessment in real time and delayed mode. [GEOSS...]
2- Registration of users is highly recommended for downloading
3- Experimental data should follow classical scientific confidentiality rules: no more than 2 years restriction. A low-resolution data set such as a display of images is proposed to the public in the meantime.
4- Data classified for security and environment protection reason, exceptions as defined by the INSPIRE directive, must at least be stored and be available as soon as they will be de-classified. Access to classified data will be granted on request to agreed scientists.
5- Access to citizens is facilitated by implementation of specific tools.
6- Long term archiving (more than 20 years) policy and implementation has to be performed for all types of data, including classified data. Archived datasets should be citable with a mention of the observatory network.
7- This archiving is assumed by data centres complying with ESONET data management plan and standards.
8- Training should be provided to the various levels of staff handling subsea observatory data (recommendation).

-Remarks and actions:

* Marmara: the decision to send information may be screened by political authorities.
* Interoperability test within the sites having SOS data distribution.
* The first one statement on the mention « free and open » was commented
* Discussion on the Aarhus convention and the GEOSS project.

J-F. Rolin suggested adding a page in order to define all terms: in a glossary as for the « basic data »

Best Practices Workshop #3

December, 1
Marseille

FROM OCEANS TO THE NET

Bringing data from science to science

ESONET
data management system

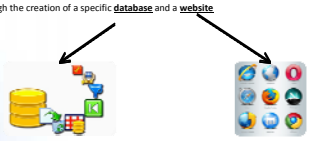
Fawzi Doumaz
Adriano Azzarone
Stefano Vinci
Laura Beranzoli
Paolo Favali

Data management infrastructure

In view of the EMSO infrastructure establishment, the aim is to create an infrastructure that allows:

- To store **parametric** data of underwater stations,
- The database must also contain the specifications of each **instrument**,
- The **traceability** of all data produced by each campaigns or monitoring station.

The **ALL** through the creation of a specific **database** and a **website**



The website will help to:

- **retrieve** data
- **display** them with graphs
- **compare** data between instruments

At the beginning...

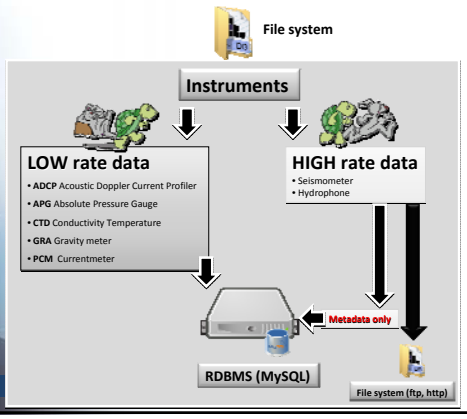
Data were :

- Flat files (Binary and ASCII)
- Organised in directories (file system)
- Not remotely accessible
- Heterogeneous

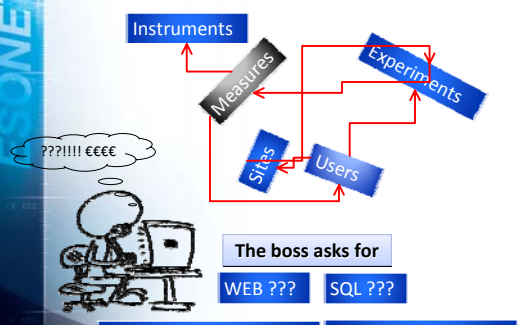
The data organisation process

- Classify data type (Sensor & **sampling rate**)
- Write the scripts to convert to **CSV** format
- Make timestamp in **ISO-8601** format
- Collect information on **instruments**
- Write scripts to **insert/import** data in the RDBMS

The data classification & Destination



Db or not Db ?



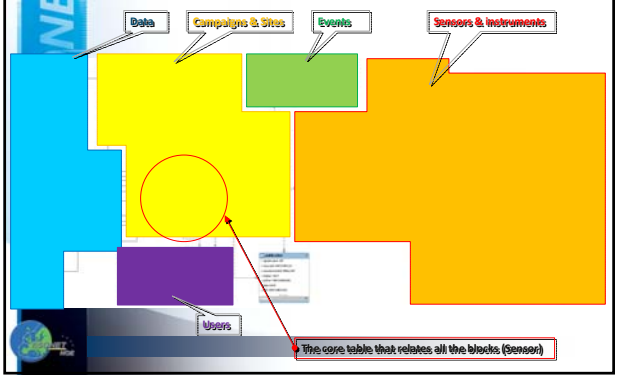
The boss asks for

WEB ??? SQL ???

As cheap as possible !!! If it's free it's better

The result: MOIST
Multidisciplinary Oceanic data Information SysTem

Database reverse engineering



Working with standards I

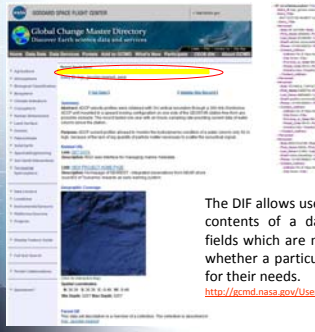
SensorML : to describe sensors and instruments

http://dataportals.pangaea.de/esonet

Within ESONET WP1 (exchange of personnel) and WP9 (Data management), in collaboration with MARUM (Bremen) INGV has prepared a XML model for describing sensors, following the OGC SensorML standard. This model can collect, for all kind of sensors, information regarding inputs, outputs, parameters, methods.

Working with standards II

DIF* : Directory Interchange Format



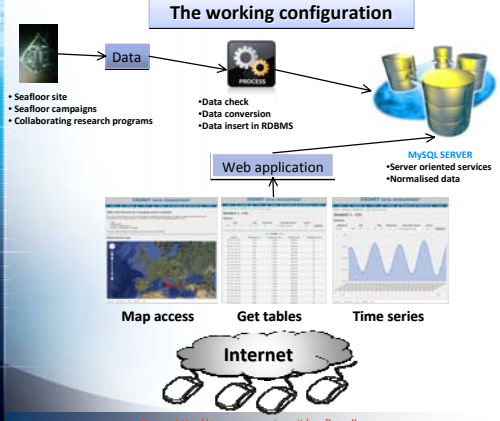
The DIF allows users of data to understand the contents of a data set and contains those fields which are necessary for users to decide whether a particular data set would be useful for their needs.

http://gcmd.nasa.gov/User/difguide/whatisadif.html

http://gcmd.nasa.gov/KeywordSearch/

*Directory Interchange Format

The working configuration



Demo: http://openmap.rm.ingv.it/seafloordb

Concluding remarks

Some keywords:

- Data sharing (Query and retrieval, repository reference point)
- Interoperability (Exchange)
- Notion of community (ex. Yellow pages link, Pangaea, NASA)
- Standards (SensorML -Sensor Metadata & DIF - Directory Interchange Format in collaboration with MARUM)

MOIST can host other data and can be considered the starting point for the EMSO data infrastructure

DATA MANAGEMENT IN LIDO

LIDO analyses acoustic streams in real-time, taking noise measurements, detecting acoustic evens such as impulses and tonal sounds, and classifying and localising acoustic sources. When multiple channels are available at an observatory, only one is used for detection of events and others may be used for localisation.

Data is analysed locally at each platform, as close to the hydrophone as possible. This allows discarding of data (saving bandwidth and storage space) when nothing of interest was detected, keeping only noise measurements in those cases. In order to monitor the acoustic data, spectrograms and a compressed audio stream can also be kept.

Analysis results, spectrograms and compressed audio are distributed from the platform site. They are made available to the public and can be visualised through a Flash tool. The analysis results are also collected in a global database at the LAB and can be distributed from there through an SOS framework.

DATA MANAGEMENT IN LIDO

The LIDO framework is currently (being) implemented at the following sites:

•NEMO observatory in Sicily, redeployment of two instrumentation lines is expected in the second week of December 2010; 4 channels are available at 96 kHz and 4 at 192 kHz.

•ANTARES observatory near Marseille; 36 channels are available sampled at 250 kHz.

•OBSEA, shallow water platform in Catalonia; 1 channel is available at 96 kHz.

•NEPTUNE, 3 hydrophone data streams from different locations are expected to become publicly available in December 2010; all channels are sampled at 96 kHz.

DATA MANAGEMENT IN LIDO

To serve data from the global platform database, a 'light' SOS framework is being developed in collaboration with MARUM in PHP with the specific objective to allow easy integration of the software at other platforms. The code is available from http://code.google.com/p/esonet-ogc/.

The code currently provides the following three classes:

•an OGC base class that contains generic functions to handle requests and template based responses; generally this file will not have to be changed to deploy the framework at another site.

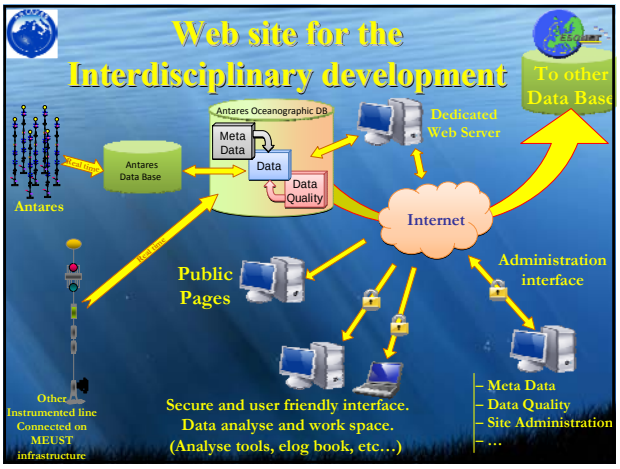
•an SOS class that extends OGC and handles the specific SOS request; this class defines a few abstract methods that should be implemented locally, especially access to the data storage engine. This file should not be edited directly, but its methods are extended through an implementation of it.

•an example implementation of the SOS class; this class shows how to extend SOS, adding substitution variables and implementing data handling methods.

DATA MANAGEMENT IN LIDO

Interaction with the SOS framework is done through HTTP-XML requests (although there is support for simple key-value pair requests). The commands DescribeSensor, GetCapabilities and GetObservation are supported using XML template files. In the replies, there is only support for one resultModel and responseMode. The responses follow predefined XML templates that contain a few variables that are replaced by the code with the correct data/information. New or more substitution variables can readily be defined in the code (through an extended class) and added to the templates.

The SOS framework has been tested with ANTARES data (signal level measurements and cetacean presence) for a few months by the WDC-Mare.



Data Table Structure

First, The raw data is stored in one table. All these data are sent by the sensor.

Raw data table						
Data Set	TS	L0 Data	Physical Data	Calculate Data	AQC	Qset
DS_i	T_j	$V_1, V_2, A…$	T°,P,Conductivity	Salinity, Density	Q_j	QS_k
DS_i	T_{j+1}	$V_1, V_2, A…$	T°,P,Conductivity	Salinity, Density	Q_{j+1}	QS_k

Quality Control for a Set of data

Time Stamp — Sensor Calibration Table — UNESCO formula — Auto Quality Control

Calculation made in sensor. But the configuration can be set/changed by operator → Metadata information…

Auto Quality Control tag (AQC) : Tag which data are between a Min and Max value.
- First step of data quality control.
- Done automatically by computer.

Qset : Give the Quality of the data set.
All data is grouped by data set (refer to specific metadata information) and by set of same Quality.
All information (metadata) about quality and correction is stored in Table "Qset"

Followed of data correction

When one part of dataset must be corrected, a new *Qset* entry is create in *QSet_table* with all the information on the applied methods of correction and the cause of the error.

DataSet Table — Metadata information QA/QC setting Etc…

Raw Data Table

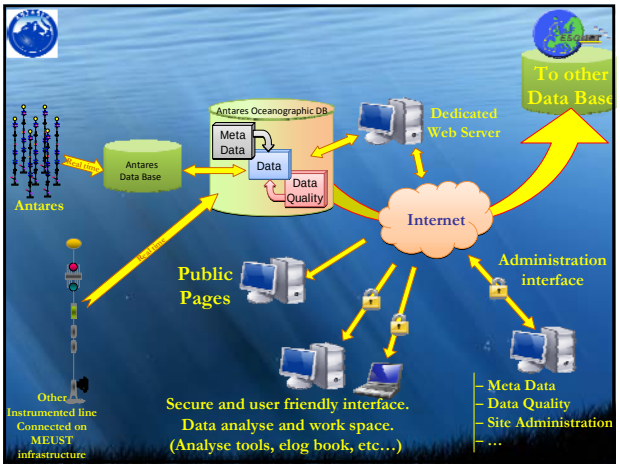
Auto Control — Parser

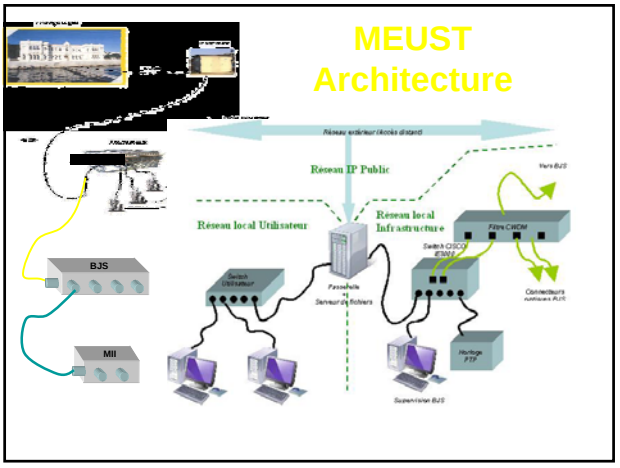
The corrected Data are stored in special table.
- → Can have more than one corrected method.
- → Original data preserved

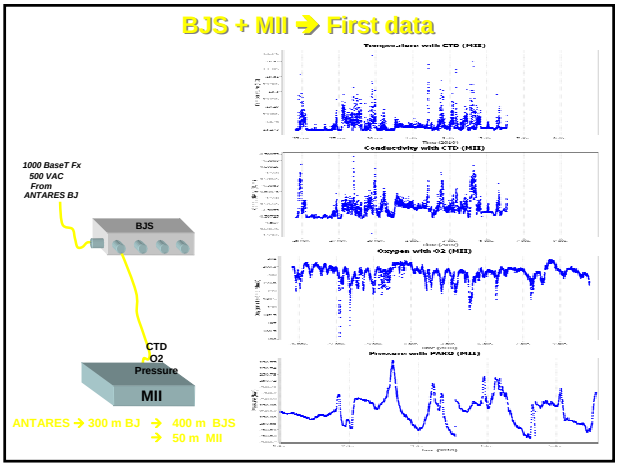
Corrected Data

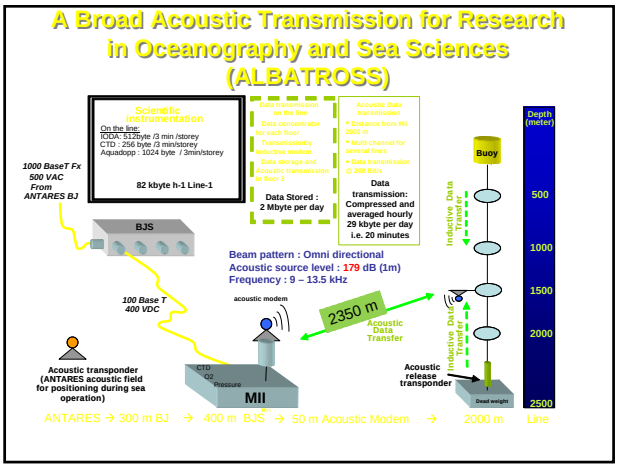
QSet_Table

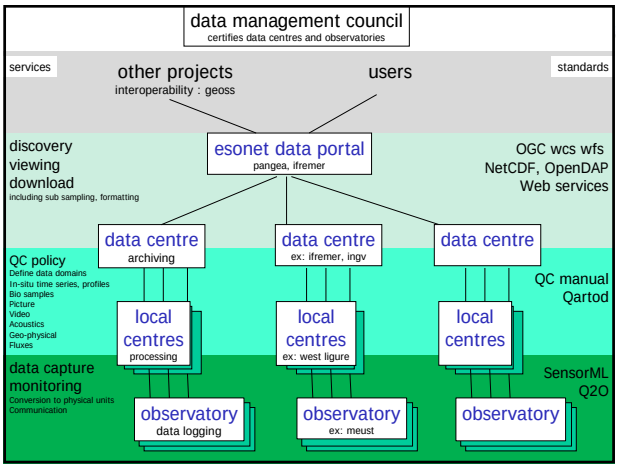
AQC : Auto Quality Control tag








A Broad Acoustic Transmission for Research in Oceanography and Sea Sciences (ALBATROSS)
Scientific Instrumentation
On the line:
TODA: 512byte /3 min /storey
CTD : 256 byte /3 min/storey
Aquadopp : 1024 byte / 3min/storey
82 kbyte h-1 Line-1
1000 BaseT Fx
500 VAC
From
ANTARES BJ
BJS
Data transmission on the link
Data concentrator for each floor
: Transmission by inductive modem
Data storage and Acoustic transmission in floor 3
Data Stored :
2 Mbyte per day
Acoustic Data transmission
* Distance from MII 2000 m
* Multi channel for several lines
* Data transmission @ 200 Bds
Data transmission:
Compressed and averaged hourly
29 kbyte per day
i.e. 20 minutes
Buoy
Inductive Data Transfer
Depth (meter)
500
1000
1500
2000
2500
Beam pattern : Omni directional
Acoustic source level : 179 dB (1m)
Frequency : 9 – 13.5 kHz
100 Base T
400 VDC
acoustic modem
2350 m
Acoustic Data Transfer
Acoustic transponder
(ANTARES acoustic field for positioning during sea operation)
CTD
O2
Pressure
MII
Acoustic release transponder
Dead weight
ANTARES → 300 m BJ → 400 m BJS → 50 m Acoustic Modem → 2000 m Line



Data and metadata format : NetCDF and CF standard names

- Within oceanographic data centres and the scientific community, a consensus is growing on NetCDF for data and metadata management.
- NetCDF format provides a solution for long term archiving of observations in autodescriptive data files.
- OceanSITES-EuroSITES, Argo, MyOcean and others are promoting an implementation of NetCDF data and metadata formats for oceanographic observatories.
- The OceanSITES NetCDF format is available at: http://www.oceansites.org/data/index.html
- CF standard names and SeaDataNet parameter vocabulary and define the physical parameters description.
  More on:
  - http://cf-pcmdi.llnl.gov/documents/cf-standard-names
  - http://seadatanet.maris2.nl/v_bodc_vocab/welcome.aspx

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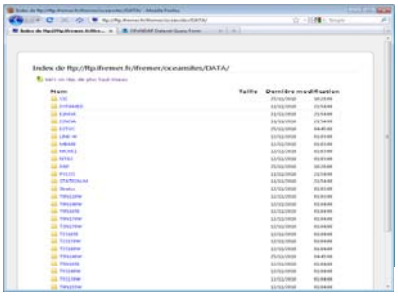
2

OceanSITES-EuroSITES data and metadata servers

- All OceanSITES data and metadata are available from 2 Global Data Assembly Centers, one in Europe, one in USA:
  - IFREMER Coriolis ftp://ftp.ifremer.fr/ifremer/oceansites/
  - US NDBC ftp://data.ndbc.noaa.gov/data/oceansites/



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3

Standardized data access: OpenDAP

- *"OPeNDAP is a framework that simplifies all aspects of scientific data networking."*
  OPeNDAP: Open-source Project for a Network Data Access Protocol
  - More on: http://www.opendap.org/
- In cooperation with US-NDBC (National Data Buoy Center), OceanSITES-EuroSITES-ESONET data and metadata are now available online as an OPeNDAP resource.
- The OceanSITES OPeNDAP server is directly serving the content of the files stored on both US and European GDAC (Global Data Centres).
- OpenDAP is widely used in the oceanographic community for its ability to have a direct access to data stored worldwide on Internet servers. A scientist can combine observations from OceanSITES and others sources from
  - Any location with an Internet access (http from office, home or coffee shop)
  - The most powerful data analysis software (from IDL, Matlab to Excel)

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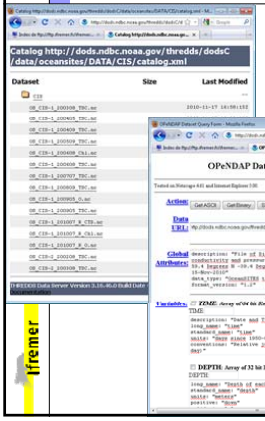
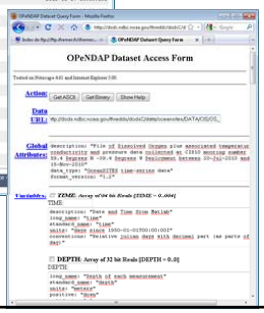
4

Standardized data access: OpenDAP



The OPeNDAP data server provides a direct access to observations, from any desktop using analysis software such as Matlab, through the widely available "http" Internet protocol.
http://dods.ndbc.noaa.gov/thredds/dodsC/data/oceansites/DATA/CIS/OS_CIS-1_201007_R_O.nc.html



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5

Integration of EuroSITES data and metadata in ESONET portal

- Once a day, EuroSITES metadata are harvested by ESONETdata-portal.
- The harvested metadata are presented on Esonet web interface, with a direct link to each EuroSITES observation file.
- EuroSITES data and metadata files are publicly available from OceanSITES GDAC ftp server. Each file is a NetCDF file, with a comprehensive metadata header (harvested by Esonet) and the corresponding observations (data part).

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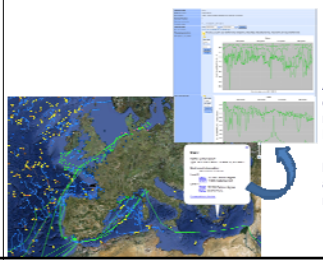
Connection with MyOcean

- *"MyOcean is the implementation project of the GMES Marine Core Service, aiming at deploying the first concerted and integrated pan-European capacity for Ocean Monitoring and Forecasting."*
- In-situ observations available from ESONET and EuroSITES are distributed to MyOcean. This distribution service is all the more efficient that both projects share a very close ftp structure organization and common NetCDF data format.



A quick look of all real-time observations available for MyOcean models in the European area on November 26th 2010

ESONET and EuroSITES observations are highly valuable for MyOcean models
http://www.ifremer.fr/co/co052801/MYOCEAN-EUROPE-LATEST-MONTH.kmz

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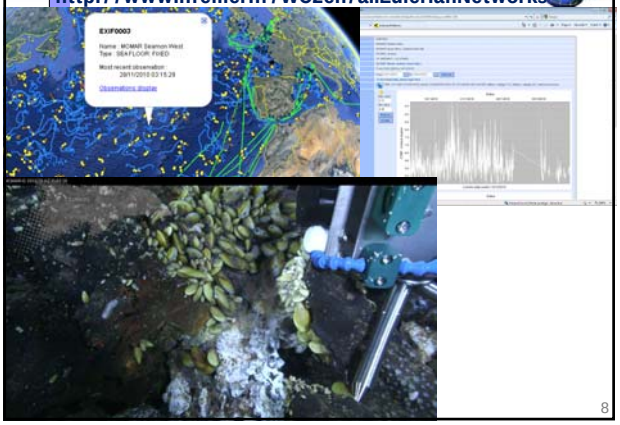
ifremer

7

ESONET Momar data access
http://www.ifremer.fr/WC2en/allEulerianNetworks



8

2.4.5 Conclusions of the workshop

The recommendations of the 3 Working Groups are to be included in the ESONET Label definition, Deliverable D68"*ESONET Label definition: final version*". A part of the Best Practices activities will be continued in the EMSO infrastructure and another part in the Virtual Institute that will take over ESONET. This has been discussed in the After ESONET session led by JF. Rolin.
All the topics addressed during the 3 Best Practices Workshops and the Technical Workshop of Aberdeen will have a continuation either in EMSO for engineering and integration purpose or as ESONET Vi activities. For ESONET Vi, the need is to convene at least once a year in Europe (notwithstanding larger international conferences). The funding of these workshops must be addressed.

3 SCIENCES MEETING

3.1 Introduction

The final science meeting of ESONET NoE set out to get feedback on its work and deliverables output. To this end, the ESONET NoE Science Council and Steering Committee were invited to comment on D11 and D13. Additionally there were a number of issues flagged for breakout discussion including VISO, network level hypothesis and analyses, as increasing industrial collaboration. Presentations on DONET (by Dr. Kaneda), NEPTUNE Canada's use of cabled technology for science (by Dr. Barnes), and the possibility of a GEO Community of Practice for ocean science (by Dr. Waldmann) were also given.

3.2 Agenda

Monday 13 December – Palais du Pharo		
Time	**Topic**	**Speaker**
14:00	Introduction	Henry Ruhl (NOCS)
	New Researches for Earthquakes, Tsunamis and Mitigations - Observational researches, simulation researches and disaster measures in Japan-	Dr. Kaneda
	Discussion: What is the feedback from the Science Council on the Science Objectives work in ESONET NoE?	Priede Moderator
16:00	*Coffee break*	
	Discussion: What should be the final steps in science plan development during ESONET NoE?	Priede Moderator
18:00		
Tuesday 14 December **Palais du Pharo (08:30/10:30) – MPM Pharo (10:30/11:30)**		
08:30 10:30	*Update on acoustics observatory science* *Successful examples of results from NEPTUNE Canada* *Update on GEOSS 'Community of Practice' concepts* *<u>Breakouts</u>* Discussion: How might this community capitalise on the anticipated VISO (http://visobservatories.webs.com/) and, for example, continue to advise on science objectives for EMSO after ESONET NoE is finished? From H. Pero: "What do you identify as main opportunities to extent your collaboration with the relevant international scientific communities and what do you identify as main barriers in order to achieve this - in particular as concerns the RI and the data management parts?"	Michael Taroudakis Chris Barnes Christoph Waldmann Benedicte Ferré

	Discussion: Can a small group draft some text on recommendations for observations related to oil and gas impact monitoring?	Monty Priede
10:30	*Coffee break*	
11:00 11:30	Breakout Reporting	

3.3 List of registered attendees

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3.4 Debriefing of the main discussions

The meeting started the presentation from Dr. Kaneda, which highlighted the recent progress of constructing the first phase of DONET. The meeting then proceed to discuss the D11 focussing on science objectives for ocean observatories in Europe. One of the main discussion points was the need for greater clarity on the capability of cabled infrastructure. It was also suggested that clearer rational for the minimum sampling frequencies for generic sensors is needed. Several relatively minor points were raised including suggestions for improvement of the figures. The introductory slides are here after the text.

Day two started with a talk from Dr. Barnes to give real examples of capabilities provided by cabled infrastructures. The collaboration with Jacobs University using their benthic crawler in NEPTUNE was highlighted. Further guest science participation from Europe was also encouraged. The Community of Practice discussions from the GEOSS meeting in Seattle the previous September were introduced by Dr. Waldmann followed by a brief introduction of VISO by Dr. Ferré. Two breakout groups were then formed, one to discuss VISO in anticipation of the Thursday VISO workshop, and one to discuss improving collaborations with industry. The VISO discussion helped focus the discussions for Thursday's VISO workshop. A key result of the industry breakout was a statement (see below). Elements of this statement will be used to revise D11 and potentially form a declarative statement from the ESONET community.

Statement:

> *'Industrial operations in the deep sea are characterised by the absence of independent human witnesses.*
>
> *We recommend that as a condition for licensing future deep sea drilling, mining or other exploitative activities, operators be required to install real-time observing and sensing systems at appropriate locations around the area of potential impact. The observing system should operate before and throughout the period of industrial activity. Imagery and data should be publically available for interpretation by independent scientific experts.*
>
> *The ESONET NoE can advise on sensor packages and data analysis.*
>
> *Such a system would have greatly aided management of the Deep Horizon incident in the Gulf of Mexico. Feasibility is indicated by the DELOS (Deep Sea Long Term Observatory System) installed by BP in an oil field offshore Angola.'*

4 ESONET 3rd GENERAL ASSEMBLY

4.1 Introduction

The third ESONET General Assembly was held in Marseille on 14-15 December 2010. This third General Assembly aimed to share all results obtained from the beginning of the ESONET project. The presentations were distributed over 2 days and the second days was dedicated to communication on the most visible part of the ESONET activities, meaning the Demonstration Missions (WP4), the Test experiments (WP2 & 7) and the Education and Outreach (WP7). Indeed these activities provide good communication material and support for different types of audience, from the scientists to the stakeholders and journalist. A press conference was organised during the lunch break.
This section sums up the two days of the General Assembly: the GA agenda, the list of participants, a summary of the presentations and discussions, approvals made during the meeting and a copy of all slides presented.
88 ESONET members and invited persons participated in the General Assembly.

4.2 Agenda

General Assembly 14-15 December 2010
MPM Pharo – meeting room Hémicycle

Tuesday 14 December		
Time	**Topic**	**Speaker**
13:15-13:45	Introduction ESONET and EMSO general presentations	ESONET Coordination Team EMSO Coordination Team
13:45-14:15	Work Package #1 presentation and discussion	(IPGP) presented by Ingrid Puillat
14:15-14:45	Work Package #2 presentation and discussion	Christoph Waldmann (UniHB)
14:45-15:15	Work Package #3 presentation and discussion	Henry Ruhl (NOCS)
15:15-15:45	Work package #5 presentation and discussion	Mick Gillooly (IMI)
15:45-16:15	Work Package #6 presentation and discussion	Berlarmino Barata (FFCUL)
16 :15-16 :45	Work Package #9 presentation and discussion	Robert Huber (UniHB)
16:45-17:15	*Coffee break*	
17:15-18:15	Work Package #8 presentation and discussion - Financial	Ingrid Puillat / Christophe Desbois (IFREMER)
18:15-19:15	Votes for approval	

Wednesday 15 December			
08:30 10:50	Communication and Demonstration missions show		
	08:30	Work Package #4 presentation	Laura Beranzoli (INGV)
	08:40	Arctic node / AOEM Demonstration mission	Ian Wright (NOCS) / Stein Sandven (NERSC)
	09:00	Norwegian Margin / LOOME Demonstration mission	Jurgen Mienert (UiT)/Dirk de Beer (MPIMM)
	09:20	PAP / MODOO Demonstration mission	Johannes Karstensen (IFM-GEOMAR)/ Richard Lampitt (NOCS)
	09:40	Azores / MOMAR Demonstration mission	Pierre-Marie Sarradin (IFREMER)
	10:00	LiDO / Iberian	Belarmino Barata (FFCUL)
	10:10	LIDO Sicily	Michel André (UPC)
	10:20	Hellenic node	Vassilios Lykousis (HCMR)
	10:30	Marmara node and Demonstration mission	Louis Geli/Namik Cagatay/Luca Gasperini /Pierre Henry /Günay Cifçi (IFREMER/ITU/ISMAR/CEREGE/DEU-IMST)

General Assembly 14-15 December 2010 MPM Pharo – meeting room Hémicycle			
10:50-11:05	*Coffee break*		
11:05-12:00	11:05	Test Experiment on Ligurian Sea	Christian Tamburini (UnivMed)
	11:20	Test Experiment on Obsea	Michel André (UPC / CSIC)
	11:35	Test Experiment in Sicily	INGV/INFN
	11:50	Test Experiment in Koljo Fjord – Progess and plans	Anders Tengberg (UGOT)
12:00-12:30	VIP presentations		+ Gerard Riou (IFREMER) *postponed to next day* + Christopher Barnes (UVIC)
12:30-13:45	*Lunch*		
13:45-14:00	Movie: The Ocean Under Surveillance		Sylvain Ghiron (Oceanopolis)
14:00-14:25	Work package #7 presentation		Laurenz Thomsen (JUB)
14:25-14:35	Nordic site		Peter Sigray (SU) *cancelled*
14:35-14:45	Movie: ESONET EMSO deep sea observatories		Sylvain Ghiron (Oceanopolis)
14:45-15:15	*Coffee break*		
15:15-19:00	POSTER SESSION		

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4.4 Debriefing of the main discussions on Tuesday 14 Dec. 2010

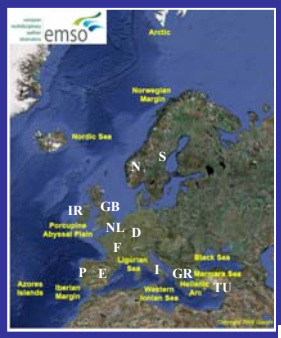
4.4.1 General introduction

Presented by R. Person (IFREMER)

A general introduction was realized by Roland Person (ESONET Coordinator) and Ingrid Puillat (ESONET Deputy Coordinator).

WP activities were introduced by Ingrid Puillat. At the beginning of the ESONET project, there were eight work packages. Due to a lot of work in the WP1 (Networking), it was decided in 2009 to split this work package, led by Michael Diepenbroek in two work packages:

EMSO is composed by fixed seafloor and water column observatories constituting a distributed infrastructure for long-term real-time monitoring of environmental processes



A large European users community is currently gathered around ESONET-NoE (www.esonet-emso.org/) which has been providing many inputs to the shaping of EMSO

ESONET General Assembly - Marseille 13-16 December 2010

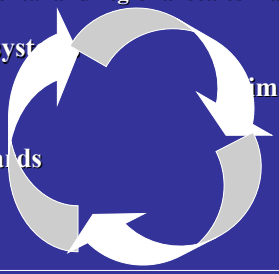
EMSO mission

A Marine Permanent Research Infrastructure to provide the necessary "ambient" (i.e. observatories, labs, long-term data, experiment assistance…) for deep-sea sciences both at continental and regional scales mainly on

Marine Ecosyst

imate Change

Geo-Haza ds



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The legal organisation/1

- The ERIC is considered a suitable legal form by the funding agencies and the community (Strasbourg - Funding Agencies meeting, February 2010)
- EMSO-ERIC statutes already drafted, under review by the partners
- Environmental laws at each EMSO site already reviewed
- Legal work for the next months will cover:
  - Finalisation of EMSO-ERIC Statutes
  - Model agreements for sites with already-existing facilities
  - Model sites: Arctic/Norway, Porcupine Abyssal Plain, Sicily

ESONET General Assembly - Marseille 13-16 December 2010

The legal organisation/2

- Next steps before the end of the Preparatory Phase:
  1. MoU among Countries that have shown interest, while the EMSO-ERIC statutes is being finalised
  2. Once 3 Member States Countries will ensure the financial commitment ⟶ application for the EMSO-ERIC
  3. Additional Countries will join subsequently

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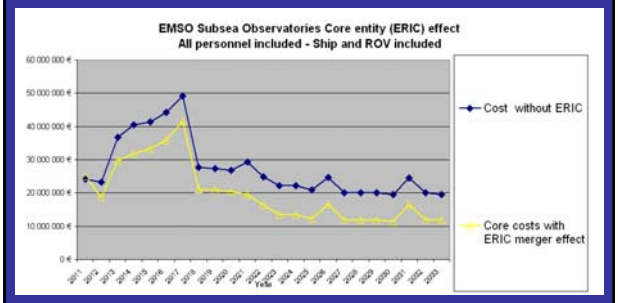
The multi-annual financial planning



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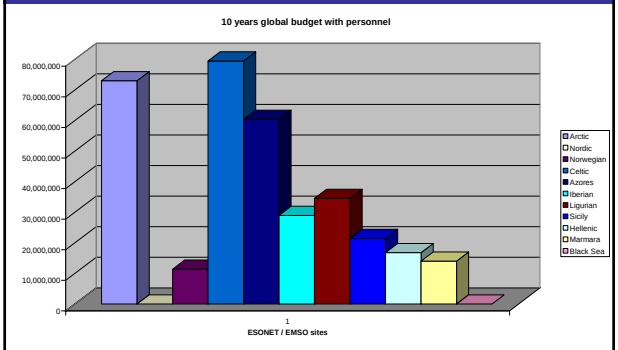
10 years global budget including personnel



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The management of the future infrastructure

- Statutory seat with Central Management
- Regional Departments (RDs) in charge of the EMSO nodes
- The RDs shall be either owned or not by the EMSO-ERIC (agreements needed)

Central Management

- EMSO-ERIC main tasks:
  - Define and deploy the scientific and financial strategy
  - Ensure the open access
  - Coordinate the scientific evaluation of experiments proposed by users
  - Ensure compliance with quality standard
  - Adopt technical standards
  - Ensure steady operation of observatories in order to provide the collection of long-term time series data
  - Manage, store and disseminate collected data
  - Organise cost efficient cooperation of personnel and technical means including sea operation

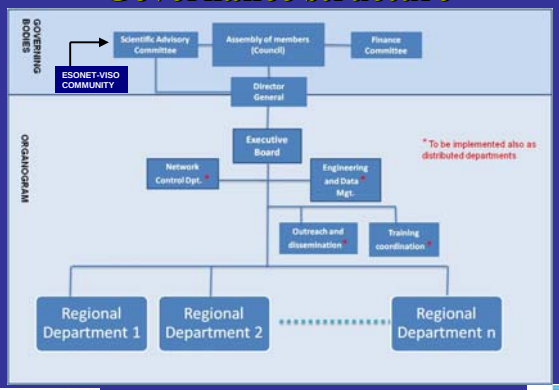
Regional Department

- A regional unit managing the EMSO node:
  - It includes personnel and facilities
  - It can be owned by the EMSO-ERIC
  - It can also be an institute or a consortium of institutions signing agreements with the EMSO-ERIC
  - It can be hosted by a scientific institution involved in EMSO
  - Scientific institutions can provide facilities and second staff (as in-kind contribution to the EMSO-ERIC)

Regional Department Tasks

- Deploy observatories
- Ensure continuous operation (24h x 7d)
- Contacts with local authorities and stakeholders, local ships, etc…
- Provide assistance to users in implementing experiments
- Manage data flow
- Manage budget to implement the activities at the nodes

Governance structure



Assembly of Members - AoM

- The highest decision-making body
- AoM delegates the day-to-day responsibility to the executive bodies: Director General, Executive Board
- One representative of the Member State/Funding Agency and one of the scientific community
- Observing member status will be envisioned

Scientific Advisory Committee - SAC

- SAC is established as an advisory body, to provide recommendations on the general scientific strategy of the RI. The users community will be represented within SAC through appropriate representation of ESONET-VISO
- SAC will be structured in order to cover all the disciplines represented within EMSO
- SAC will review and rank the experiments proposed by the users

ESONET General Assembly - Marseille 13-16 December 2010

Interest Currently expressed by Member States

- EMSO is presently in the roadmap of the following Countries:
  - Italy, France, Germany, Ireland*, Spain, Sweden, Greece, UK, Norway
  - The Prime Ministry of Turkey State Planning Organization (DPT), acting as funding agency for research infrastructures, is considering EMSO as one of the projects to include in the roadmap for Turkey

*EMSO has been designated in Ireland as an "A" rating in terms of potential investment

ESONET General Assembly - Marseille 13-16 December 2010

Involvement of the scientific community/1

Italy	Institutes that partnered to present the EMSO-Italy proposal in 2007. These institutes are: CNR-ISMAR, CNR-IAMC, CONISMA, INFN, OGS , SZN	about 500 researchers
France	The EMSO.FR group lead by Mathilde Cannat (IPGP) established a link with the users. IFREMER,CNRS and 4 Universities are supporting directly the initiative	100 researchers have expressed their interest. Ifremer and CNRS scientists are the more numerous.
Germany	The German ocean science community has bundled their interest in ocean observatories in the common supported organisation KDM	of the order of hundreds
Ireland	Significant initiative to develop a SmartOcean technology cluster linking Indigenous companies, Multinationals and National Research Centres http://www.marine.ie/home/research/SeaChange/NationalMarineTechnology/Ocean+Technology+Cluster+Workshop.htm	100-150 Researchers, companies, SME's, Multinationals etc
Spain	Interested Institutes are: CSIC, IEO, IGN, Real Observatorio de San Fernando (ROA), Instituto Canarias de Ciencias Marinas, Campus de excelencia internaciona, Autonomous Governmnet of Canaries, University of Barcelona, University of Madrid, University of Cadiz, etc	more than 300 researchers

ESONET General Assembly - Marseille 13-16 December 2010

Involvement of the scientific community/2

Sweden	Institutes/org. interested are the universities in Gothenburg, Stockholm, Umea, Kalmar, and SMHI, Fishery Board, Marine Research Centres, the Marine Environmental Institute, etc.	About 75-100 researchers and other users.
Greece	Core national partners of EMSO-HELLAS are: HCMR, NESTOR Institute, University of Athens, University of Piraeus, ITE Crete, University of Aegean. Strong interest have been expressed by NOA, National Technical University of Athens, University of Thessaloniki, Naval Engineering department of TEI	About 350 research and academic scientists. About 80 scientific staff of public organizations regarding environmental monitoring and global change, civil protection, weather and sea state forcast, maritime trafic etc
UK	NERC will continue a sustained observation programme that includes work envisioned by EMSO-PP. UK is working to align Marine Strategy Framework Directive objectives and observatory interest. See also 'other stakeholders'.	>100 researchers
Norway	All major Norwegian Universities: UiT, UiB, UiO and Uniresearch for the Universities; SINTEF at NTNU; IMR and CMR for the governmental agencies	more than 3000 users including project partners, industries, teachers and students, public users (e.g. policy makers), national/international research communities and the general public
Turkey	There is a general consensus among the Turkish scientific community about the need for EMSO infrastructure in general and its Marmara node in particular. This consensus was established in two meetings held in 2009 and 2010 with 12 stakeholders including marine sciences Institutions, organizations related to civil protection.	100-150 researchers
The Netherland	NWO mentioned that if concrete plans exists and NL can contribute scientifically and technically they are willing to listen carefully	possibly < 20 scientist at present

ESONET General Assembly - Marseille 13-16 December 2010

Ongoing initiatives to secure funding/1

Italy	Applied for 7.6 M€ of seed funding for technical development (structural funds). The current plan is to use structural funds for 50 M€
France	A general EMSO budget of 3 to 8 M€ per year is expected during the next 3 years. A request for Grand Emprunt funding (EQUIPEX) called EMSO Ligure presented the project for 3 year construction and 7 year operation. Total is 33 M€.
Germany	Germany is already spending something of the order of several Million Euros to continuously monitor environmental changes in the Arctic. A national strategy for the Arctic has been formulated and will form the base for the next step in funding individual research projects and the establishment of a permanent infrastructure.
Ireland	Ireland has invested €3.823m in recurring funding for the SmartBay infrastructure - a shallow water test and demonstration platform. This is seen as a precursor to developing a deep sea marine observation platform in the coming years. Ireland can make a benefit in kind contribution to an EMSO ERIC, potentially by providing ship time to the EuroSITES PAP observatory.
Spain	The Ministry of Science & Innovation provides funds for the Large Scale National Infrastructures, like RV Ships, Submarine Laboratories as PLOCAN (Canaries), OBSEA (Mediterranean) which partially will be included within the EMSO. Additionally, there is year call for research for the use of such infrastructures
Sweden	The Swedish Research Council (VR) has money available to apply for planning of / contributions to a joint proposal for construction of an EMSO type observatory. The RI council of VR visited UGOT on 11 Nov. (today) to find out status and progress of RI involving UGOT. EMSO was presented by P. Hall at that meeting.

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Ongoing initiatives to secure funding/2

Greece	3.5 M€ allocated for 2010-2011 Applied for 10 M€ structural funds. It is expected that part of the 50 M€ allocated for KM3NeT will be used by EMSO if implemented in synergy. Applied also for 4.5 M€ for working class ROV
UK	NOC currently funds sustained observing work that is planned to join EMSO. NOC also envisions augmenting current funding as open-ocean observatory work is a priority item. NOC will lead a funding bid to evolve open-ocean observatory infrastructure in UK. As the attributes of EMSO are clarified, the way in which UK effort (including funding) will link with EMSO will also clarify.
Norway	NOON applied for 23M€ from NRC for a new proposal named COSMOS (Cabled Observatories for Monitoring of the Ocean System)
Turkey	A Project proposal 'MARDEP' to be submitted to the State Planning Department "DPT" by April or June 2011, for funding. This project aims to establish the Marmara Sea regional infrastructure with a budget of 15 M€ over a four year period. If funded the regional infrastructure is planned to be operated under EMSO, starting by 2014.
The Netherland	No funds secured at the moment. In-house funds as well as project proposals to NWO and the EU are seen as the most likely funding source to perform science related to EMSO at present

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Governance and legal work (WP2 and 3)

Tasks/Outcomes

- The governance model for EMSO is being refined to comply with the needs of the research community: final goal is to design an agreed-upon governance with the funding agencies.
- EMSO-ERIC statutes finalised by mid 2011
- The final objective is to apply for the EMSO-ERIC before the end of the PP

Funding Plan and Business Plan (WP4 and 5)

Tasks/Outcomes

- Complete version 2 of CAPEX and OPEX
- Issue the funding plan for selected EMSO sites on the basis of the input received by funding agencies
- The aim is to have a comprehensive business plan for some selected sites that will be constructed in the first phase of EMSO construction
- Input to the implementation plan for EMSO

Logistic work (WP6)

Tasks/Outcomes

- Detailed logistics and timing of the relevant operations related to the infrastructure management, with the support of independent private shipping experts
- Provide solid and optimised models for cost simulation for logistic intervention (ship and ROV) to input to business plan and to implementation plan
- GIS tool to manage, provide and update detailed information on each site contributing to the installation, maintenance, reparation, emergency cases, etc.

Strategic Work (WP7)

Tasks/Outcomes

- Access rules have been formulated based on experience from other RI like particle accelerators
- Integration with other observation programs is essential to make best use of the RI. Links are established with EUROSITES, KM3NeT, EUROFLEETS, etc.
- The identification of EMSO sites with operational capabilities is a stepping stone to bring together individual observing components to a coherent system of systems
- The definition of the impact assessment and the implementation plan will form the base for the MS to define the extent of their contribution

Technical work (WP8)

Tasks/Outcomes

- Definition of the specification for the construction after EMSO PP
  - Infrastructure costs reliability and performances
  - DATA MANAGEMENT SYSTEM ANALYSIS. Input from ESONET. Data dissemination policy
  - ENERGY REQUIREMENT. In Europe, most of the sites require 1kW per Junction Box (JB). Some will do with 100W per JB. Energy requirement simulation is underway
  - VERY LONG TERM PROTECTION OF SENSORS. Good perspectives with a need of energy in most cases. Commercial and non-commercial solutions are mastered
  - EXTENSION SCENARIO. Extension for cabled high voltage is not recommended. Studies in 2011 on other solutions
  - IMPROVEMENT OF LOW RELIABILITY COMPONENTS. A major issue leading to studies on: buoys, acoustic transmissions, fibre transmission (redundancy), junction boxes and underwater mateable connectors, etc.

Full European approach vs more regional approach

- For EMSO distributed RI a full European approach is the most appropriate:
  - Since it provides a unique opportunity for a global approach to fundamental scientific challenges
  - For a global integration with GEOSS and GMES
  - Since it is the proper mean to sharply increase the European competitiveness with respect to analogous worldwide programs
  - It contributes to reinforce the European Research Area

Synergies with other initiatives (EUROSITES) towards European Ocean Observing System(s)

- **Feasibility:**
  - the objectives of EMSO include seafloor and water column observations
  - specific task of EMSO-PP is dedicated to the possible integration of EUROSITES
  - input to the shaping of the EMSO-ERIC Statutes
- **Strategy:**
  - inclusion of EUROSITES community representatives in the SAC
  - Collaboration in forthcoming calls to further integrate the communities
- **Impact on PP:**
  - involvement of EUROSITES representatives in the shaping of EMSO

EMSO is considered essential component of the European Ocean Observing System(s)

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Synergies with other initiatives

- EMSO is complementary to other initiatives such as:
  - EUROARGO as the Eulerian counterpart
  - KM3NeT with respect to associate sciences
  - SIOS as the marine component
  - EPOS for marine data
  - ICOS for marine data
  - EUROFLEETS

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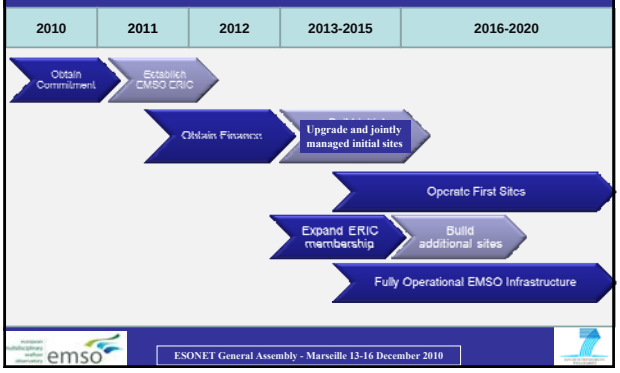
EMSO Timeline



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4.4.3 WP1: Networking

Presented by I. Puillat (IFREMER),

WP1 was presented by Ingrid Puillat in absence of the WP1 leader, M. Cannat and IPGP representatives.
Main WP1 tasks were organised as follow:

- Organisation and reporting of the two "All Regions Workshop"
- Creation and organisation of the Core Groups on each ESONET sites
- Organisation and reporting of the fourth Call of Exchange of Personnel
- Plan and implementation of VISO

Summary of the 2 All regions workshop:

- First one: Barcelona Sept. 2007, 1 week, ~100 persons.

During this workshop the initial regional groups have been constituted and each group presented their intended and running activities and their intention of demonstration mission proposals

- Second one: Oct 2009 in Paris, 3 days, ~100 persons,

During this meeting it was presented the advancement of the work done, the confirmation of regional core groups, and the futures plans for each site.

For more information please consult the deliverable D7 "Report on constitution of integration groups; Proceedings of All Regions workshop. Report on potential creation of a virtual institute." and D55 "Report on 2nd All Regions Workshop"

Regional core groups:
There are eleven sites plus testing sites and the challenge was to identify the scientists involved in each site and to increase these groups with people who have other competencies like engineers or lawyers. The aim of these groups is to create a legal entity for each site. The demonstration missions within the framework of ESONET are very helpful to promote the integration on sites but also across sites. The constitution of the regional groups resulted of a process with different steps. First step was the constitution of a list with the involved person, who are working on these sites and to identify also who are the reference persons for dedicated topics.
This list is including in the deliverables D7 "*Report on constitution of integration groups; Proceedings of All Regions workshop*." and D56 "*Membership of Regional Implementation Groups*" It is of course important that every partner keeps this list updated because it will be a very useful information for "after ESONET".

The aim of these core groups is give the opportunity to contact the right person for the right field (see the list in the power point at the end of this minute).

Discussion:

- *What future for these groups?*
- *Which strategy for official constitution (legal framework)?*

Exchange of personnel:
Within the framework of the project the WP1 leader with the ESONET coordination team opened four calls for the exchange of personnel.
Around 30 proposals in four different calls were granted.
The Exchange of personnel funds are allocated for travels and accommodation in order to promote the work together between the partners. Please for more information read the deliverable "*D10 Report: Exchange of personnel: common schedule and methodology of tests*", and D54 "*Report of 1st and 2nd call for Exchange of personnel*" and D73 "*Final report on exchange of personnel"*

VISO:
A dedicated workshop will take place on Tuesday.

Conclusion:
The objectives of WP1 tasks were reached, and the most important general objective that was the network integration is also well done:

- Across science integration through the active collaboration between scientist and engineers
- Integration of people and teams
- The challenge of the future is to keep this integration.

ESONET WP1

14 Dec. 2010
Marseille, France

Leading participants:
M. Diepenbroeck, UniHB
J. Mienert, UiT
B. Ferré, UiT
M. Priede, UniABDN

ESONET WP1
« NETWORKING »

Lead by Mathilde Cannat with help of Inmaculada Lopez Bonilla (IPGP)
Presented by Ingrid Puillat (Ifremer)

WP1 objectives

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

1. WP1 Tasks

- 2 All Regions workshops
- Constitution of Regional Core groups
- 4 calls for Exchange of Personnel
- VISO, the Virtual Institute
- *Initially:*
  Data management, moved to WP9
  Word wide cooperation, moved to WP8

2. All Regions Workshops

- *First one: Barcelona, September 2007*
  - *One Week*
  - *~100 participants*
  - *Initial constitution of the regional groups*
  - *First presentation of the DM projects*
- *Second one: Paris, October 2009*
  - *3 days*
  - *~100 participants, 17 countries*
  - *Advancement of the work done and project per site and region*
  - *Confirmation of regional groups*
  - *Futures plans for each site*

Deliverables: D7, D55

3. Regional core groups

3. Constitution of regional Core groups

- *List of persons involved in each regional group:*
  - *names of persons, position, field of interest*
  - *reference persons for dedicated topics*
  - *a questionnaire was circulated twice*
  - *to be revised if necessary, please check, this is useful for the future in EMSO*

Deliverables: D7, D56

3. Constitution of regional Core groups

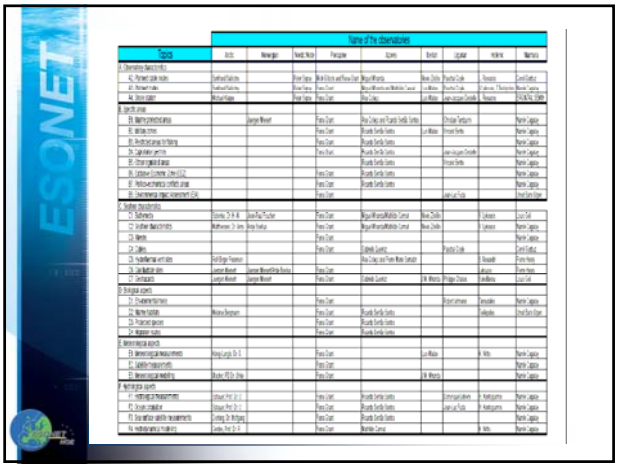
Reference persons per site

Node #	Node name	Contact persons	Demo-mission
1	Artic	T. Soltwedel (AWI), M. Klages (AWI)	MASOX-ARCOONE
2	Norwegian Margin	J. Mienert (Univ. Tromso), D. de Beer (MPI-MM), B. Ferré (UiT)	LOOME
3	Nordic Sea	P. Sigray (Stockholm univ.)	
4	Porcupine	F. Grant (IMI), M. Gillooly (IMI), O. Pfannkuche (IFM-GEOMAR)	MODOO
5	Azores	A. Colaco (UAc), R. Santos (UAc), Maria Gabriella Queiroz (UAc), Miguel Miranda (FFCUL), Mathilde Cannat (IPGP), Pierre Marie Sarradin (IFREMER)	MoMAR-D
6	Iberian Margin	L. Matias (FFCUL), M. Andre (UPC CSIC), N. Zitcllini (ISMAR), J.M. Miranda (FFCUL)	LIDO

3. Constitution of regional Core groups

Reference persons per site

7	Ligurian Sea	J.J. Destelle (CPPM), S. Escoffier (CPPM), G. Gorsky (LOV), C. Curtil (CPPM), J. Carr (CPPM) , Dominique Lefevre et Christian Tamburini (LMGEM)	
8	East Sicily	L. Beranzoli (INGV), P. Favali (INGV), R. Papaleo (INGV), G. Riccobene (INFN)	LIDO
9	Hellenic	V. Lykousis (HCMR), T. Tsellipides (HCMR)	
10	Marmara Sea	N. Cagatay (ITU), L. Géli (IFREMER)	MARMARA
11	Black Sea	L. Dimitrov (IO-BAS), H. Sahling (Univ. Bremen)	
	Koster Fjord	L. Thomsen (Jacobs Univ.), L. Lundaly (Goteborg Univ.)	



3. Constitution of regional Core groups

- *What future for these groups?*
- *Which strategy for official constitution (legal framework)?*

Let's discuss this Thursday!

4. Exchange of Personnel

- ***One simple call in 2007: no reaction***
  - ***-Not enough oriented on dedicated activities***
  - ***-Too early compared with the starting date of DMs***
- ***4 calls well formalised***
  - ***Calls posted on website, a form to compile***
  - ***Proposals boosted by DMs activities, and by WP activities***
  - ***Different kinds of exchanges, one way, 2 ways, triangular and more***

4. Exchange of Personnel

- ***Results of the 4 calls***
  - ***Call 1: 16 proposals granted***
  - ***Call 2: 6 proposals granted (3 of them are merged)***
  - ***Call 3: 6 proposals granted***
  - ***Call 4: 4 proposals granted***
  - ***Total grant: 352 k€, 25 partners***
- ***What is funded? - travels and accommodations***
- ***To do what? - For instance***
  - ***- to exchange knowledge and know how in the framework of DMs for instance***
  - ***- to produce common papers after common data analysis***
  - ***- to work on standardization issues to implement common practices and to share them***

Deliverables: D10, D73 (in progress)

5. VISO

- *The Virtual Institute: the future of the Esonet club of scientists.*
- *Activity managed by UiT, J. Mienert and B. Ferré.*

A dedicated workshop the 16th Dec.

In this room

6. Conclusions : Networking

- *Objectives of*

- cross region integration of sciences & engineering activities reached

- *intregration of teams and people around sites and across sites is reached*

- *Challange*

- *To keep this integration alive and to reinforce it.*

= To be adressed in VISO and EMSO

Thank you!!!!!!!!

4.4.4 WP2: Standardization and interoperability

Presented by C. Waldmann (MARUM)

The importance of this workpackage was pointed out by the European reviewers of the ESONET project and was one of the ESONET challenges.
Christoph Waldmann is the workpackage leader and presented main results:

- Rationale for Standardization
- Scope of the workpackage on standardization
- Implementation of tasks

+Rational for standardization
The question behind this topic was: "Would this be accepted by the ocean science community?"
The reasons of the standardisation are the strength of will to build a system, to allow the share of infrastructures and platforms, to integrate different systems and to enable the transition from experimental to operational phase.

The data quality issue is the biggest indicator of this need of standards. That is the motor of ESONET label.

Standardization is not only collect of data but it is also dealing with service and maintenance.

At the beginning it was quite difficult to determinate the boundaries between WP2 and WP9 (data management). After discussions activities were clearly identified for each of them.

The work for the workpackage 2: standardization and interoperability is described in the first slide of the power point "AG-Marseille-WP2".

+Workpackage tasks presentation

a. Sensors and Scientific packages
b. Quality assurance / quality control
c. Underwater intervention
d. Sharing testing facilities
e. Contribution to GEOSS standardization and implementation activities
f. Organization of the Third Best Practices Workshop
g. Organization of equipment tests on cabled sites

+Tasks implementation

- Forming task teams on standards it is really important to keep these tasks teams activities for the future of ESONET
- Review and test existing standards
- Set up links to international initiatives
- Active involvement in GEOSS activities

ESONET
General Assembly

Date 14/12/2010
Marseille

Minutes of presentation

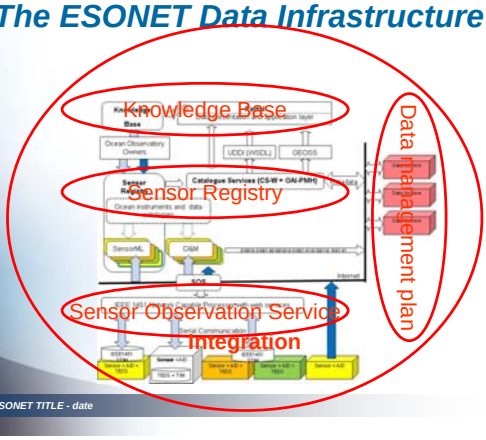
Participants

ESONET WP2 « Standardization and interoperability »

Lead: C. Waldmann

UniAbdn, IFREMER, INFN, UPC, dBScale, SEND OFFSHORE, Kiel University 52° North

The ESONET Data Infrastructure



ESONET TITLE - date

OUTLINE

- Rationale for Standardization
- Scope of the workpackage on standardization
- Implementation of tasks

RATIONALE

It is essential for

- System building
- Sharing infrastructures and platforms
- Integrating different systems
- Enabling the transition from experimental to operational phase

Concerns

- Will it constraint the versatility/flexibility?
- Will the integration be easier or more complex?

RATIONALE

Visions

- Instruments can be freely interchanged between observatories worldwide
- Instruments are calibrated according to agreed upon standard procedures
- Data quality can be checked and specified
- Data are described with a standard format and vocabulary
- Deployment, maintenance and service can be carried out by different groups

BACKGROUND

CONSTRAINTS

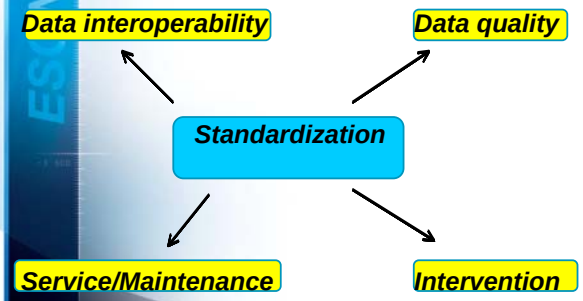
The existing systems are an eclectic mix of what individuals and groups have brought to the table.

As technology constantly changes, operators of observatory systems must be prepared to re-evaluate constantly

Carl Wunsch

OceanObs09

BACKGROUND



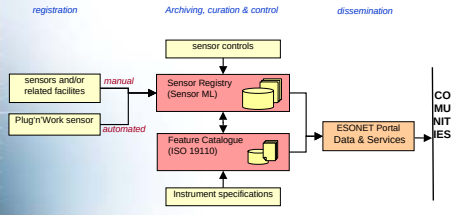
Workpackage 2- Tasks

a. Sensors and Scientific packages
b. Quality assurance / quality control
c. Underwater intervention
d. Sharing testing facilities
e. Contribution to GEOSS standardization and implementation activities
f. Organization of the Third Best Practices Workshop
g. Organization of equipment tests on cabled sites

IMPLEMENTATION

- Forming task teams on standards
- Review and test existing standards
- Set up links to international initiatives
- Active involvement in GEOSS activities

Sensor registry



Task 9c: Data infrastructure: Sensor Registry

(Lead: Eric Delory [dbscale] -> WP2)

- Entry screen

ESONET TITLE - date

Quality Plan

- Come up with a framework document for all standard related documentation

- 1. Subcontractor/Manufacturer Equipment
- 2. Design and Technology Reviews
- 3. Reliability Engineering
- 4. High Level Test Plan
- 5. Risk Analysis
- 6. Documentation Control
- 7. Data flagging model

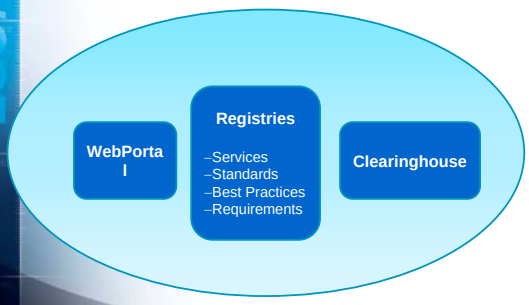
UNDERWATER INTERVENTION

- ***Review of common or shared procedures***
- ***Review offshore standard evaluation and define a recommendation for marine science observatory intervention***
- ***Design recommendations for training, simulation and testing***

Underwater intervention on scientific permanent observatories – Draft document in progress

Standards and recommended practices for underwater intervention and structures interfaces in the Offshore industry

Contribution to GEOSS standardisation and implementation activities



GEOSS Common Infrastructure

Contribution to GEOSS standardisation and implementation activities

http://sites.google.com/site/esonetgeoss/Home

DISSEMINATION ACTIVITIES

Session on EGU General Assembly, 2011

Towards establishing permanent infrastructures for ocean observations: instrumentation, measurement strategies and methods for ocean observatories

Convener: C. Waldmann, MARUM
Co-Conveners: I. Puillat-Felix, IFREMER, L. Beranzoli, INGV

WS on CoP

GEOSS Workshop XXXVIII–
Evolution of Oceans Observing Systems – Building an Infrastructure for Science
Seattle, Sep 2010

IEEE

DISSEMINATION ACTIVITIES

GEOSS Workshop XXVII - Conclusions

The establishment of a GEOSS Community of Practice devoted to permanent ocean observations is encouraged

The CP shall address cross cutting issues like

- common monitoring strategies
- scientific objectives
- implementation strategies.

Equipment tests on cabled sites

- *Organization of equipment tests on cabled sites with training activities*
- *Tests of observatory equipments will be organised*
  - *to teach and demonstrate the use of equipment dedicated to long term immersion for real time measurements*
  - *to demonstrate the procedures of measurements, underwater interventions etc*

Standardization Group

Anne Holford, Aberdeen University
IFREMER
Yves Auffret, Jean- Francois Drogou, Jerome Blandin, Jean Marvaldi
Antoni Manuel, Joaquin Del Rio, UPC
Eric Delory, dbScale
Klaus Schleisiek, SEND Offshore
Jesper Zedlitz, Kiel University
Mario Musumeci, INFN
Robert Huber, Uwe Schindler, Christoph Waldmann, MARUM

Tom O'Reilly, MBARI, USA

4.4.5 WP3: Scientific objective and observatory design,

Presented by H. Ruhl (NOCS)

The aim of this workpackage was to establish the link between ESONET and the scientific community. Christian Berndt initiated this workpackage and then Henry Ruhl took the head of this workpackage.
The main objective of this work package is to outline the NoE scientific needs related the use of a long-term observatory network.

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 module(s)
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 & observatory utilization plans
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 observatory.

WP3

December 2010
Marseille, France

WP3 - Science Objectives and Observatory Design

WP leader: H Ruhl, NOCS,h.ruhl@noc.soton.ac.uk
J Karstensen, O Pfannkuche, KDM
J Greinert, NIOZ
L Geli, Y Auffret, et al. Ifremer
L Beranzoli, INGV

& IPGP, IUEM, HCMR, FORTH, UAç, NERSC, ITU, DEU-IMST, & others

WP3 Objectives

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

- *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 module(s)*
  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 … & observatory utilization plans*
  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
- *Held science workshops, worked mainly with WP4 and WP5.*
- *Key deliverables are D11 & D13.*
- *Annex to D13 on acoustics is drafted.*

D11 - 'Science Objectives'

Societal need for improved understanding of climate change, anthropogenic impacts, and geo-hazard warning drive development of ocean observatories in European Seas

Progress in Oceanography running header:
Open-Ocean Observatories in Europe

Henry A. Ruhl[a,*], Michel André[b],Laura Beranzoli[c], M. Namik Çağatay[d], Ana Colaço[e], Mathilde Cannat[f], Juanjo J. Dañobeitia[g], Paolo Favali[c], Louis Géli[h], Michael Gillooly[i], Jens Greinert[j], Per O.J. Hall[k], Robert Huber[l], Johannes Karstensen[m], Richard S. Lampitt[a],Vasilios Lykousis[n], Jürgen Mienert[o], J. Miguel Miranda[p], Roland Person[h], Imants G. Priede[q], Ingrid Puillat[h], Laurenz Thomsen[r], Christoph Waldmann[l]

Transformative Ocean and Earth Science

Socioeconomically important topics which cross-cut the above outlined science areas include themes spanning numerous spatial and temporal scales such as:

- *Natural and anthropogenic change*
- *Interactions between ecosystem services, biodiversity, biogeochemistry, physics and climate*
- *Impacts of habitat destruction and pollution on ecosystems and their services*
- *Impacts of exploration and extraction of energy, minerals, and living resources*
- *Geo-hazard early warning capability for earthquakes, tsunamis, and gas hydrate release*
- *Connecting scientific outcomes to stakeholders and policy makers*

Research Questions

- *How can monitoring of factors such as seismic activity, fluid pore chemistry and pressure, and gas-hydrate stability improve seismic, slope failure, and tsunami warning?*
- *To what extent do seabed processes influence ocean physics, biogeochemistry, and marine ecosystems?*
- *How are physical and biogeochemical processes that occur at differing spatial and temporal scales related?*
- *What aspects of physical oceanography, biogeochemical cycling, and ecosystem function will be most sensitive to climatic and anthropogenic change?*
- *What are the factors that control the distribution and abundance of marine life and what will the influence of anthropogenic change be?*
- *Will there be important feedbacks of potential ecological change on biogeochemical cycling and ecosystem function which require policy intervention to avoid costly outcomes?*
- *How can industries using marine resources work in a more sustainable way and better respond to accidents?*

D11 - 'Science Objectives'

1. Introduction

2. Science Objectives
2.1 Geosciences
2.1.1 Seismicity
2.1.2 Gas hydrate stability
2.1.3 Seabed fluid flow
2.1.4 Seafloor-water column interactions and Submarine landslides
2.1.5 Tsunamis
2.1.6 Geo-hazard Early Warning
Key questions in understanding and monitoring of geophysics:

2.2 Physical Oceanography
2.2.1 Ocean Warming
2.2.2 Wind-Driven Circulation
2.2.3 Deep-Ocean Circulation
2.2.4 Benthic-Water Column Interactions
2.2.5 Marine Forecasting
Key questions in physical dynamics and impacts from anthropogenic change:

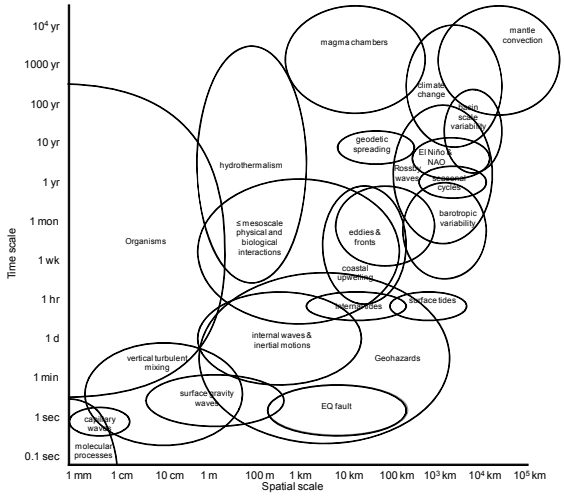
2.3 Biogeochemistry
2.3.1 Solubility Pump and Ocean Acidification
2.3.2 Biological Pump
2.3.3 Continental Shelf Pump
2.3.4 Deep-Ocean Biogeochemical Fluxes
Key questions in biogeochemical dynamics and impacts from anthropogenic change:

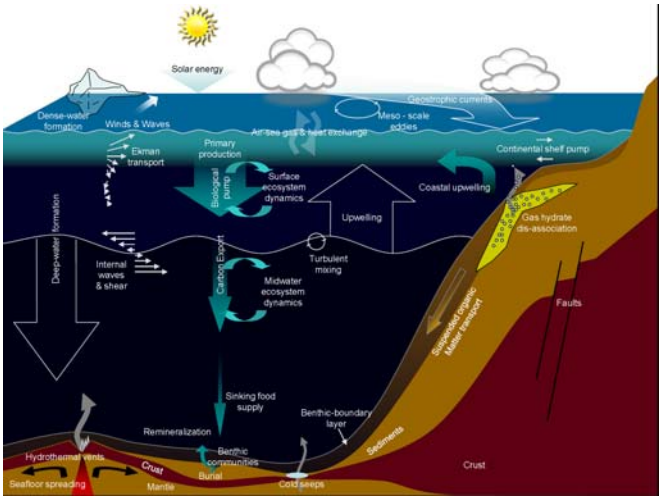
2.4 Marine Ecology
2.4.1 Climate Forcing of Ecosystems
2.4.2 Molecules to Microbes
2.4.3 Fisheries
2.4.4 Bioacoustics
2.4.5 Export Flux Dependent Ecosystems
2.4.6 Deep Biosphere and Chemosynthetic Ecology
Key questions in marine ecology dynamics and impacts from anthropogenic change:

2.5 Transformative Ocean and Earth Science

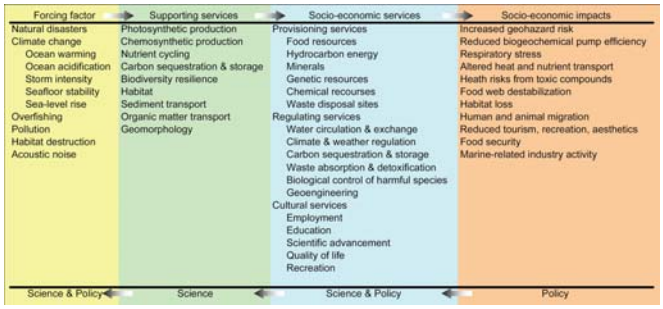
3. Observatory Design
3.1 Observatory Fundamentals
3.2 Principal Observatory Nodes
3.3 Generic Sensor Module
3.4 Science-Specific Modules
3.5 Data Infrastructure

4. Conclusions





Tracing Science to Policy



D13 – 'Science Modules'

- ***Authors for this deliverable: H. A. Ruhl,L. Géli, Y. Auffret, J. Grienert, A. Colaço, J. Karstensen, P. M. Sarradin, D. De Beer, M. André, R. Person, L. Menot, A. Khripounoff, P.-M. Sarradin, J. Galéron, . J. Blandin, P. Bagley, P. Favali, J. Mienert, L. Thomsen, H. Villinger, N. Sultan, O. Pfannküche, E. Delory, J.M. Strout***

I Summary
II Introduction
III Generic Sensor Modules
IV Science Specific Sensor Modules
A Geosciences
B Physical Oceanography
C Biogeochemistry
D Marine Ecology
V Instrumentation Module architecture
VI References
VII Appendix
Demonstration Mission sensors
Standalone and cabled systems
US OOI
US IOOS
Neptune Canada
Seacycler
POSEIDON-II
GEOSTAR
SEAMON
TEMPO
BOB
Dropcam
FOCE
DELOS

Suggested Generic Variables

Table 4. Generic ESONET variables in the water column and at the seafloor surface.

Variable	Geosciences	Physical Oceanography	Biogeochemistry	Marine Ecology
Temperature	X	X	X	X
Conductivity	X	X	X	X
Pressure	X	X	X	X
Dissolved O_2	X	X	X	X
Carbon dioxide			X	X
Turbidity	X	X	X	X
Chl-a fluorescence			X	X
Ocean currents	X	X	X	X
Passive acoustics	X			X
Time-lapse camera	X		X	X

Suggested Specifications

Table 5. Overview of minimum specifications under consideration for in generic sensor modules that may be used across European ocean observatory sites.

Type of sensor	Range†	Accuracy†	Sampling frequency
Conductivity	0 to 9 S/m	0.001 S/m	4 Hz*
Temperature	-5 to +35°C	0.01 K	4 Hz*
Pressure	0 to 600 bar	0.1 % FSR	4 Hz*
Dissolved oxygen	0 to 500µM	5%	0.01 Hz*
Carbon dioxide	0 to ≥600 ppm	1 ppm	1 min
Turbidity	0 to 150 NTU	10%	1 Hz*
Chl-a fluorescence‡	0to ≥100 µg/l	5%	1 min
Currents	0 to 2 m/s	2%	1 Hz*
Passive acoustics	50 - 180 dB re 1 µPa	+/-3dB	96 KHz
Time-lapse camera♣	Colour	5 Megapixels	hourly

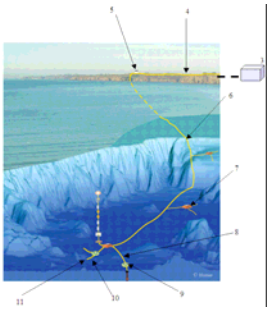
†*Range and accuracy are given are often adjustable through calibration and given here as suggestions.*
**High-frequency only needed for a few applications (i.e. those related to turbulence)*
‡*Suggested for near surface stations*
♣*Suggested for benthic stations*

Table 6. List of generic parameters and examples of available systems. Most systems are available to 6000 m depth.

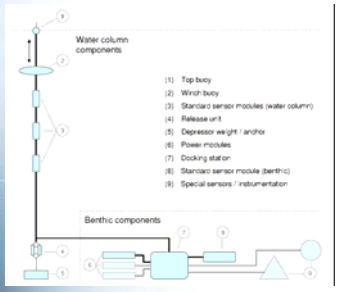
Variable	Model	Manufacturer	Internet link
Temperature	SBE MicroCat 37 w/o pressure	Seabird	http://www.seabird.com
	NXIC-CTD, Micro CTD	Falmouth Scientific Inc.	http://www.falmouth.com
	CTD48, 60, 90	Sea & Sun Technology	http://www.sea-sun-tech.com
Conductivity	SBE MicroCat 37 w/o pressure	Seabird	http://www.seabird.com
	NXIC-CTD, Micro CTD	Falmouth Scientific Inc.	http://www.falmouth.com
	CTD48, 60, 90	Sea & Sun Technology	http://www.sea-sun-tech.com
Pressure	SBE 54 Tsunameter	Seabird	http://www.seabird.com
	Digiquartz series 8CB	Paroscientific	http://www.paroscientific.com
	Differential pressure gauge (DPG)	Scripps Institution of Oceanography	http://marineemlab.ucsd.edu
Dissolved O_2	Oxygen Optode 3830 or 3975	Aanderaa	http://www.aadi.no
Turbidity	Turbidity Meter	Seapoint Sensors	http://www.seapoint.com
	MST-AutoCal	Trios	http://www.trios.de
	C-star	Wetlabs	http://www.wetlabs.com
	ECO-FLNTU	Wetlabs	http://www.wetlabs.com
Ocean currents	300kHz workhorse	Teledyne RDI	http://www.rdinstruments.com
	75kHz workhorse	Teledyne RDI	http://www.rdinstruments.com
	RCM series	Aanderaa	http://www.aadi.no
	FlowQuest, FlowScout	LinkQuest	http://www.link-quest.com
	Aquadopp series	Nortek AS	http://www.nortek-as.com
Passive acoustics	HTI-96-MIN + Data logger	High Tech	http://www.hightechincusa.com
	HTI-99-PCFD2 + Data logger	High Tech	http://www.hightechincusa.com
	OAS E-2PD + Data logger	Optimum Applied Solutions	http://www.oas-inc.com
	Ethernet hydrofon	Bjørge Naxys AS	http://www.bjorge.no
Chl-a fluorescence	ECO-FLNTU	Wetlabs	http://www.wetlabs.com
	C3 Submersible Fuorometer	Turner Designs	http://www.turnerdesigns.com
	AQUAtracka III	Chelsea Technologies Group	http://www.chelsea.co.uk
	Chlorophyll Fluorometer	Seapoint Sensors	http://www.seapoint.com
	enviroFlu-DS or microFlu-DS	TriOS GmbH	http://www.trios.de
pCO_2	SAMI^2-CO_2	Sunburst Systems	http://www.sunburstsensors.com
	HydroC	Contros	http://www.contros.eu
	CO_2-Pro	Pro-Oceanus	http://www.pro-oceanus.com
Time-lapse camera	OE14-208, OE11-242 + controller	Kongsberg Maritime	http://www.km.kongsberg.com
	SharkEye series	Desert Star Systems	http://www.desertstar.com
	SDS 1210 + high power flash unit	Imenco AS	http://www.imenco.no

Cabled Observatory Design Concept

Legend:
3 - Technical supervision infrastructure
4 - Onshore network
5 - Land Base termination
6 - Land sea communication segment
7 - Node from branching unit to node
8 - Branch extension of the network
9 - Junction box
10 - Link to instruments
11 - Individual instrument



Standalone Obervatory Concept



EuroSITES deliverable 1.1.3 outlines the existing platforms and sensors used throughout the EuroSITES network.

Specific Sensors/Parameters/Insturments

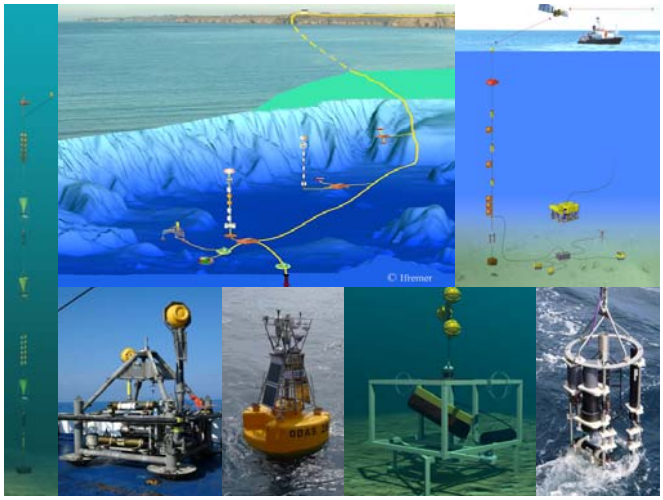
Seismic motion
Geodesy and Seafloor deformation
Gravity
Magnetism
Fluid related processes monitoring
Chemical and aqueous Transport (CAT)
Pore pressure
FluSO
Gas hydrate monitoring
Dissolved Fe, Mn and sulfide species
Particle flux
Acoustic tomography
Photosynthetically active radiation (PAR)
Specialized hydrothermal vent CTs
Methane
Hydrocarbons

pH, Eh, and alkalinity
Nutrient analyzers
Particle flux
Image based particle flux
Pigments
***In situ* Mass spectrometer**
Osmosampler
Deep biosphere
Line-scan imaging
Holographic imaging
Video
Planar lasers and thin light sheets
Active acoustics
Zooplankton sampling
Flow imaging of particles &plankton
Molecular probes
***In-situ* respiration**

Next steps

- ***Finalise D11 & D13***
- ***EMSO – ERIC Technical & Scientific Description***
- ***Organise ESONET 'Special Volume'***
  - ***Proposed titles ASAP***
  - ***Conceptual abstract - February***
  - ***Submit ms - fall***

Photo Credit: DELOS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4.4.6 WP5: Implementation strategy

Presented by F. Grant (IMI)

The WP5 activities were mostly reviewing the last year. This WP is also incorporating elements of EMSO-ERIC work. And this WP5 presentation for the GA will focus on this former issue.
F. Grant explained that a meeting on legal issues was organised and there was agreement to pursue the ERIC framework.
An overview of ERIC framework is provided:

- Single personality legally, tax exemption, flexible procurement rules,
- Engages governments,
- Has some resistance from some Member States and some revisions may occur, VAT has issues
- Centralised model, mostly in-kind contributions, acting as coordinating body
- There was guidance for starting with a simple framework and limited liability

Regarding the phased implementation:

- Desire to enable straightforward relationships with OOI, others
- Discussed possible tasks of the EMSO-ERIC, seven major areas,
- Suggested that early 2011 we should have full statues, does not match timeline suggested in Brussels by Mr. Pero

The Governance structure is presented and definitions of attributes were given.
Advantages of simple start was presented, concentrating on value added aspects, next steps, agreement on activities, first 5 years focus, cash/in kind contribution, documentation, iterative engagement with funding agencies/member states

Update
ESONET Implementation Strategies

ESONET EMSO

EMSO

- The MI are work package leaders for the business planning and legal work required to design, construct and implement a European Research Infrastructure dedicated to deep sea observation.
- Important meeting was held in Galway in November to develop the legal framework for EMSO

11-Feb-11 2

EMSO Legal Work

ERIC - European Research Infrastructure Consortium

- is a legal form created by the EU in order to facilitate the creation and operation of research infrastructures.
- is a European legal form, governed by EU Law and not by national laws.
- has a legal personality in all EU Member States without individual state ratification

Advantages of an ERIC

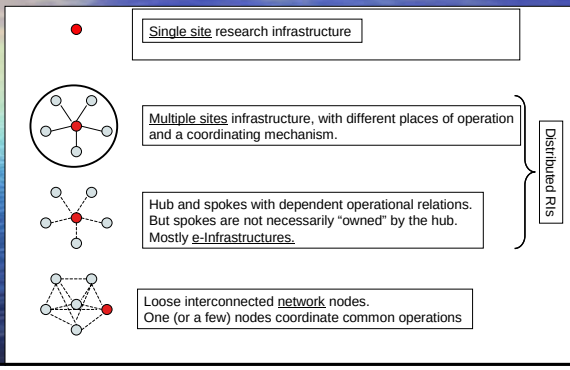
- An ERIC enjoys a single personality on a European level.
- An ERIC enjoys tax exemptions and flexible procurement rules.
- An ERIC engages Ministries, Funding Agencies and Research Organisations.
- An ERIC underlines the European dimension of the research

11-Feb-11 4

Political Dimension of the ERIC

- An ERIC has a political dimension.
- This political dimension has its advantages: The Governments participate and provide the necessary funds…
- but… Governments make the application for the establishment of an ERIC. This means that they have the right to change any of the proposals made by the preparatory project, or they can delay the establishment of an ERIC
- Not all MS are “comfortable” with the new legal entity and it is impacting on the establishment of a number of RIs

Operational models



EMSO requirements for an ERIC

Some partner requirements when drafting the ERIC statutes should include that:

1. it does not become an overly complex or burdensome legal framework,
2. there is limited liability for partners. For example a partner investing in one EMSO site does not open that partner to the full liability of all EMSO sites,
3. in-kind contributions versus direct financial investments and associated voting rights are addressed,
4. partners investing in one or more sites have control over decisions made at those sites,
5. the issue of "ownership" of assets when investing in a site is discussed and assessed. For example, if an agency or Member State invests in a site can they retain ownership of the assets rather than transferring them to the EMSO ERIC?

11-Feb-11 7

EC requirements for an ERIC

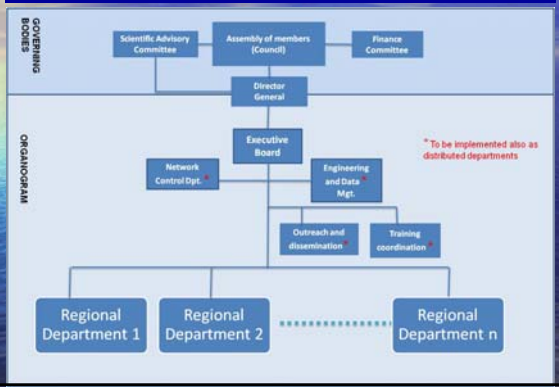
- Politically it will be extremely important to develop an EMSO ERIC by the end of 2011, with 3 Member States or associated Countries – push from OOI for collaboration
- Phased implementation seems to be favoured by a significant number of partners and the EC – start with a small project office and build on that
- Coordinating body rather than one which owns considerable assets
- Develop something that MS can sign up to

Tasks of the ERIC

- EMSO-ERIC main tasks:
  - Define the scientific strategy
  - Ensure open access
  - Ensure compliance with quality standards
  - Coordinate the scientific evaluation of experiments proposed by users
  - Manage, store and disseminate collected data
  - Education and Outreach (Advocacy)
  - Interoperability aspects

11-Feb-11 9

Governance Structure



Bodies

- Assembly of Members – The highest decision-making body. AoM delegates the day-to-day responsibility to the executive bodies: Director General & the Executive Board
- Director General – Includes a coordination office with support staff for admin and finance tasks
- Executive Board – Heads of the Regional Departments
- Regional Departments – in charge of the day to day operations of the Regional nodes
- Scientific Advisory Board - It is an advisory body, to provide recommendations on the general scientific strategy of the RI and review and rank the experiments proposed by the users. The users community will be represented in order to cover all the disciplines through appropriate representation of ESONET-VISO.

Advantages of Proposed Structure

- Ownership of Assets remains with the Member States – facilities are offered as "benefit in kind" contribution to the ERIC
- Smaller overhead for ERIC office in early stages
- ERIC offer "value added" activities to each partner and to the EMSO ERIC as a whole
- Cash and in-kind contributions currently being assessed. Other RIs are based on a 10% cash and 90% benefit in kind contribution

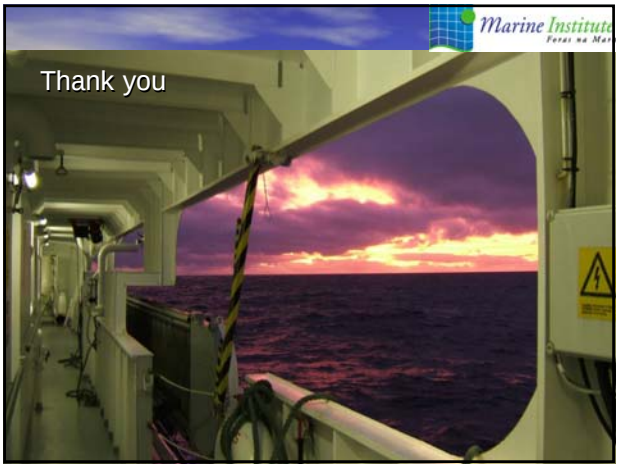
Next Steps

- Agreement from EMSO partners and related initiatives on the governance structure and precise tasks of the ERIC
- Cost the value added activities and the EMSO ERIC coordinating office for first five years of construction
- Develop a funding model based on cash and in-kind contributions
- Look at Membership costs based on Full and Observer members
- As statutes are developing, engage with funding agencies

Outlook

- Made a lot of progress over the last number of years
- Next step is for integration
- Scientists have demonstrated an interest in developing deep sea observatories from the Arctic through to the Marmara
- Funding will be awarded in some cases in 2011
- Only question remaining is whether observatories will be implemented as part of a European venture

11-Feb-11 14



4.4.7 WP6: Socio-economic users

Presented by B. Barata (FFCUL)

The presentation with a debriefing of the activities on ESONEWS letter and continued by the ESONET Yellow pages which offers different levels of information available in these pages. The PESOS group involves fifty companies. The WP6 leader ended his talk on present and future of WP6 activities: scientific exchange needs to be continued.

4.4.8 WP9: Networking ESONET data management

Presented by R. Huber (MARUM)

The presentation is a description of the "ESONET data infrastructure" (see slides) and started with a description of the WP9 objectives task by task.

Task a results: presented on the Deliverable D9 "ESONET data management plan" and D70 "*updated data management plan"*.

Task b result: operational ESONET web portal presented in Deliverable D44 "*ESONET knowledge base*". The work done on the web portal includes an important activity on the Mock up and on the ESONET Data catalogue.

- Mock up (software design draft): presentation of the front page showing the
  - map of the site,
  - archived data

- ESONET data catalogue: collects metadata related to ESONET in 2 forms, a simple form and one more complex with more possibilities (geographic area…)
  - to choose a form depend on the metadata format
  - Visualisation of data: graphics

Task c results: operational sensor registry presented in D71 "*ESONET sensor registry*" with help of DBSCALE (Eric Delory) in WP2
A standardisation effort was drawn on sensor ML and CS-W mapping. As a result the ESONET sensor ML profiles were obtained on the EuroSites project and ESONET CS-W profiles also obtained. The entry Screen of the system was shown.

Task d results: operational SOS presented in D43 data infrastructure productive version
The standardisation efforts were put on OGC O&M observation and measurements with SOS specifications.
Results are:

- ESONET O&M profiles on EuroSites
- Open source ESONET SOS
- IFREMER SOS server
- Generic ESONET SOS portal client
- SOS data harvesting client (automatized archiving)
- Open source ESONET OGC base class for common services

ESONET TITLE

Date
City

Minutes of presentation

Participants

ESONET NOE

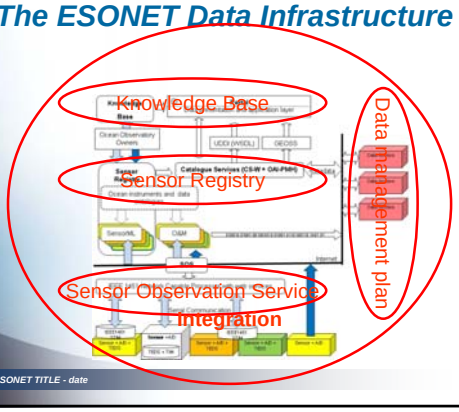
ESONET

WP 9: Networking Data Management

The ESONET Data Infrastructure

ESONET

The ESONET Data Infrastructure



ESONET TITLE - date

ESONET

Task 9a: Data management plan

(Lead: Michel Andre [UPC])

Objectives:

- Data management plan (guide) for ESONET
- Site specific documentation on data management
- Evaluation of demo mission data management

Results:

D9 ESONET data management plan
D70 Updated data management plan

ESONET TITLE - date

ESONET

Task 9b: Knowledge base

(Lead: Robert Huber [UNI-HB])

Objectives:

- General information platform and will serve data from all ESONET institutions and observatories
  - Topology of observatories
  - Sensor registry
  - Data management plan
  - Data archive
- User friendly front-end service on the ESONET website to access the ESONET data infrastructure
  - Full text search engine
  - Mapping interfaces
  - Near real time access to selected demo sites (SOS)

Results:

Operational ESONET web data portal
D44 ESONET knowledge base

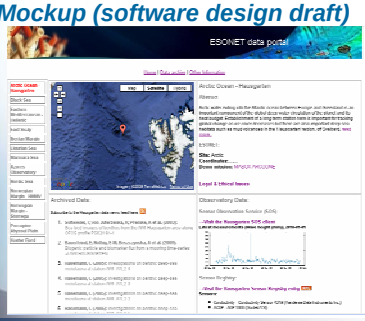
ESONET TITLE - date

ESONET

Task 9b: Knowledge base

(Lead: Robert Huber [UNI-HB])

- *Mockup (software design draft)*



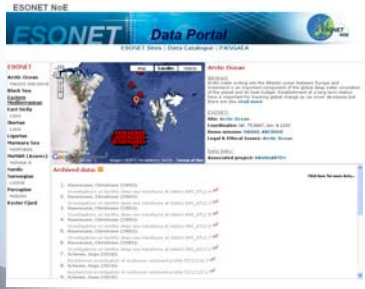
ESONET TITLE - date

ESONET

Task 9b: Knowledge base

(Lead: Robert Huber [UNI-HB])

- *ESONET Site View*



ESONET TITLE - date

Task 9b: Knowledge base

(Lead: Robert Huber [UNI-HB])

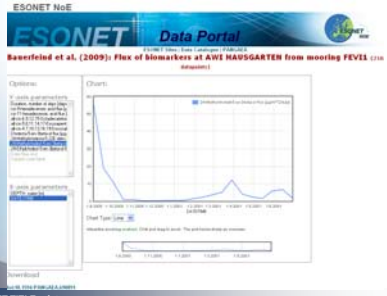
- ESONET Data Catalogue

ESONET TITLE - date

Task 9b: Knowledge base

(Lead: Robert Huber [UNI-HB])

- Data visualisation



ESONET TITLE - date

Task 9c: Data infrastructure: Sensor Registry

(Lead: Eric Delory [dbscale] -> WP2)

Objectives:

- Central catalogue of observatories and sensors
- User friendly entry interface
- Data stored in native XML database (eXist) as OGC standard SensorML (XML)
- OGC CSW (Catalogue Service) as GEOSS interface.

Results:

Operational Sensor registry

D71 ESONET sensor registry

ESONET TITLE - date

Task 9c: Data infrastructure: Sensor Registry

(Lead: Eric Delory [dbscale] -> WP2)

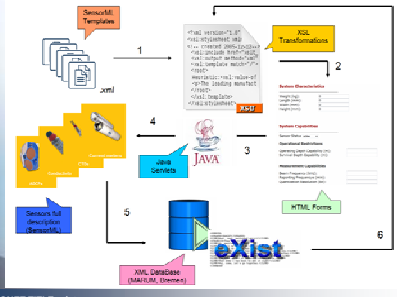
- Standardisation efforts:
  - SensorML
  - CS-W mapping (SML - common queryable elements)
- Results:
  - ESONET SensorML Profile (+EuroSites etc..)
  - ESONET CS-W
  - Open Source ESONET OGC base class for common services (for SOS and CS-W)

ESONET TITLE - date

Task 9c: Data infrastructure: Sensor Registry

(Lead: Eric Delory [dbscale] -> WP2)

- Concept



ESONET TITLE - date

Task 9c: Data infrastructure: Sensor Registry

(Lead: Eric Delory [dbscale] -> WP2)

- Entry screen

ESONET TITLE - date

Task 9c: Data infrastructure: Sensor Registry

(Lead: Eric Delory [dbscale] -> WP2)

- **Template choice**

ESONET TITLE - date

Task 9c: Data infrastructure: Sensor Registry

(Lead: Eric Delory [dbscale] -> WP2)

- **Metadata entry**

ESONET TITLE - date

Task 9c: Data infrastructure: Sensor Registry

(Lead: Eric Delory [dbscale] -> WP2)

- **CS-W** *(http://dataportals.pangaea.de/esonet/oac/client.php)*

ESONET TITLE - date

Task 9d: Data infrastructure: SOS development and implementation

(Lead: Thierry Carval [IFREMER])

Objectives:

- Sensor Observation Service (**SOS**) software as interface for sensors and retrieving sensor data.
- Provide observatories with SOS services which will be used to connect to these observatories and collect their data.
- Data wrapper tools if necessary

Results:

Operational SOS

D43 Data infrastructure productive version

ESONET TITLE - date

Task 9d: Data infrastructure: SOS development and implementation

(Lead: Thierry Carval [IFREMER])

SOS:

- Observation Service Interface Standard
- OGC (Open Geospatial Cons.) SensorWeb Enablement (SWE).
- API for managing deployed sensors and retrieving sensor data and specifically “observation” data

ESONET TITLE - date

Task 9d: Data infrastructure: SOS development and implementation

(Lead: Thierry Carval [IFREMER])

- ***Standardisation efforts:***
  - ***OGC O&M Observations and Measurements***
  - ***SOS Specifications***
- ***Results:***
  - ***ESONET O&M Profile (+EuroSites etc..)***
  - ***Open Source ESONET SOS (LIDO) server***
  - ***Ifremer SOS server***
  - ***Ifremer SOS client***
  - ***Generic ESONET SOS portal client***
  - ***SOS Data harvesting client (automatized archiving)***
  - ***Open Source ESONET OGC base class for common services (for SOS and CS-W)***

ESONET TITLE - date

Task 9d: Data infrastructure: SOS development and implementation

(Lead: Thierry Carval [IFREMER])

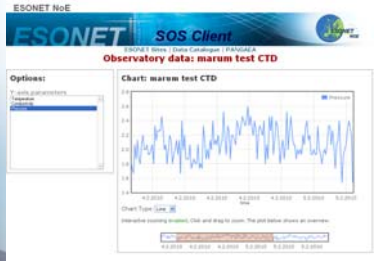
- Ifremer SOS client (PAP etc..)

ESONET TITLE - date

Task 9d: Data infrastructure: SOS development and implementation

(Lead: Thierry Carval [IFREMER])

- Generic ESONET SOS client



ESONET TITLE - date

Task 9d: Data infrastructure: SOS development and implementation

(Lead: Thierry Carval [IFREMER])

- SOS data harvesting client
  - Automatised archiving
  - Chron jobs
  - Predefined intervals
  - Uses SOS and O&M
  - PANGAEA ingest format

ESONET TITLE - date

Task 9e: Data infrastructure: Prototype Implementation

(Lead: Robert Huber [UniHB])

- Integration…

ESONET TITLE - date

4.4.9 WP8: Management activities

Partly Presented by I. Puillat (IFREMER) and by C. Desbois (IFREMER)

-Part presented by I. Puillat (IFREMER):

Meeting organisation:

- Management of the consortium: SC, General Assembly…
- WP activity meeting: Best Practices workshops, help in the organisation of the All Regions workshops, training workshop

Monitoring activity:

- coordination of the activities between WPs
- coordination with other projects
- help in writing deliverables (80 deliverables in 4 years)

Worldwide cooperation:

- IASSOO: tentative association for Sub Sea cabled observatories involving DONET, Neptune Canada, MARS, OOI…

Label ESONET in process with the Best Practices Workshop #3, Deliverable 68
A set of criteria to be applied to deep-sea observatories in order to guarantee:

- A high controlled quality level and a durable integration of the sea observatory community at European level, with generally free access to the data for users
- That standardisation and technical exchanges between operators would minimize implementation costs and operational operations.

This set of criteria will be transferred to EMSO, to implement regional ESONET-EMSO Observatories

Contract amendments and Grant agreements:

- Contract amendments: one per year and each time for DoW modification
- Grant agreements: 6 for DMs and 1for test experiment
- Consortium agreement: 1 amendment in 2010-12-

Yearly reporting

- Debriefing of the 3rd ESONET reporting: Audit certificate requests need a certain time to be performed by the expert. Anticipation is needed
- Next reporting process
  - One audit certificate per partner is compulsory!
  - Audit certificate cost MUST be paid before the 15th of April 2011 to be eligible for reimbursement as management cost, with a maximum rate of 1500 € per certificate.
  - Other eligible costs: incurred before the 1st March 2011.
  - Next reporting process DEADLINES
  - Deadlines: The reporting process will start the 17th January 2011.

Phase 1: 17 Jan. – 31 Jan. 2011: Activity Report of each Partner
Phase 2: 1 – 18 Feb. 2011: Activity Report of WP Leaders

Phase 3: 1 – 21 Mar. 2011: Financial report of each Partner
Phase 4: 21 Mar. – 10 Apr. 2011: Consolidation and correction by coordination team + other reports

- Presentation of the reporting site

-Presented by C. Desbois (IFREMER): Debriefing of the financial issues

C. Desbois reminded the usual process of fund distribution and the costs already justified since the beginning of the project and over the past 3 periods and a synthesis of the status is presented:

- 12 partners already requested 80 to 100 % of their maximum allowance
- 6 partners requested less than 80% of their allowance,
- While 11 partners requested less than 50% of theirs.

These discrepancies seem to have been justified by the amount of work done, but should be adjusted in the final period.

For this final period, all eligible costs have to be spent BEFORE the end of the period: 1 March 2011.
An audit certificate will be mandatory for ALL partners, before the 15th of April 2011.

- From period 1 to 3
  - 60 % of the total grant (7 M€) has been paid
  - Only 54 % of the estimated eligible costs (cf DoW) have been reported

- For period 4 (until the end of the project) :
  - Payment of 1 017 240, 87 € for pre-funding of the foreseen activity (decision SC Feb 2010, payment in March 2010)
  - Eligible costs still need to be incurred (DM Text Rex)
  - WHAT WE PAID TODAY:
    Payment of 80 % TGA for ALL partners
  - We KEEP ~ 10 % GARANTY FUND

ESONET WP8

ESONET General Assembly

14th Dec. 2010

WP8: coordination and management

Ingrid Puillat and the coordination team

Esonet-coordinator@ifremer.fr

1. Overview of the activities

- Meetings organization
- Activity monitoring & Deliverables
- Word wide cooperation (IASSOO)
- ESONET Label
- Contract amendment & Grant Agreements
- Yearly reporting to the EC
- Communication and Web
- Financial issues
- ESONET-EMSO web portal

2. Meetings organisation

- **Management of the consortium:**
  - SC meetings
  - General Assembly meetings (Fao: Portugal, Oct 2008) D31
- **WP activity meeting:**
  - 2 Best Practices workshops: Brest (Oct. 2009) and Marseille (this week)
  - Help in organisation of the 2 All regions workshops, and other smaller meetings
  - 2 Training workshops for the yearly reporting to the EC

3. Activity monitoring

- **Initially 8 WPs, then 9 WPs**
  - Coordination in between WPs
  - Coordination with other projects
  - Help to WP leaders, in WP's task management, in writing deliverables
- **More than 80 deliverables over 4 years**

4. Word wide cooperation

- **IASSOO, A Tentative association for sub-sea cabled observatories**

  Involving DONET, Neptune Canada, MARS (MBARI), OOI for
  - exchange of information,
  - internal call assessments
  - specific cooperation in between partners

  Deliverables: D33, D34
- **Expected later outputs:**
  - a common website
  - common communication documents
  - A rotating secretary

  But…later, after NoE's end… VISO???????????

5. ESONET Label

- A set of criterias to be applied to deep sea observatories in order to guarantee:

  - a high controlled quality level and a durable integration of the sea observatory community at European level, with generally free access to the data for users
  - that standardisation and technical exchanges between operators would minimize implementation costs and operational operations

- **This set of criterias will be transferred to EMSO, to implement regional ESONET-EMSO Observatories**

Deliverable D68, in progress

Let's discuss it on Thursday!

6. Contract amendments & Grant Agreements

- **Contract Amendments:**
  - *At least one per year for the yearly reporting*
  - *Plus for each modification of the DoW or of the general contract*
- **Grant agreements**
  - *6 demonstrations missions (2.7M€)*
  - *1 test Experiment (620 000 €)*
- **Consortium agreement**
  - *1 amendment in 2010*

Involvement of the IFREMER lawyers

7. Yearly reporting to the EC

- **First reporting process: a draft for the 3 other ones!**
  - *set up of an online system with help of Altran*

http://www.ifremer.fr/application/reporting/esonet/

  - *Update of the online system with help of Altran*
  - *constant improvement of the process*
  - *a training workshop for the reporting each year*

2011 ????? Anyone interested???

At least 9 man months per year

7. Reporting process

- **Debriefing from the 3rd process**
  - *Sent in time*
  - *Greatly improved, but.....*

Always a « but …»

We had to correct more that 70 % of the tables because additions were wrong or due to some inconsistencies between 2 tables where the same amounts should be found

Many Thanks to Cecile who get her first white hairs!

Please verify your tables twice next time!

7. Reporting Process

- **Debriefing from the 3rd process**
  - *Audit certificate requests need a certain time to be performed by the expert …*
  - *Anticipation needed*
- **Next reporting process**
  - *One audit certificate per partner compulsory!*
  - *Audit certificate cost MUST be paid before the 15th of April 2011 to be eligible for reimbursement as management cost, with a maximum rate of 1500 € per certificate.*
  - *Other eligible costs: incurred before the 1st March 2011.*

7. Reporting Process

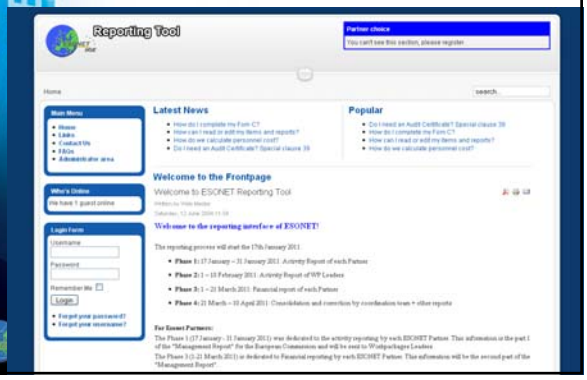
- **Next reporting process DEADLINES**

The reporting process will start the 17th January 2011.

- Phase 1: 17 Jan. – 31 Jan. 2011: Activity Report of each Partner
- Phase 2: 1 – 18 Feb. 2011: Activity Report of WP Leaders
- Phase 3: 1 – 21 Mar. 2011: Financial report of each Partner
- Phase 4: 21 Mar. – 10 Apr. 2011: Consolidation and correction by coordination team + other reports

7. Reporting Process

http://www.ifremer.fr/application/reporting/esonet/



8. Financial Issues

- *Allocated since the previous GA*
  - *2 demonstrations missions AOEM: 600 k€, MODOO: 350 k€*
  - *1 test experiment: 620 k€*
  - *Transfer of the Remaining Internal calls budget to WP budget*

8. Financial Issues

- *Budget Attribution today*

Synoptic budget 10 dec 2010

€		Allocated on categories					TOTAL grant allocated
Partner	WP	DM	Exchange Personnel	Invitation	Test Call	Coordination	
Total allocated	2 686 604	2 762 945	343 330	16 089	620 000	414 500	6 843 469
							0
WP restant	15 396						15 396
Exchange of Personnel			23 636				23 636
Faulty Partners				42 000			42 000
audit certificates						75 500	75 500
							0
Total	2 702 000	2 762 945	366 966	58 089	620 000	490 000	7 000 000

8. Financial Issues

Next topics : Christophe Desbois (IFREMER)

9. ESONET - EMSO portal

9. ESONET-EMSO portal

Thanks to my coordination colleagues in IFREMER

Véronique Le Guen

Christophe Desbois

Mathilde Le bras

and the IFREMER Communication staff

Cécile Lietard


ESONET
Thanks to….
ESONET WP leaders and their twin
WP1: Mathilde Cannat and Inmaculada Lopez Bonilla
WP2: Christoph Waldmann and Johanna Schietke
WP3: Henry Ruhl
WP4: Laura Beranzoli and Cristina Lafratta
WP5: Mick Gillooly and Fiona Grant
WP6: Jorge Miguel Miranda and Belarmino Barrata
WP7: Laurenz Thomsen and Autun Puser
WP9: Robert Huber and Michael Diepenbroek
Other Esonet Steering Committee members
N. Cagatay, P. Hall, P. Favali, J. Greinert, V. Lykousis and T. Tselepides, G. Maudire, J. Danobeitia, K. Schleisiek, J.Mienert, I.G. Priede
ESONET General Assembly -14th Dec. 2010

ESONET WP8

Financial management

ESONET General Assembly

14th Dec. 2010

Christophe DESBOIS

plan

ACTIVITY

FINANCIAL MANAGEMENT

Total Grant Allocated

2nd part/
Report on the distribution of the Community's contribution

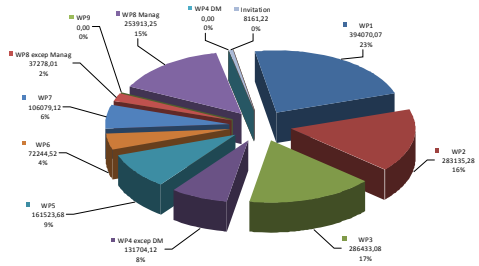
WORK PLAN → STEERING COMMITEE → Official statement of Decision → REPORTED COSTS → FUNDING

1st part /
- Reported costs (period 1 to 3)
- Summary Financial Report
- gap Requested contribution / TGA

ESONET General Assembly -14th Dec. 2010

Report P1

Eligible costs P1



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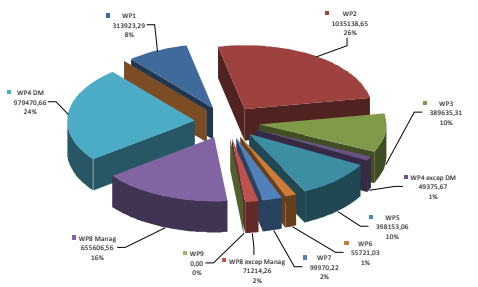
Report P2

Eligible costs P2



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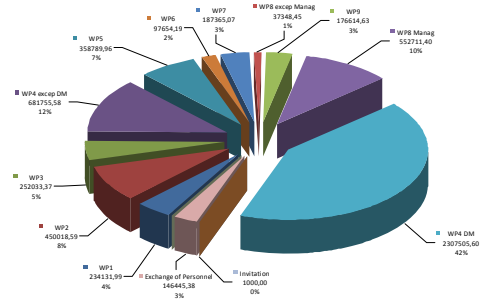
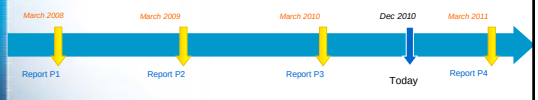
Report P3

Eligible costs P3



ESONET General Assembly -14th Dec. 2010

Reported costs (P1 to P3) : overview



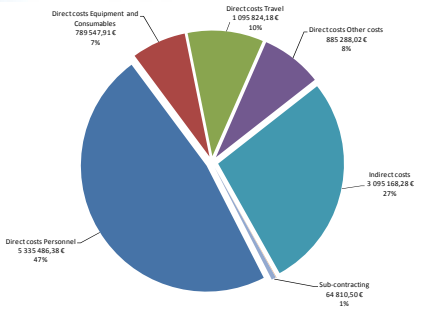
Eligible costs	1 734 542,35	4 046 309,22	5 479 471,64	11 260 323,21 €
RQ contribution	905 474,19	2 283 724,16	2 316 393,32	5 505 591,67 €

target (DoW) : 20.8 M€ — 54%

target : 7 M€ — 78%

ESONET General Assembly -14th Dec. 2010

Eligible costs (P1 to P3) by type of expenses



Today's situation :

Requested contribution / total grant allocated (%)

27 partners already requested more than their maximum allowance,

12 already requested 80 to 100 % of their maximum allowance

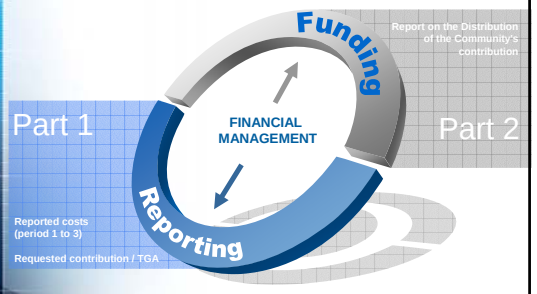
6 partners requested less than 80% of their allowance,

while 11 requested less than 50% of theirs.

These discrepancies seem to have been justified by the amount of work done, but should be adjusted in the **final period**.

For this final period, **all eligible costs** have to be spent **BEFORE** the end of the period : **1 march 2011.**

An **audit certificate** will be mandatory for ALL partners, **before the 15 th of april 2011.**



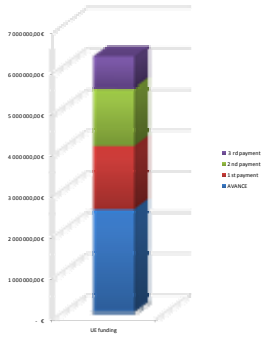
UE funding

Total grant : 7 000 000,00 €

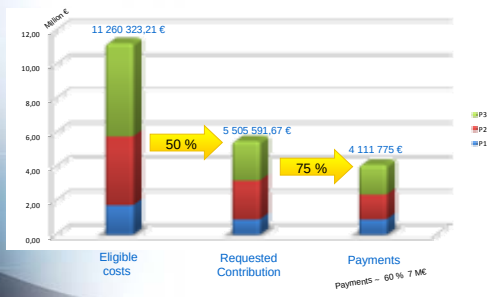
Total received : 6 247 664,27 €

received / grant : 89 %

ADVANCE	04/04/2007	2 507 500,00 €
1 st payment	06/03/2009	1 541 195,05 €
2 nd payment	09/09/2009	1 412 008,37 €
3 rd payment	06/09/2010	786 960,85 €



Financial management : period 1 to 3

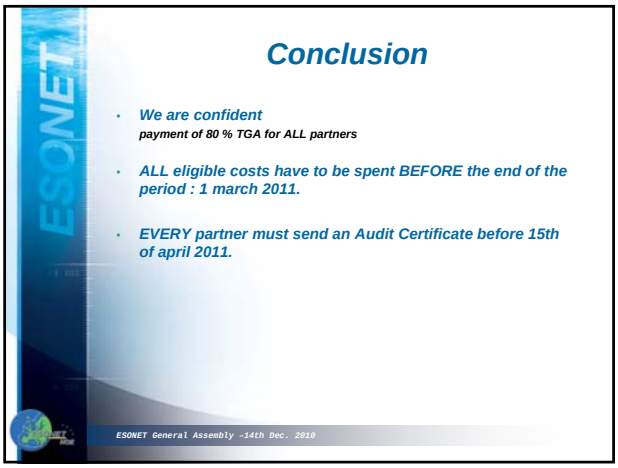


- ***From period 1 to 3***
  - ***60 % of the total grant (7 M€) has been paid***
  - ***Only 54 % of the estimated eligible costs (cf DoW) has been reported***
- ***For period 4 (until the end of the project) :***
  - ***Payment of 1 017 240,87 € for pre-funding of the foreseen activity (decision SC Feb 2010, payment in march 2010)***
  - ***Eligible costs still need to be incurred (DM Text Rex)*** ⚠

WHAT WE PAID TODAY :

payment of 80 % TGA for ALL partners

KEEP – 10 % GARANTY FUND


Conclusion
We are confident
payment of 80 % TGA for ALL partners
ALL eligible costs have to be spent BEFORE the end of the period : 1 march 2011.
EVERY partner must send an Audit Certificate before 15th of april 2011.
ESONET General Assembly -14th Dec. 2010

4.5 Debriefing of the main presentations and discussions on Wednesday 15 Dec. 2010

The Wednesday intended to be a show day, to put forward the work carried on each ESONET site in the frame of the Demonstration missions, test experiment, and to communicate a several levels with different public targets for outreach and education. Most of the presented work was performed in WP4 and WP7. In addition two outreach movies were presented and a poster session was organised. Posters can be downloaded from the ESONET gallery of the website and movies can be visualized from the same gallery.

4.5.1 WP4: Demonstration missions (DMs)

4.5.1.1 Presentation by Laura Beranzoli

Scientific and technological areas of the call have been decided in close interaction with the WP3. DMs show an evidence of the ESONET community maturity.
About more than 40 partners are involved in DMs
2 calls:

- 1st call: LIDO, MOMAR-D, MARMARA-DM and LOOME
- 2nd call: AOEM and MODOO

A rapid presentation of each DM (localisation, PI, objectives…) was shown.
L. Beranzoli underlined that in the subsequent months the DMs will be completed. The completion of all Deliverables is needed before end of February 2011 in order to prepare the final report.

L. Beranzoli reminded that the presentation of DMs at the EGU in 2011 is expected.

DM PIs presented the activities on the sites. The presentations are included in one block after the following debriefing.

4.5.1.2 AOEM – Presented by I. Wright and S. Standven (NERSC)

MASOX part: Presented by I. Wright (NOCS)
Scientific objectives:

Observing of hydrate dissociation on the seafloor
Measures of methane concentrations in the water column
Study the dissociation of gas hydrate
Impact on the atmosphere
Study the volume of gas available in the seafloor (mechanism of release…)

Initial deployment of the lander took place in Oct. 2010 at 389 m
This demonstration uses biogeochemical sensors (dissolved oxygen…) and other sensors listed on the slide. This is a minimum 2 years deployment to monitor rates and processes of Arctic methane dissociation.

AOEM future: in 2012 landers will be linked with a fibre optic cable. TheSIOS infrastructure collaborating with EMSO will hopefully ensure a permanent monitoring.

ARCOONE part: by Stein Sandven (NERSC)
Observations under the ice are needed. Different solutions are under development.
This is an acoustic observatory network is addressed to acoustic tomography or acoustic thermometry (for 2 years).

4.5.1.3 Norwegian case – Presented by Bénédicte Ferré (UiT)

The Norwegian activities are federated in two approaches: NOON the Norwegian Ocean Observatory Network and COSMOS: Cabled ObServatory for MOnitoring (svalbard/hausgarten site).

The NOON Consortium: UiT, UiB, UiO, UniResearch, CMR, IMR, SINTEF, with cooperation of Statoil for target sites & finances

NOON Objectives:

- Develop the next generation in marine science technology for a permanent interactive presence in the ocean.
- Global climate change will impact the physical, biological and biogeochemical characteristics of ocean environments along the Nordic and Arctic margin modifying their functions in an unknown way.
- Develop a national strategy in collaboration with an international research infrastructure.

NOON has a partnership with USA on ocean and climate monitoring.
A NOON/COSMOS roadmap until 2016 is presented (see slides)

4.5.1.4 LOOME – Presented by Dirk de Beer

On the Hakon Mosby mud volcano there are 3 kinds of habitats for which long term observation was missing.

With the LOOME DM we get a record of temperature during 1 year: a big variation of temperature was observed: eruption probably?

A 1st deployment was done in August 2009 with recovery on Sept 2010. The first results obtained are presented including what worked and what did not work. Then the LOOME movie is shown.

4.5.1.5 MOMAR-D – Presented by Pierre-Marie Sarradin

The MOMARSAT cruise (MOMAR-DM cruise) is presented: 2 weeks on the R/V "Pourquoi pas?" with use of the ROV 6000 in October 2010.
The first results were presented.
Perspectives: recovery in summer 2011, redeployment in 2011 expected.
List of technical point to be improved was also presented.

4.5.1.6 MODOO – Presented by Johannes Karstensen

The DM runs from May 2009 to September 2010

There are 2 nodes for MODOO:

- Porcupine node PAP
- Azores node MOMAR-D

Objectives are presented then preparation, installation and data flux. It is a joint installation of 2 European projects: ESONET and EuroSites
The expected work on the 2 sites is explained

- Porcupine: future expeditions with NOCS in summer 2011
- Azores: cruise in August 2010, 2 moorings/AUV survey and CTD station survey, install DCD nodes in mooring

Results: MODOO system design is complete
German ministry of science and education has supported an extended network of MODOO components: MoLAB which will be led by Olaf Pfannkuche.
For future test glass spheres will be avoided on BOBO lander.

4.5.1.7 LIDO

LIDO Iberian – Presented by Belarmino Barata

M. Barata presented the achievements of the LIDO-DM on the Iberian site for 2 periods of 1 year monitoring of geo-hazards and marine mammals.
In the framework of the Portuguese strategy the sea research is a priority of governance.
The activities are in continuity with the NEAREST EC project with use the GEOSTAR observatory linked to a surface buoy by acoustics and then by satellite.

LIDO Sicily – Presented by Michel André

M. André reminded the LIDO Sicily objectives: geohazards and bioacoustics.
The LIDO integration at the Catania Test site is presented as well the Sicily infrastructure
A focus is given on the LIDO mammal acoustics website.

4.5.1.8 Hellenic node – Presented by Vasilios Lykousis

The thematic is geo-hazards, climate change, bioacoustics (sperm whales) and biodiversity. The available infrastructure on POSEIDON at 1600m depth, the NESTOR onshore station, the data flow are presented as well with some examples of data output.
After ESONET: 2010-2013 a new POSEIDON version will be prepared in the frame of the POSEIDON III project (new fiber optic cable is planned at 48m: 2012-2013)

4.5.1.9 MARMARA-DM – Presented by Louis Géli

The Marmara Sea DM is related to

- fluid flow in connection with the seismic activity
- biodiversity

L. Géli presented the marine operations in Marmara Sea in 2009 and 2010 using French. Italian and Turkish vessels for the deployment and recovery sensor packages (OBSs and piezometers) and seafloor modules (SN-4 and BOB).

During this survey some gas bubbles were detected with the BOB module and a map was obtained. The BOB deployed in 2008 to detect bubbles shown a discontinuity in the gas emission.

The most significant achievements are:

- long time series of geophysical and geochemical measurements were collected
- 3 sites for continuous and long-term monitoring were selected
- A draft design for a permanent observatory and sensors were identified
- Costs estimated and included in a proposal for the Turkish government (MARDEP proposal)
- An other proposal was submitted to the European Commission (MARQUAKE)

4.5.2 Test Experiments

4.5.2.1 ANTARES – Presented by Christian Tamburini

The Antares infrastructure includes twelve lines at 2400m on the neutrino telescope.
Other scientific activities include the study of the bioluminescence at the ANTARES site, but also biochemistry, oceanography, microbial ecology… , seismology (1st site with a seismograph connected to a junction box)
On one line there is a video monitoring camera, an O_2 optode sensor, an hydrophone, a IODA system…
Sometimes, monitoring shows a correlation between bioluminescence and current.
In the frame of the test experiment the secondary junction box was deployed for associated sciences. A generic instrumentation package is connected to this junction box (MII system) as well as a seismometer and an extension through an acoustic modem.

The presentation then focused on the multi-instrumented mooring line to be deployed soon and will communicate through this modem.

4.5.2.2 OBSEA – Presented by Michel André

Presentation of the OBSEA objectives: a one-node cabled seafloor observatory with extensions. The infrastructure is described.
The work protocol includes several interfaces with smart sensors principles.

4.5.2.3 NEMO-SN1 – Presented by Paolo Favali

2 cruises are presented:

- One off Catania at 2100 m for bioluminescence and current

- One off Capo Passero at 3500 m

Use of the PEGASO ROV is foreseen. Details are given in the presentation.

4.5.2.4 KoljoFjord – Presented by Anders Tengberg

Presentation of the objectives of the test experiments on this site which is easy to access because it is not located in deep sea:
Test observatory for advanced environmental monitoring systems

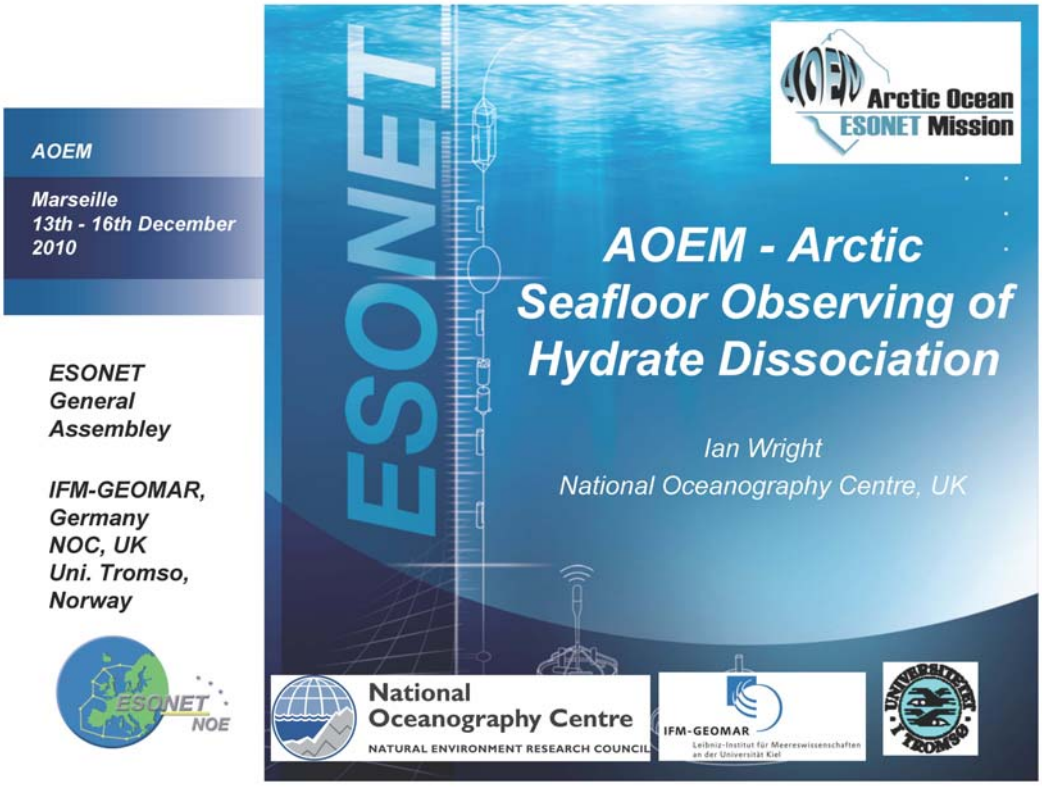
- Easy access
- Easy exchange of nodes
- High flexibility
- High quality assurance through monthly monitoring data
- Infrastructure and software being standard commercially available

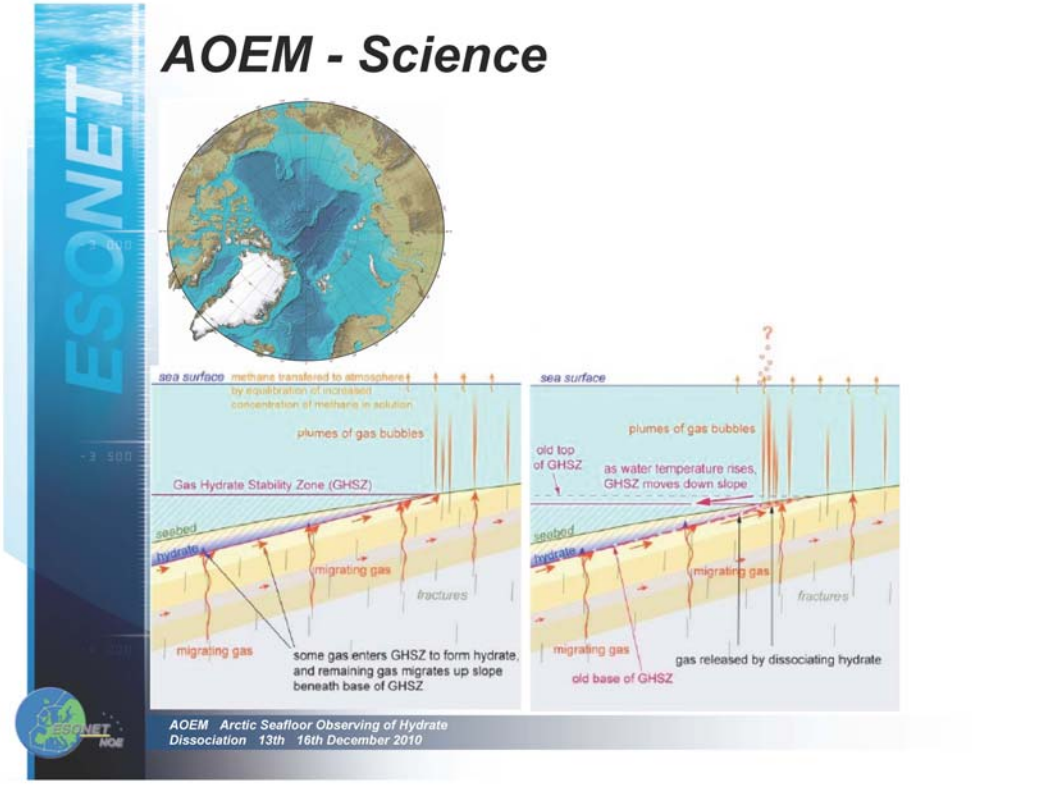
The Quality assurance is helped by several items:

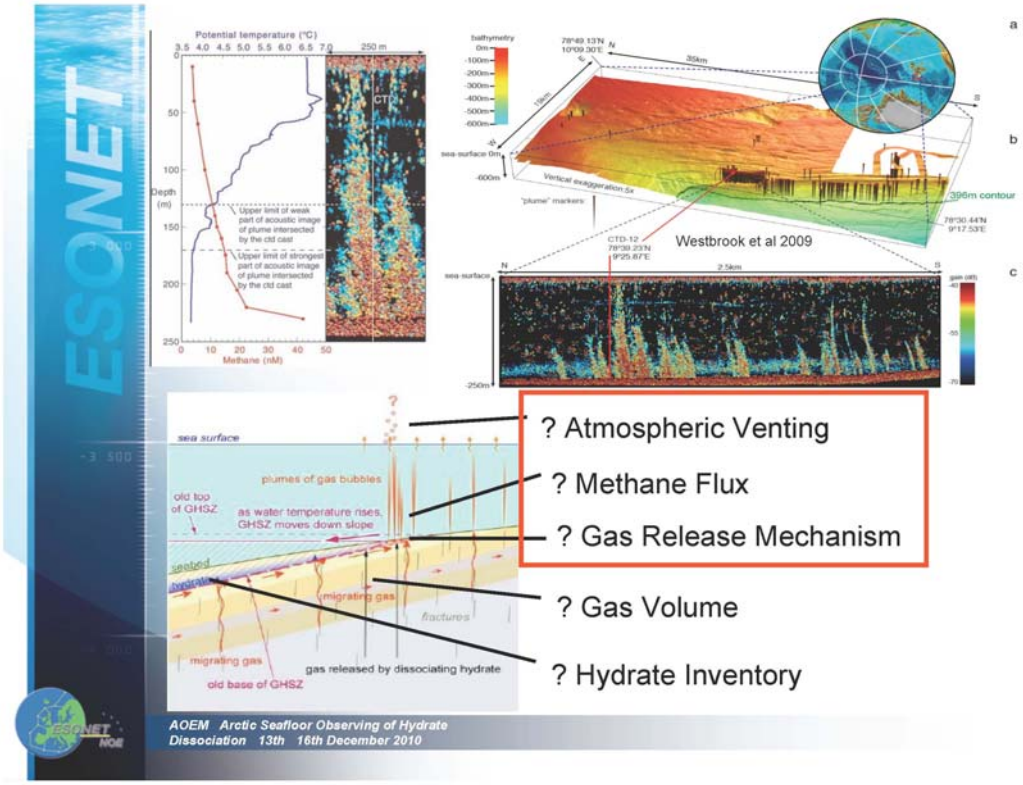
- the Swedish Meteorological and Hydrological Institute (SMHI) is doing monthly sampling in the Koljöfjord
- data available about 1 month after sampling on the Internet. Data exists since 1934.

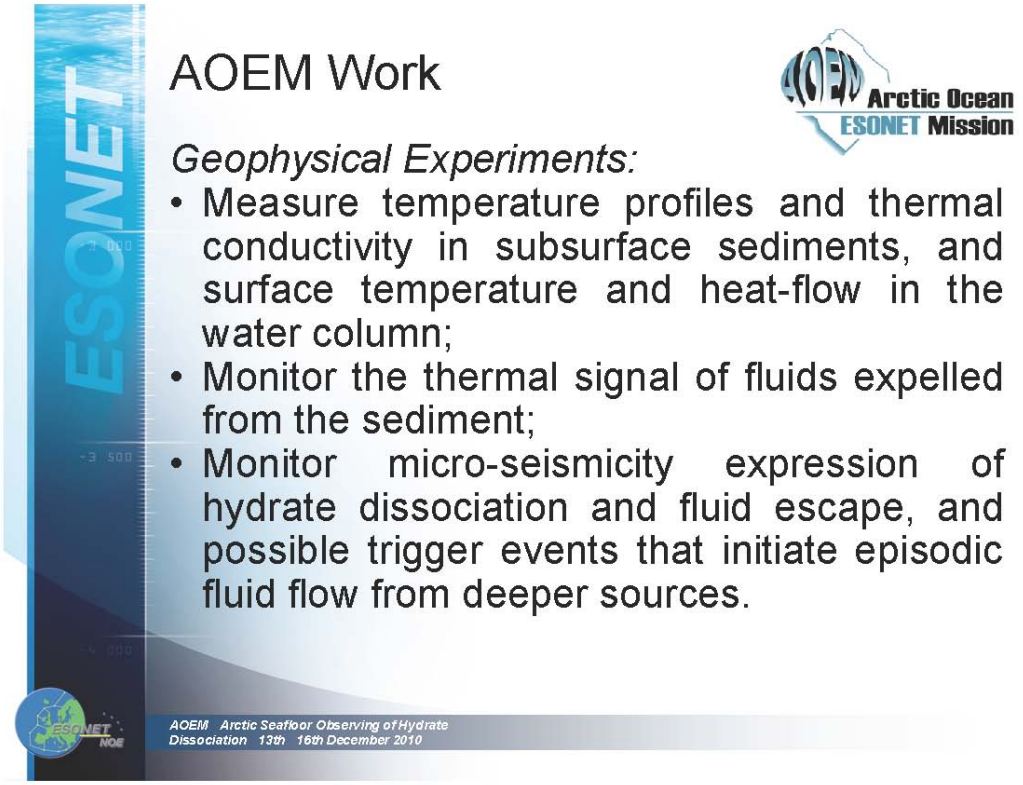
The measured parameters are: Temp, Sal, O2, pH, H2S, Nutrients, Chl etc.
The data management is managed with MARUM. Several examples of outputs are given.

The deployment is planned at end of January 2011.


AOEM
Marseille
13th - 16th December
2010
ESONET
General
Assembley
IFM-GEOMAR,
Germany
NOC, UK
Uni. Tromso,
Norway
ESONET
NOE
ESONET
Arctic Ocean
ESONET Mission
AOEM - Arctic
Seafloor Observing of
Hydrate Dissociation
Ian Wright
National Oceanography Centre, UK
National
Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL
IFM-GEOMAR
UNIVERSITETET I TROMSØ


AOEM - Science
ESONET
sea surface
methane transfered to atmosphere by equilibration of increased concentration of methane in solution
plumes of gas bubbles
Gas Hydrate Stability Zone (GHSZ)
seabed
hydrate
migrating gas
fractures
migrating gas
some gas enters GHSZ to form hydrate, and remaining gas migrates up slope beneath base of GHSZ
sea surface
plumes of gas bubbles
old top of GHSZ
as water temperature rises, GHSZ moves down slope
seabed
hydrate
migrating gas
fractures
migrating gas
gas released by dissociating hydrate
old base of GHSZ
ESONET
NOE
AOEM Arctic Seafloor Observing of Hydrate Dissociation 13th 16th December 2010


Potential temperature (°C)
Depth (m)
Methane (nM)
Upper limit of weak part of acoustic image of plume intersected by the ctd cast
Upper limit of strongest part of acoustic image of plume intersected by the ctd cast
bathymetry
"plume" markers
Vertical exaggeration 5x
396m contour
Westbrook et al 2009
sea surface
plumes of gas bubbles
old top of GHSZ
as water temperature rises, GHSZ moves down slope
seabed
migrating gas
fractures
migrating gas
gas released by dissociating hydrate
old base of GHSZ
? Atmospheric Venting
? Methane Flux
? Gas Release Mechanism
? Gas Volume
? Hydrate Inventory
AOEM Arctic Seafloor Observing of Hydrate Dissociation 13th 16th December 2010

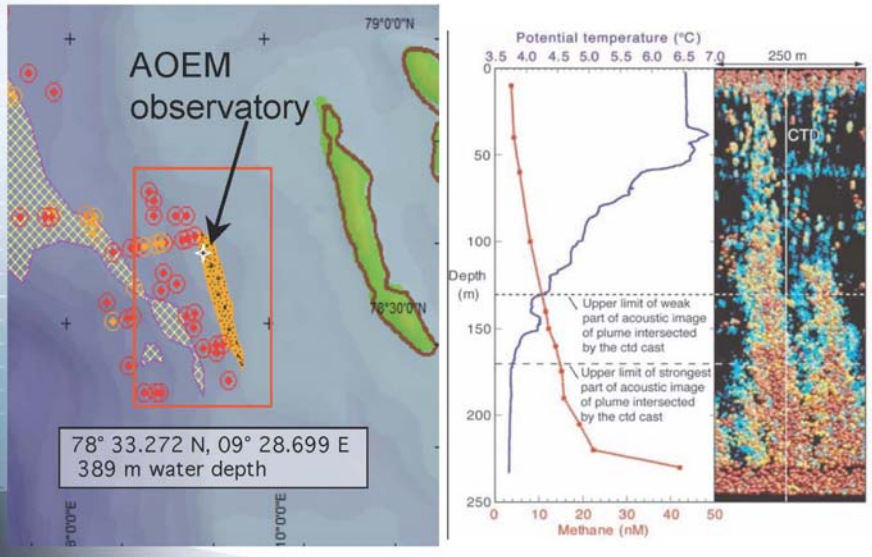

AOEM Work
Arctic Ocean
ESONET Mission
Geophysical Experiments:
• Measure temperature profiles and thermal conductivity in subsurface sediments, and surface temperature and heat-flow in the water column;
• Monitor the thermal signal of fluids expelled from the sediment;
• Monitor micro-seismicity expression of hydrate dissociation and fluid escape, and possible trigger events that initiate episodic fluid flow from deeper sources.
AOEM Arctic Seafloor Observing of Hydrate Dissociation 13th 16th December 2010

Gechemical Experiments:

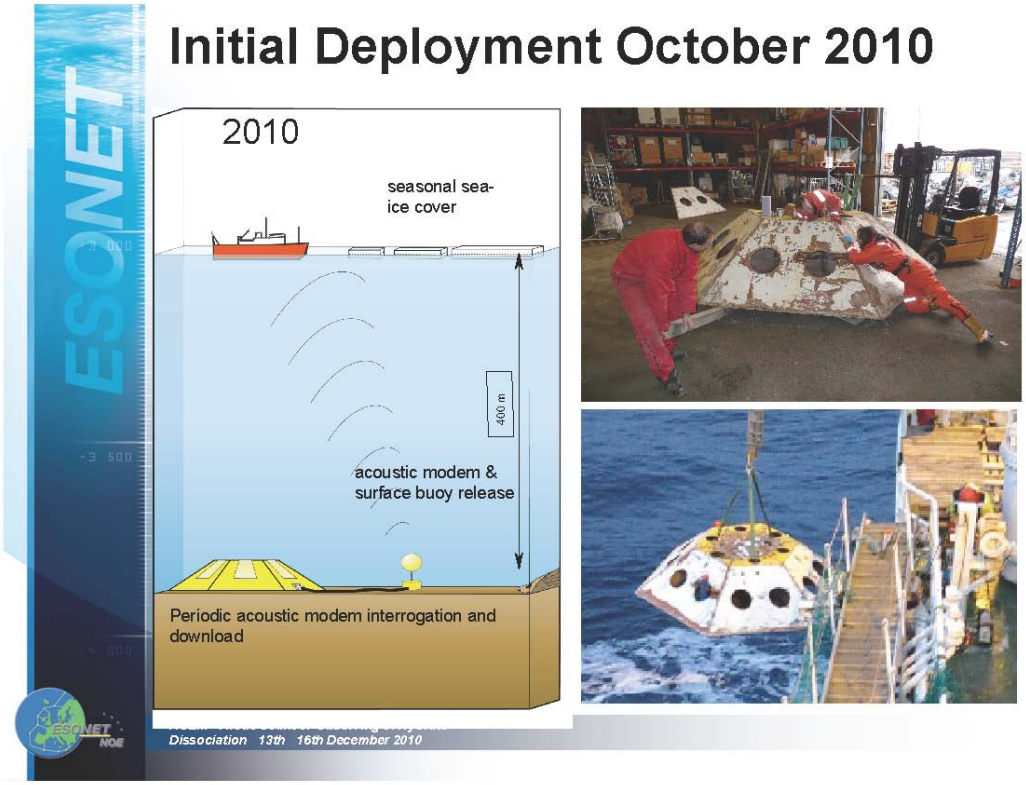
- Assess whether methane comes from just dissociating gas hydrate, or includes deeper (thermogenic) source;
- Quantify how much methane is chemically transformed via redox and anaerobic oxidation reactions;
- Biogeochemical sensors (e.g., dissolved oxygen, and Eh sensors) integrated with bubble measurements to determine geochemical fluxes across seafloor-sediment interface.

AOEM Arctic Seafloor Observing of Hydrate Dissociation 13th 16th December 2010

Initial Deployment October 2010



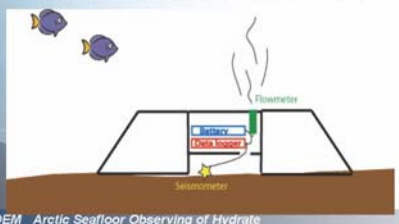
AOEM Arctic Seafloor Observing of Hydrate Dissociation 13th 16th December 2010


Initial Deployment October 2010
2010
seasonal sea-ice cover
400 m
acoustic modem & surface buoy release
Periodic acoustic modem interrogation and download
Dissociation 13th 16th December 2010


AOEM Arctic Seafloor Observing of Hydrate
Dissociation 13th 16th December 2010

AOEM Sensors

- K/MT Seismometer (4.5-200 Hz)
- HTI-04 Hydrophone;
- SENS Geolon-MLS data logger (14 Gb);
- OceanLine Water Current Sensor HS-2X;
- Lithium battery packs;
- Aanderaa Seaguard Recording Current Meters (RCM's);
- CTD sensors including oxygen, using the fast response optodes, and turbidity;
- TriTech underwater video camera.



AOEM Arctic Seafloor Observing of Hydrate Dissociation 13th 16th December 2010

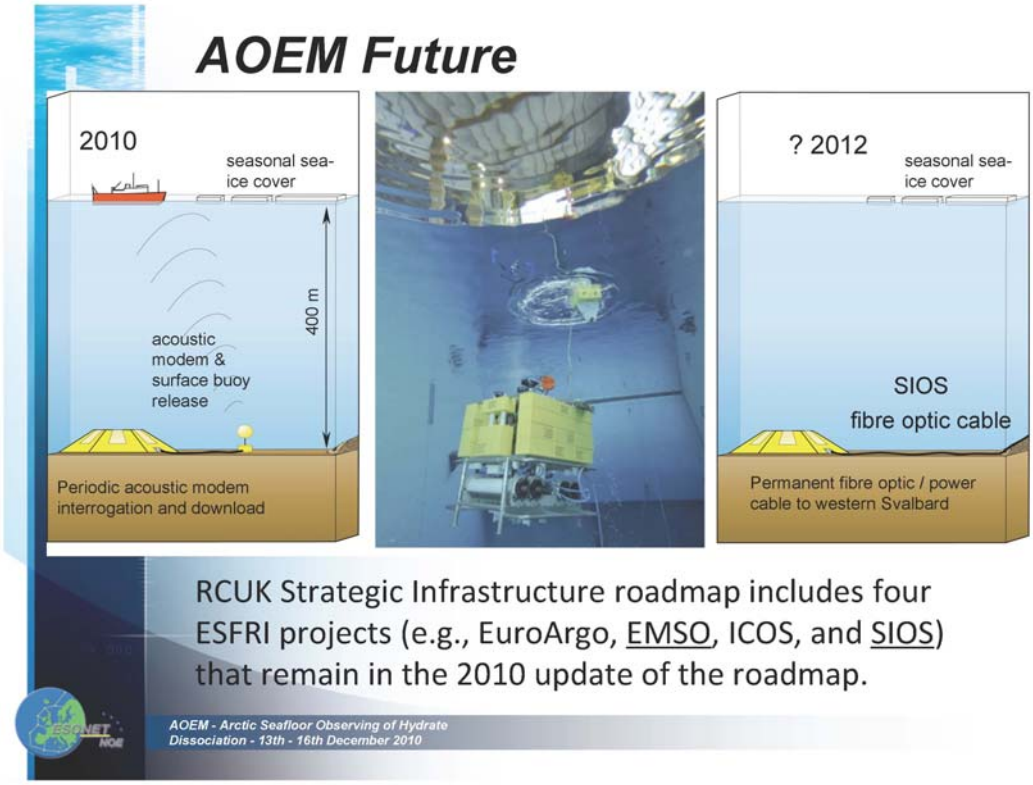
AOEM Timeline

Arctic Ocean ESONET Mission

- RV *Jan Mayen* deployed lander in October 2010
- RV *James Ross* services lander in August 2011
- RV *Merian* retrieves of lander in 2012 - but hoped for SIOS upgrade

- Minimum 2 year deployment to monitor rates and processes of Arctic methane dissociation
- Demonstration of high-latitude lander deployment in challenging setting
- Add to scientific critical mass for cabled SIOS development

AOEM - Arctic Seafloor Observing of Hydrate Dissociation - 13th - 16th December 2010


AOEM Future
2010
seasonal sea-ice cover
400 m
acoustic modem & surface buoy release
Periodic acoustic modem interrogation and download
? 2012
seasonal sea-ice cover
SIOS
fibre optic cable
Permanent fibre optic / power cable to western Svalbard
RCUK Strategic Infrastructure roadmap includes four ESFRI projects (e.g., EuroArgo, EMSO, ICOS, and SIOS) that remain in the 2010 update of the roadmap.
AOEM - Arctic Seafloor Observing of Hydrate Dissociation - 13th - 16th December 2010

NOON – Norwegian Ocean Observatory Network

NOON Consortium: UiT, UiB, UiO, UniResearch, CMR, IMR, SINTEF

Statoil cooperation for target sites & finances

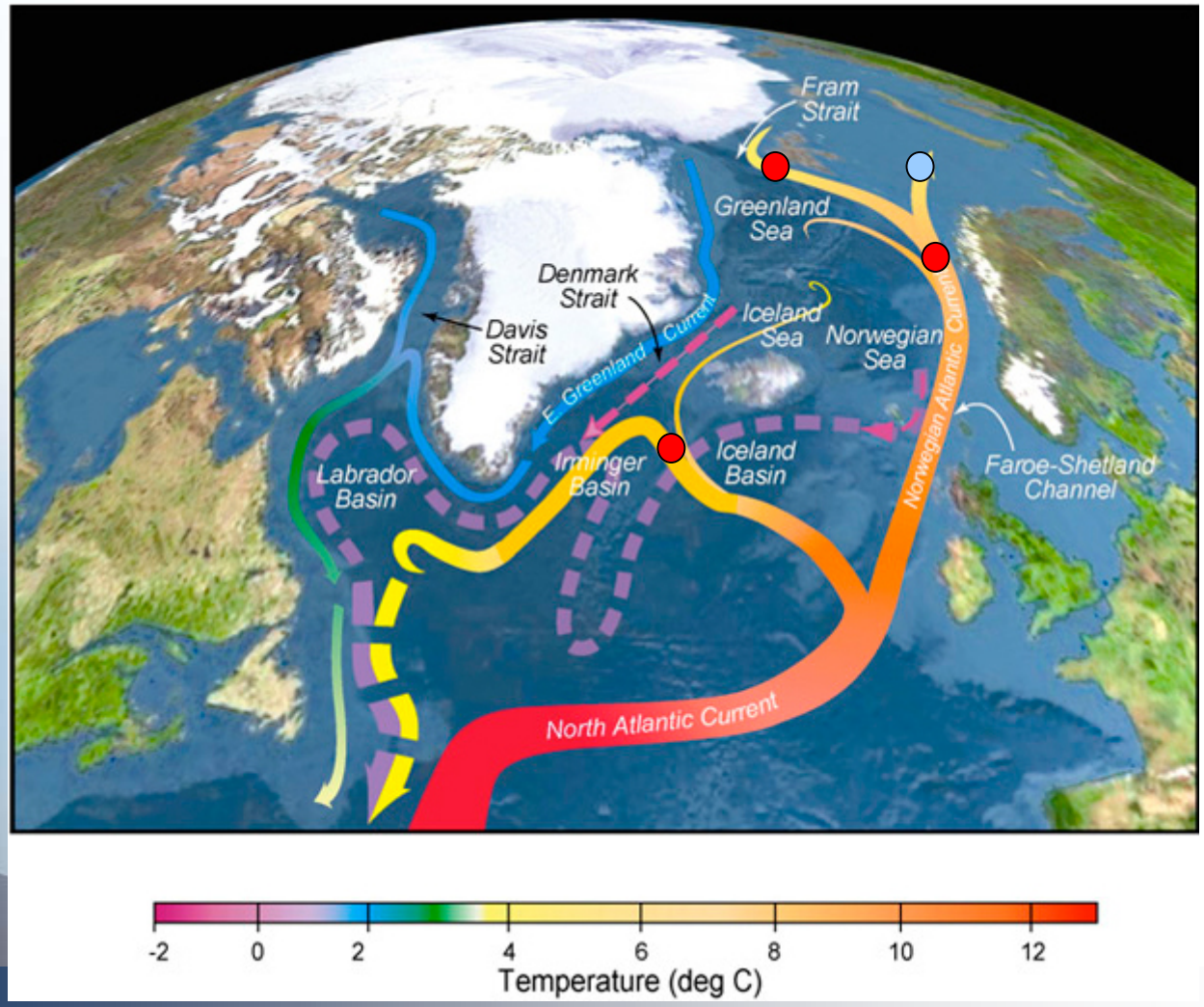
http://www.oceanobservatory.com

NOON
Norwegian Ocean Observatory Network

NOON – What do we want to achieve?

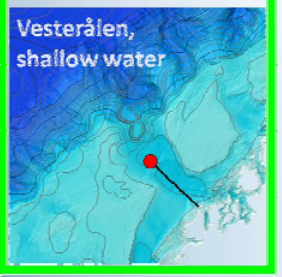
- ***Develop the next generation in marine science technology for a permanent interactive presence in the ocean.***
- ***Global climate change will impact the physical, biological and biogeochemical characteristics of ocean environments along the Nordic and Arctic margin modifying their functions in an unknown way.***
- ***Develop a national strategy in collaboration with an international research infrastructure.***

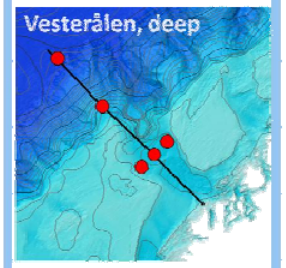
Partnership with USA - ocean and climate

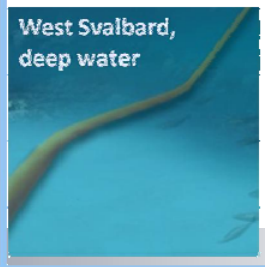


NOON/COSMOS – Roadmap

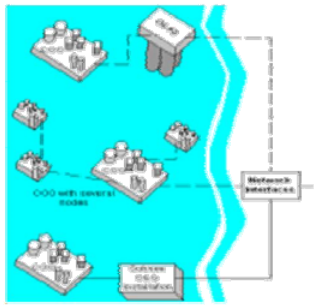
2010-2011 | 2013 | 2016 | Towards Ocean Management

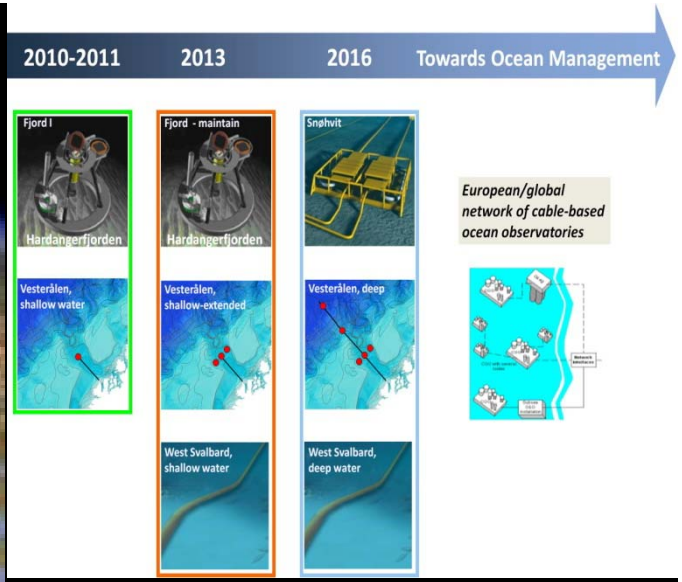






European/global network of cable-based ocean observatories





2010-2011:

-Hardanger Fjord

-Vesterålen

2013:

- Vesterålen extension

- Svalbard Shelf

2016:

- Snøhvit

- Vesterålen Deep

- Svalbard Deep

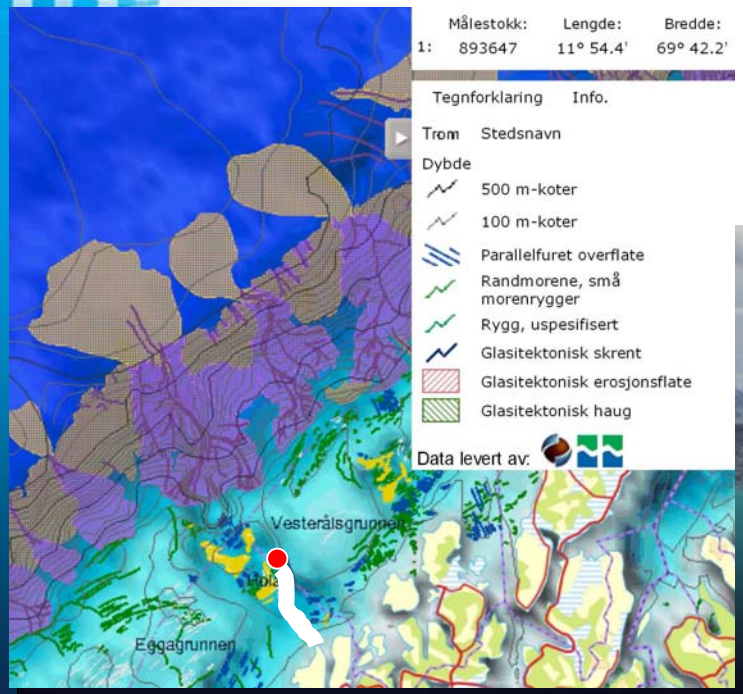
-Ocean ridge connection

Pilot mission I: Hardangerfjord

Aims:

- Training
- Technology testing for offshore site
- Research
  - Fjord biological and physical dynamics
  - Exploration of mesopelagic fish
  - Microbial mat generation and colonization of large organic falls
  - Transport and fate of sediment and associated pollutant

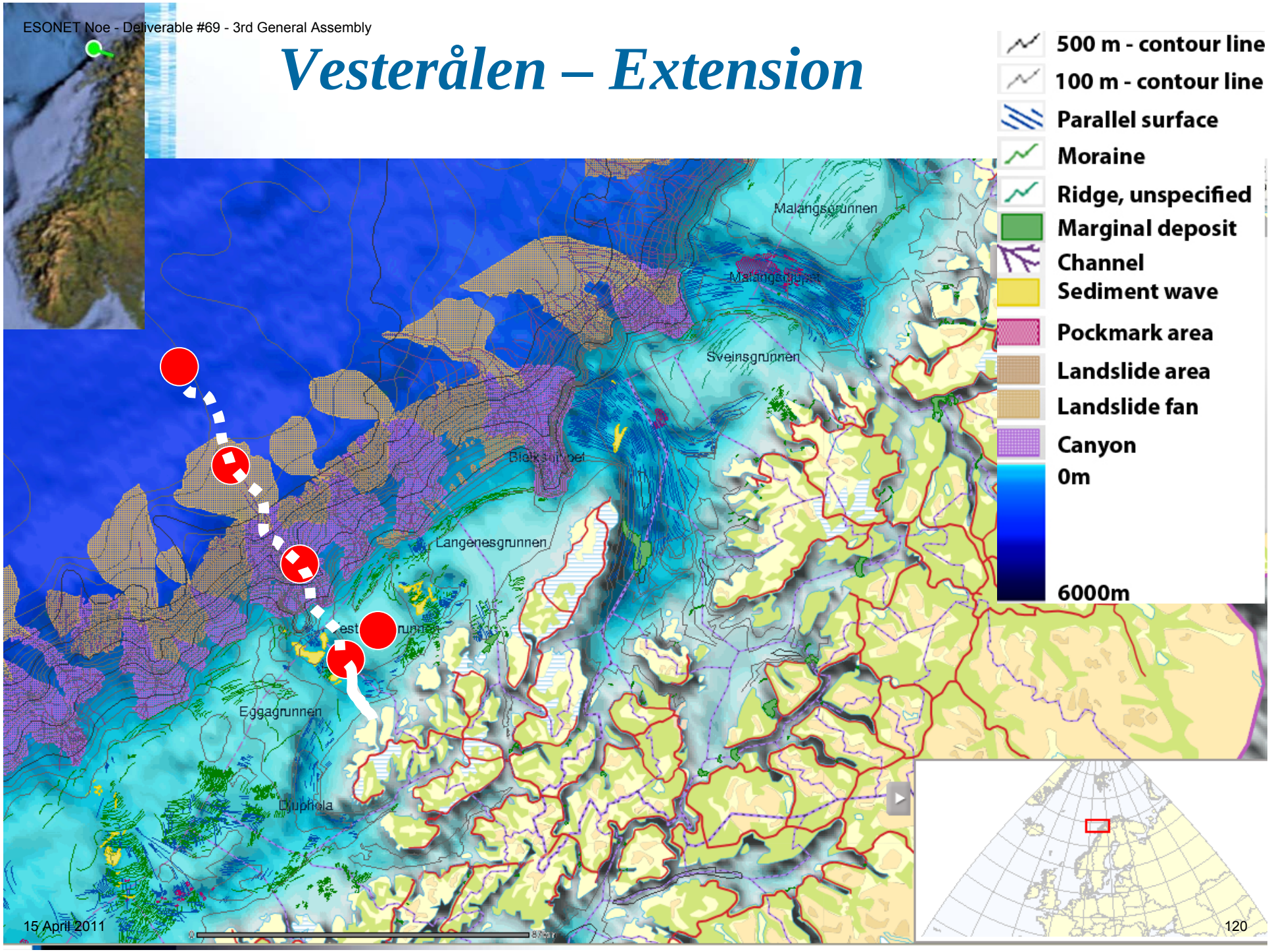
Vesterålen



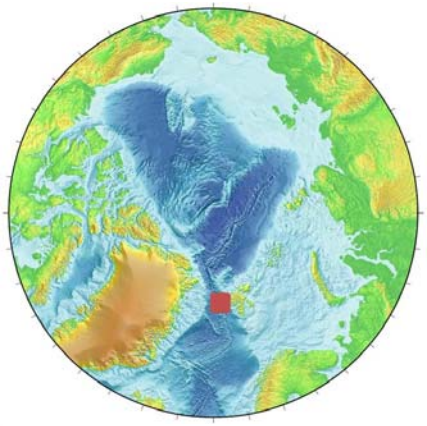
Source: Institute of Marine Research

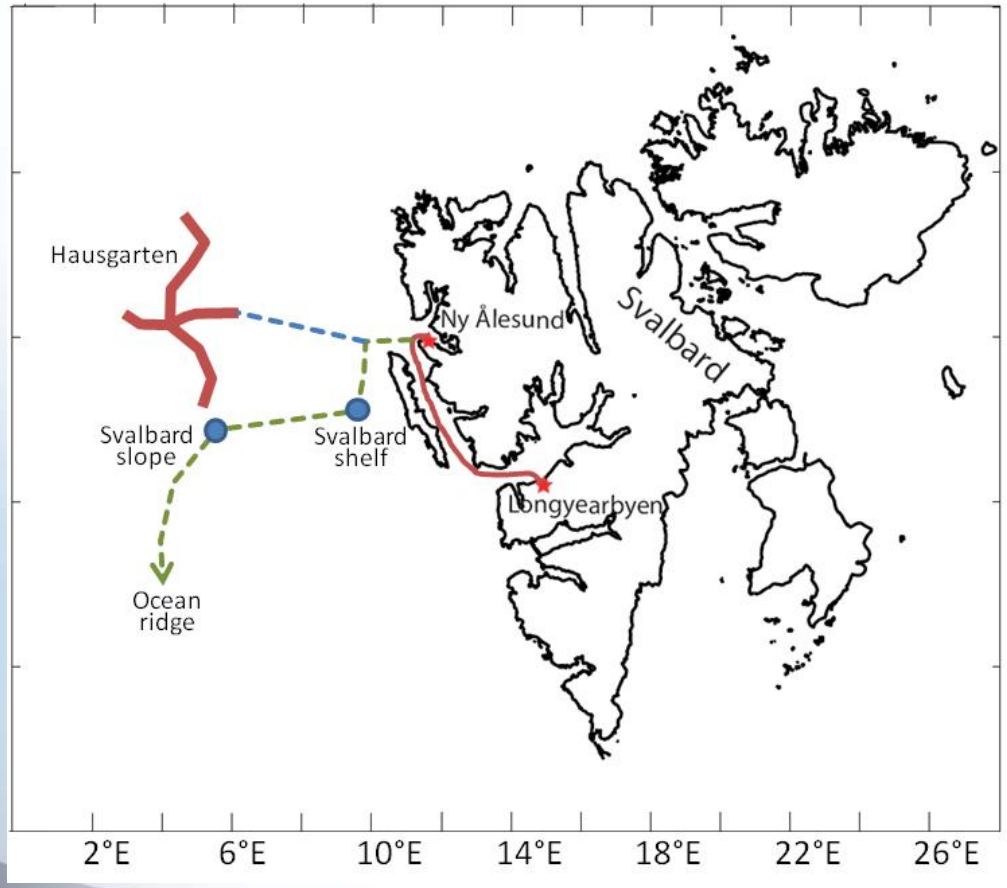
- Oceanography and Climate: flow toward the Arctic, CO2 uptake and acidification, bottom boundary layer physics, sediment transport
- Geohazard: earthquake, sediment slides, magnetic storms
- Geobiology: Methane seepage, sediment transport
- Biodiversity: macro- and microbial diversity, biological processes
- Marine biology/fishery: fish migration, juvenile drift, biological processes

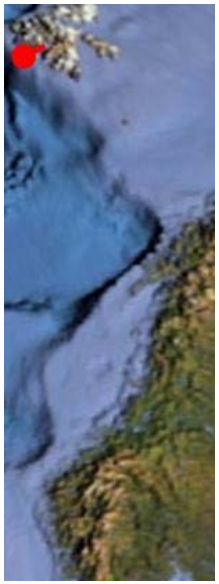
Vesterålen – Extension



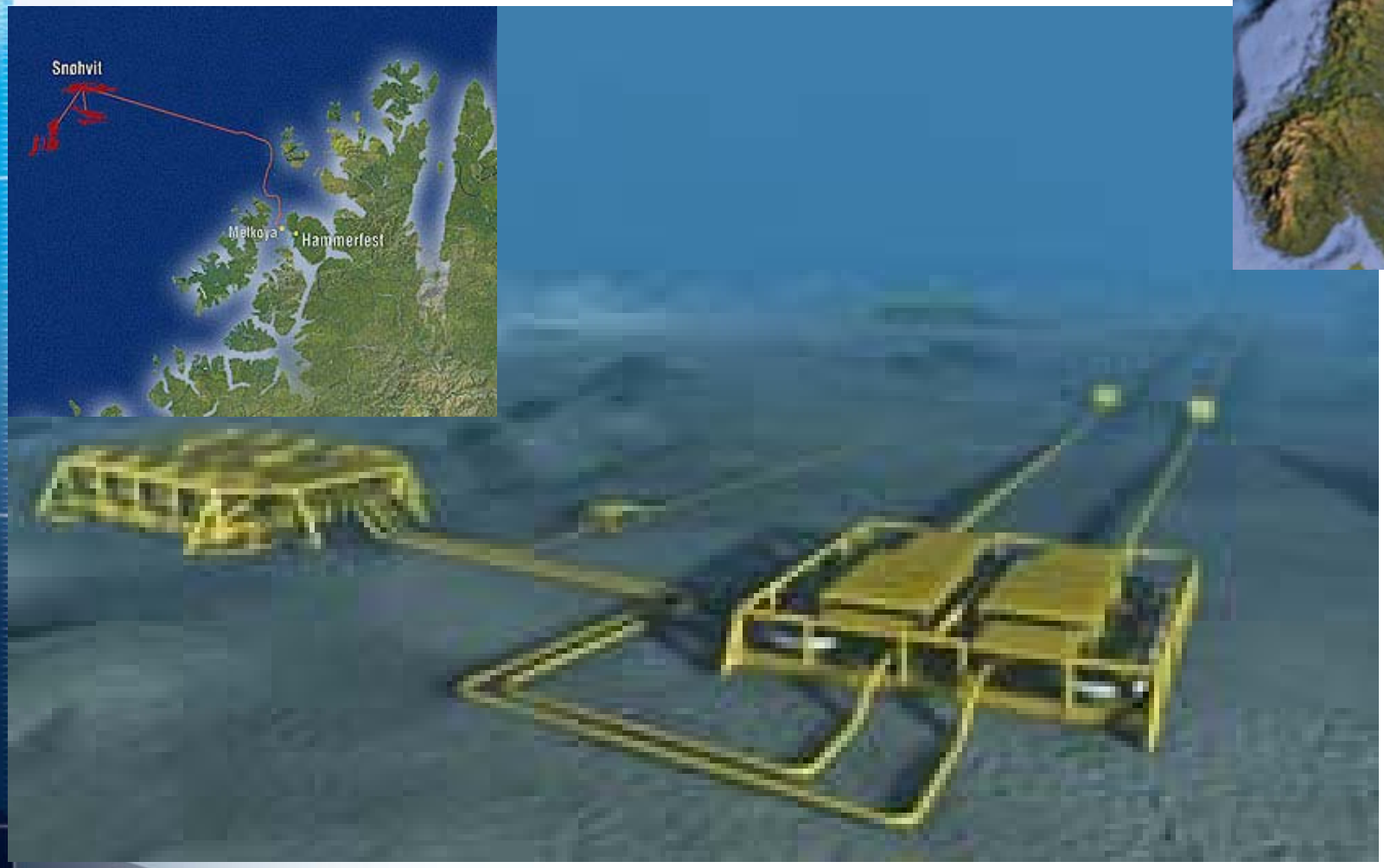
Svalbard




Hausgarten
Ny Ålesund
Svalbard
Svalbard slope
Svalbard shelf
Longyearbyen
Ocean ridge
2°E
6°E
10°E
14°E
18°E
22°E
26°E



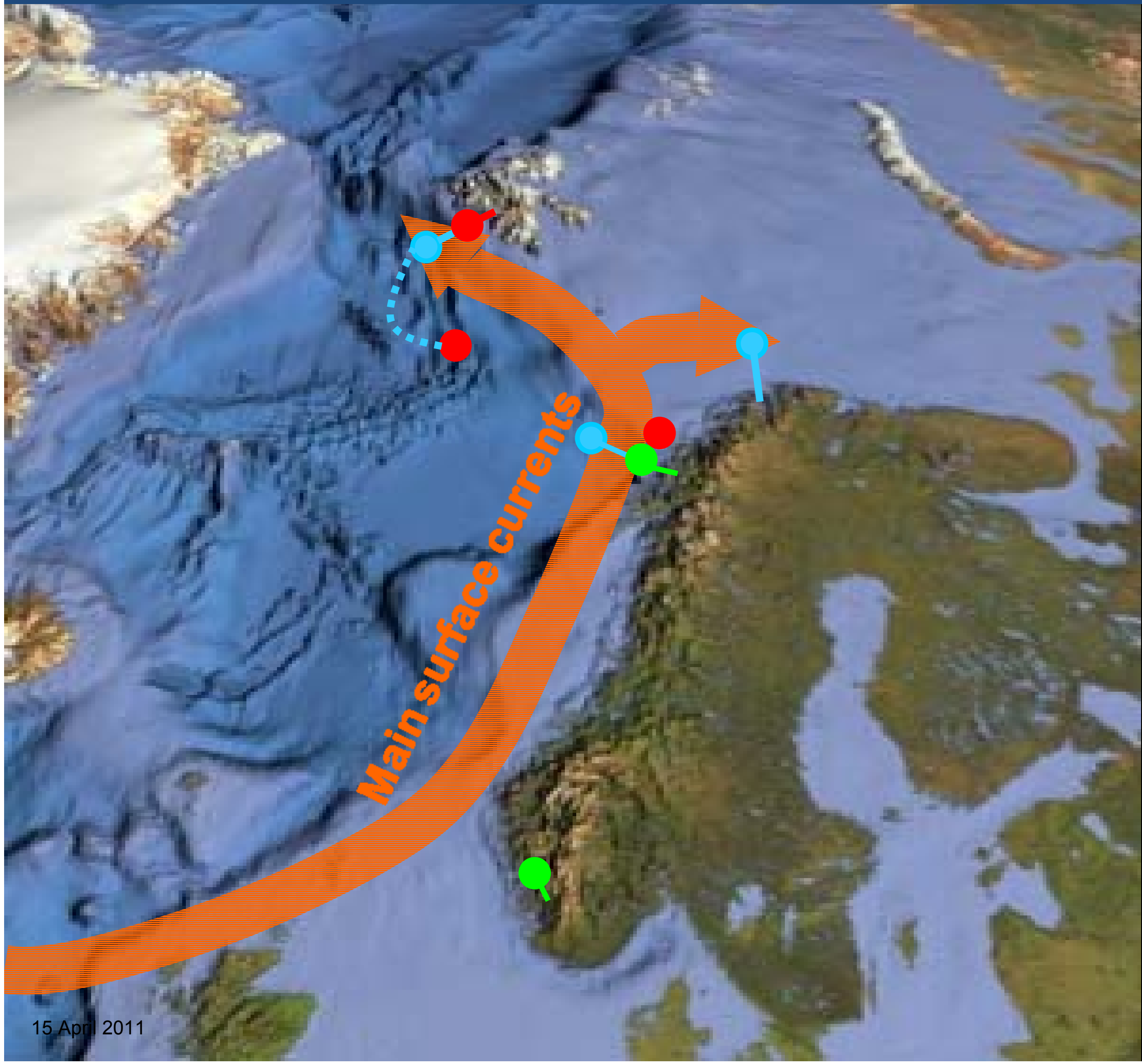
Snøhvit



→ Control over main water masses entering the Barent Sea ecosystem

→ Control over different depth regimes (shelf and deep sea)

→ Cover an ocean region of global importance and of high sensitivity to climate change



2010-2011:

-Hardanger Fjord

-Vesterålen

2013:

- Vesterålen extension

- Svalbard Shelf

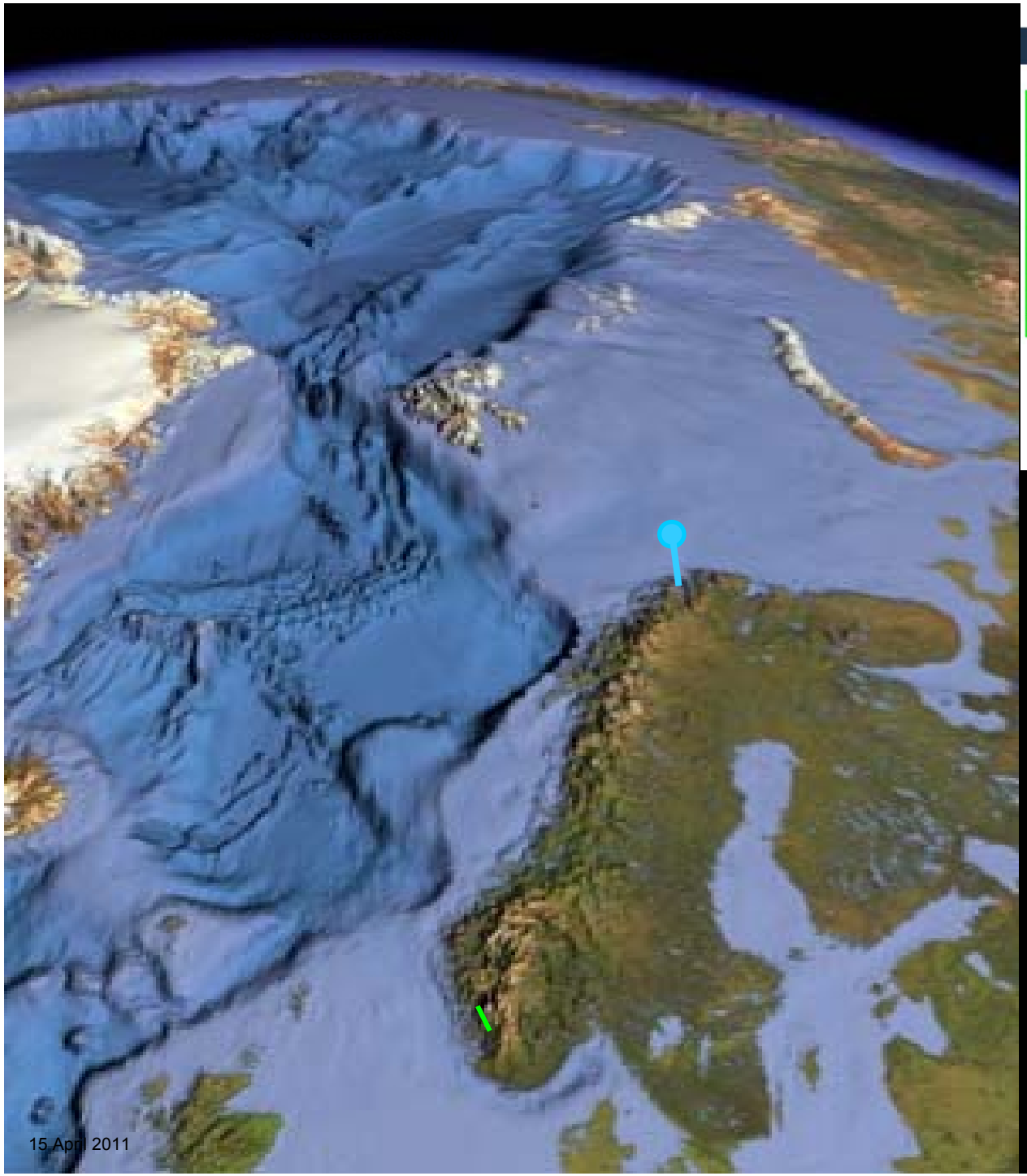
2016:

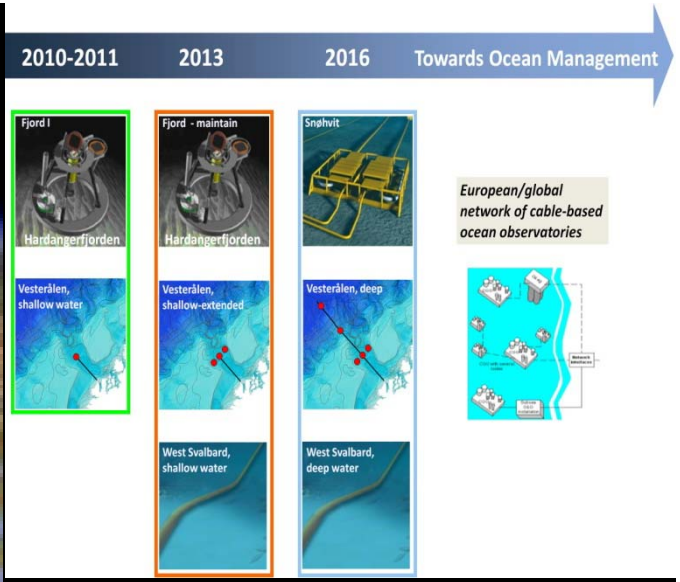
- Snøhvit

- Vesterålen Deep

- Svalbard Deep

- Ocean ridge connection





2010-2011:

-Hardanger Fjord

-Vesterålen

2016:

- Snøhvit

- Vesterålen Deep

- Svalbard Deep

- Ocean ridge connection

MoMARSAT : A first integrated observatory to monitor the dynamics of the Lucky Strike vent (eco)system

P.M. Sarradin (IFREMER), Ana Colaço (IMAR/DOP-Uaç),
M. Cannat (IPGP), J. Blandin (IFREMER),
and the MoMAR-D partners

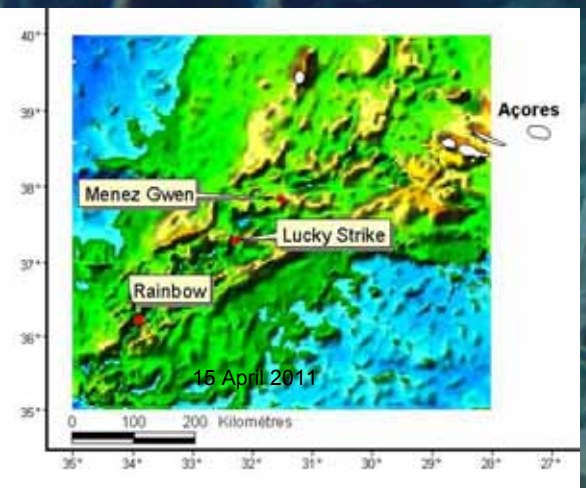
MoMAR
Long-term Monitoring of the Mid-Atlantic Ridge

Meeting MoMAR, Lisbon 1998

Ecology
Chemical fluxes

Physical oceanography
Hydrothermal activity
Chemical fluxes

Seismicity
Vertical deformation of the seafloor



To study the temporal variability of active processes such as hydrothermalism, ecosystem dynamics, volcanism, seismicity and ground deformation, in order to constrain the dynamics of mid-ocean ridge hydrothermal ecosystems.

MoMAR-D & MoMARSAT Objectives

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.

UAc-DOP
Univ. Lisb.
Centro Vulcal.

IPGP
Ifremer
LOCEAN
IUEM/UBO
OMP-LMTG
Océanopolis

Univ. Bremen
MARUM.

NOCS

The MoMARSAT cruise

Pourquoi pas / ROV Victor6000
October 2010 1 - 16

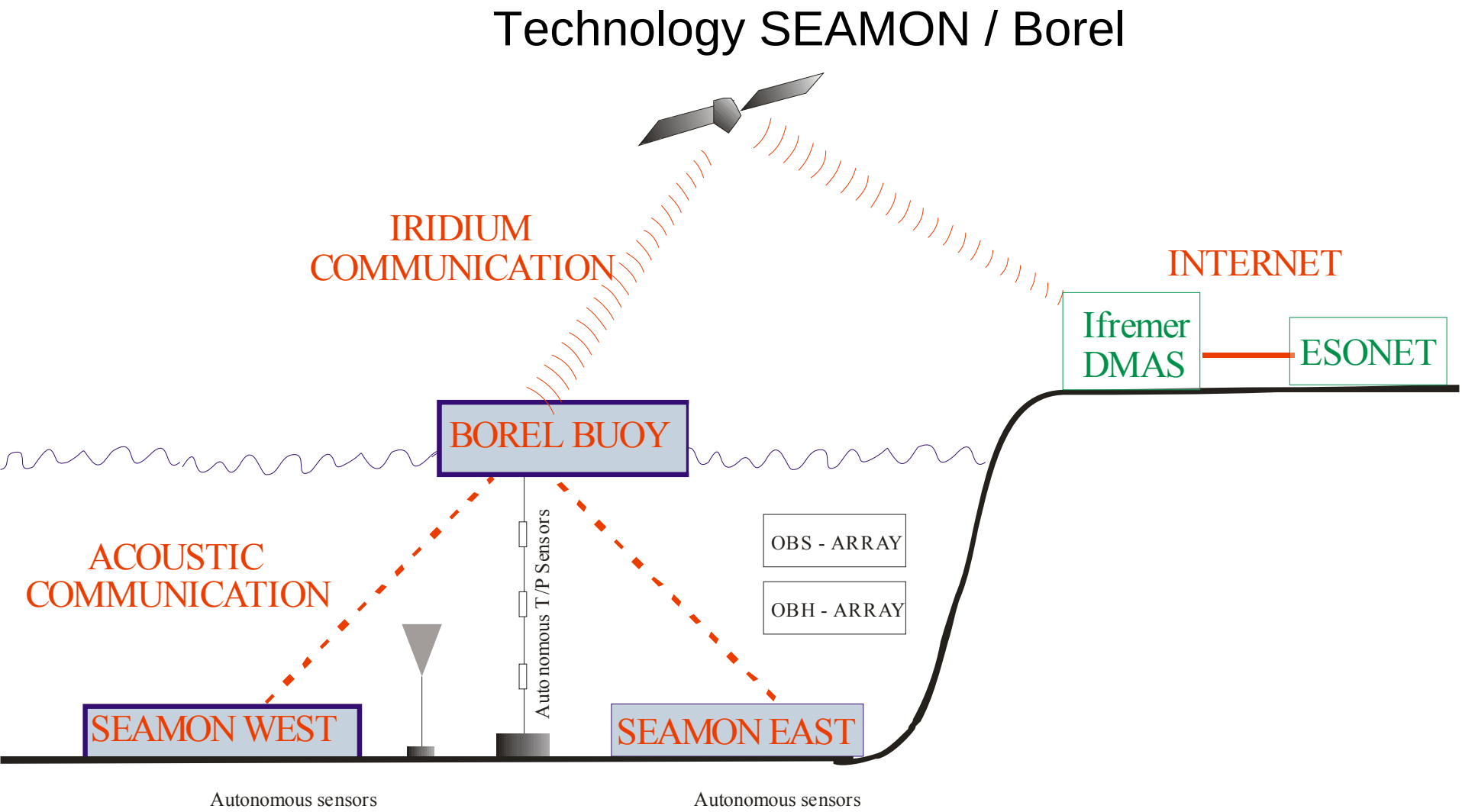
Work performed

- Mooring of 8 OBSs, 1 OBT, 1 particle trap
- Mooring of the 2 SEAMON and of the OBS-JPP module (cable)
- CTD Profiles
- Mooring of the buoy Borel
- Mooring of the physical oceanography mooring

4 Dives with the ROV Victor : 13h, 18h, 46h, 32h

- 72 h of bad weather (no dive)
- Deployment of the Nodes and Sensors
- Deployment and recovery of autonomous sensors (Bathyluck 2009 cruise)
- Sampling (Fluids, fauna, rocks)
- Colonisation experiments

The MoMARSAT Infrastructure



Geodesy (Pressure gauges JPP)
Sismicity (OBS)

Chemistry (O_2, T°C, Fe)
Ecology (Video imagery)

Deployment of the instruments

ESONET Noe - Deliverable #69 - 3rd General Assembly

Borel N 37°18.02
W 32°16.58

0 260 520 Mètres

SEAMON W

SEAMON E

Microbathymétrie
momareto
Valeur
Elevée : -1569.680054
15 April 2011
Faible : -1747.670044

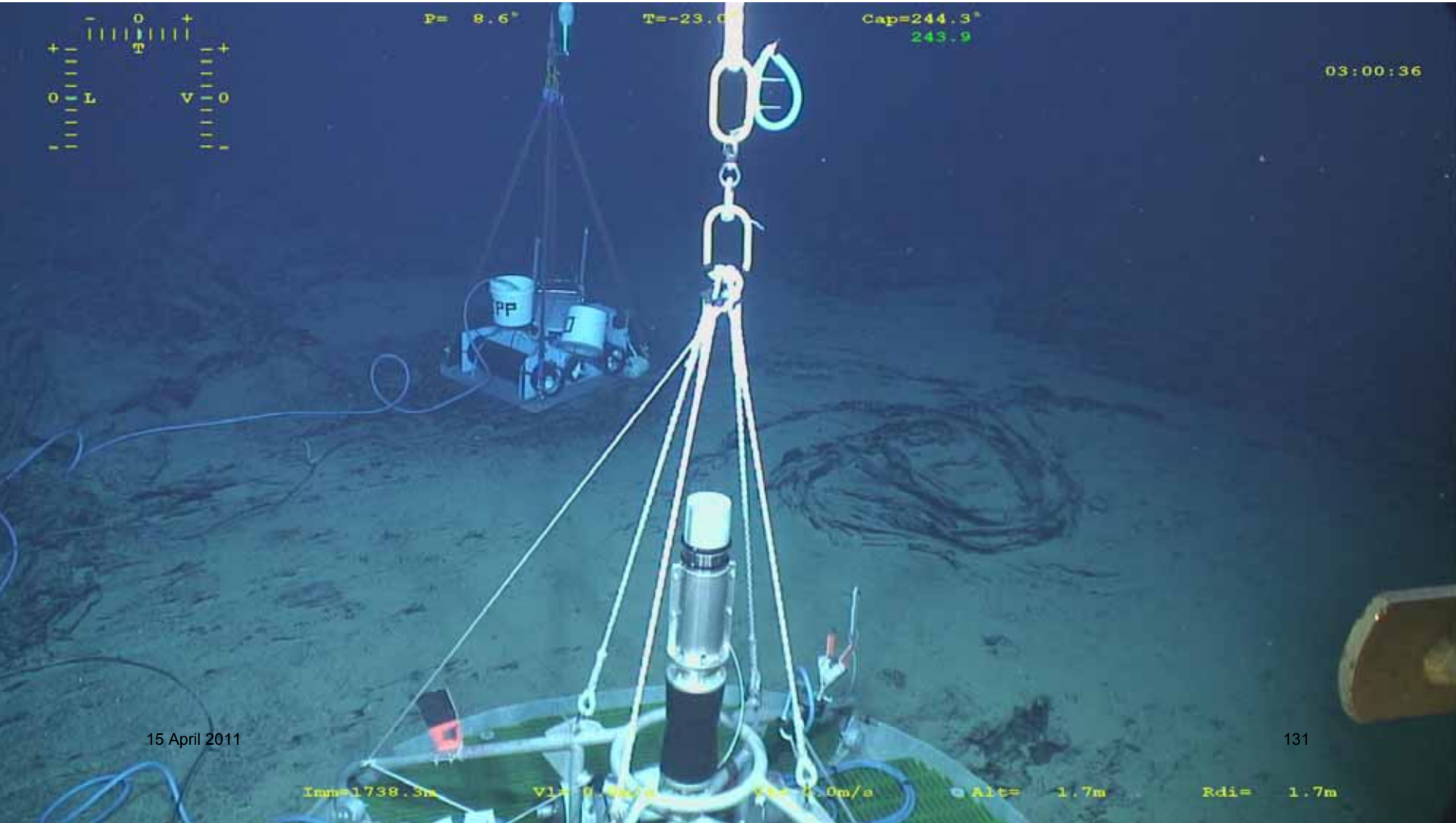
Large moorings
= Dive constraint !

130

T/Current mooring

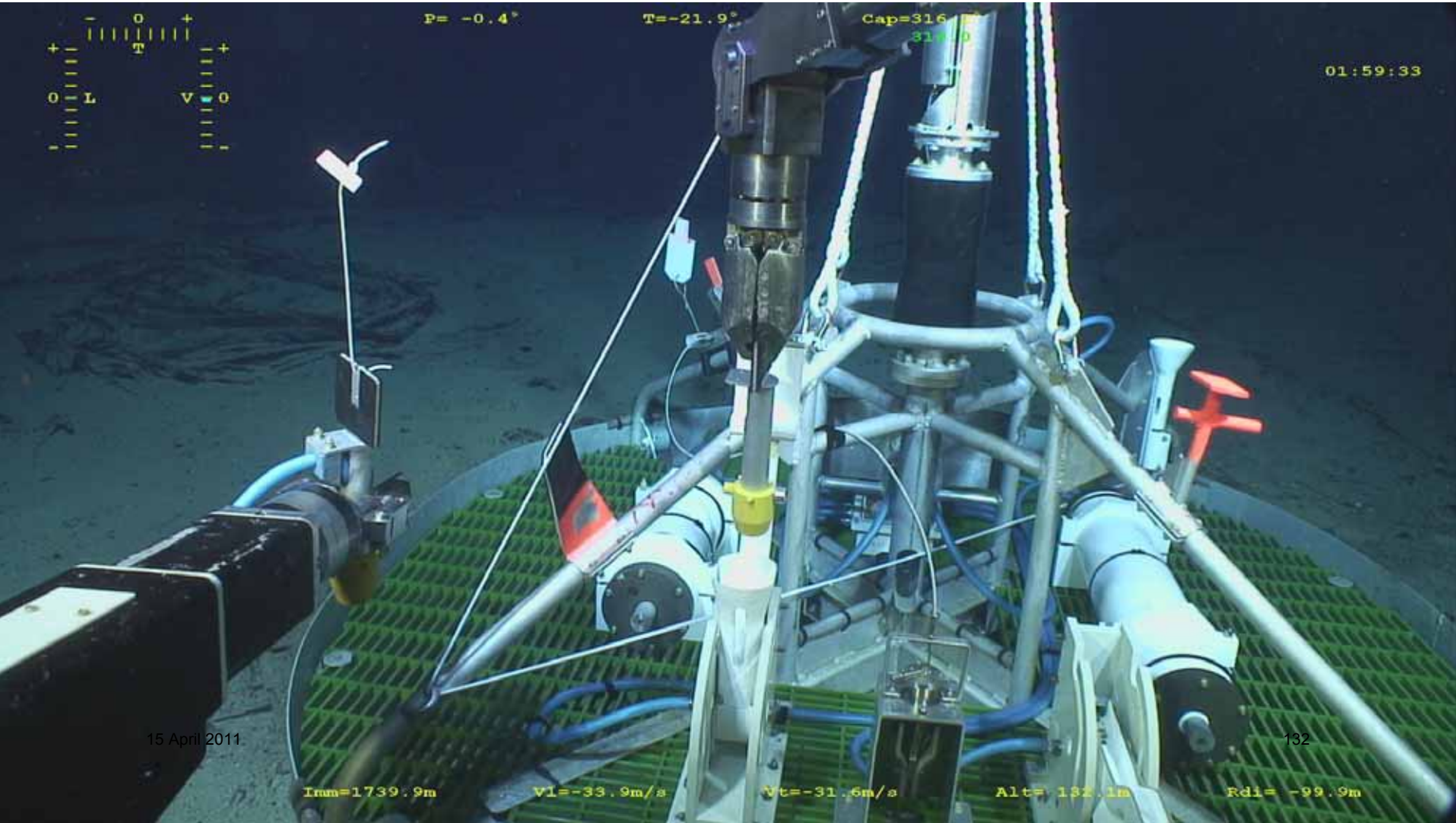
Seamon WEST – Lava Lake

1 Seamon station
1 module OBS-JPP
Cable mooring
Victor deployment



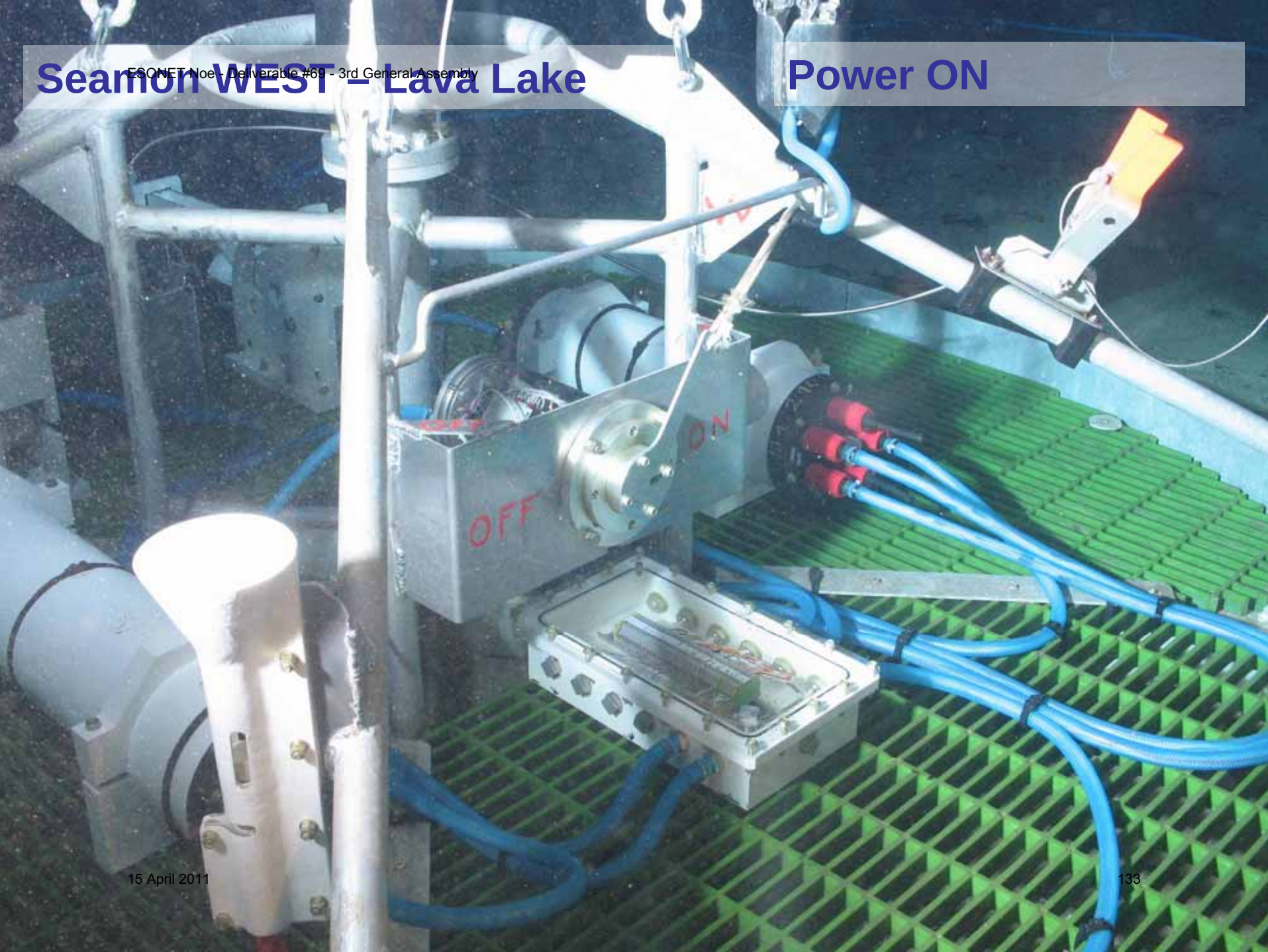
Seamon WEST – Lava Lake

In situ connection of the sensors



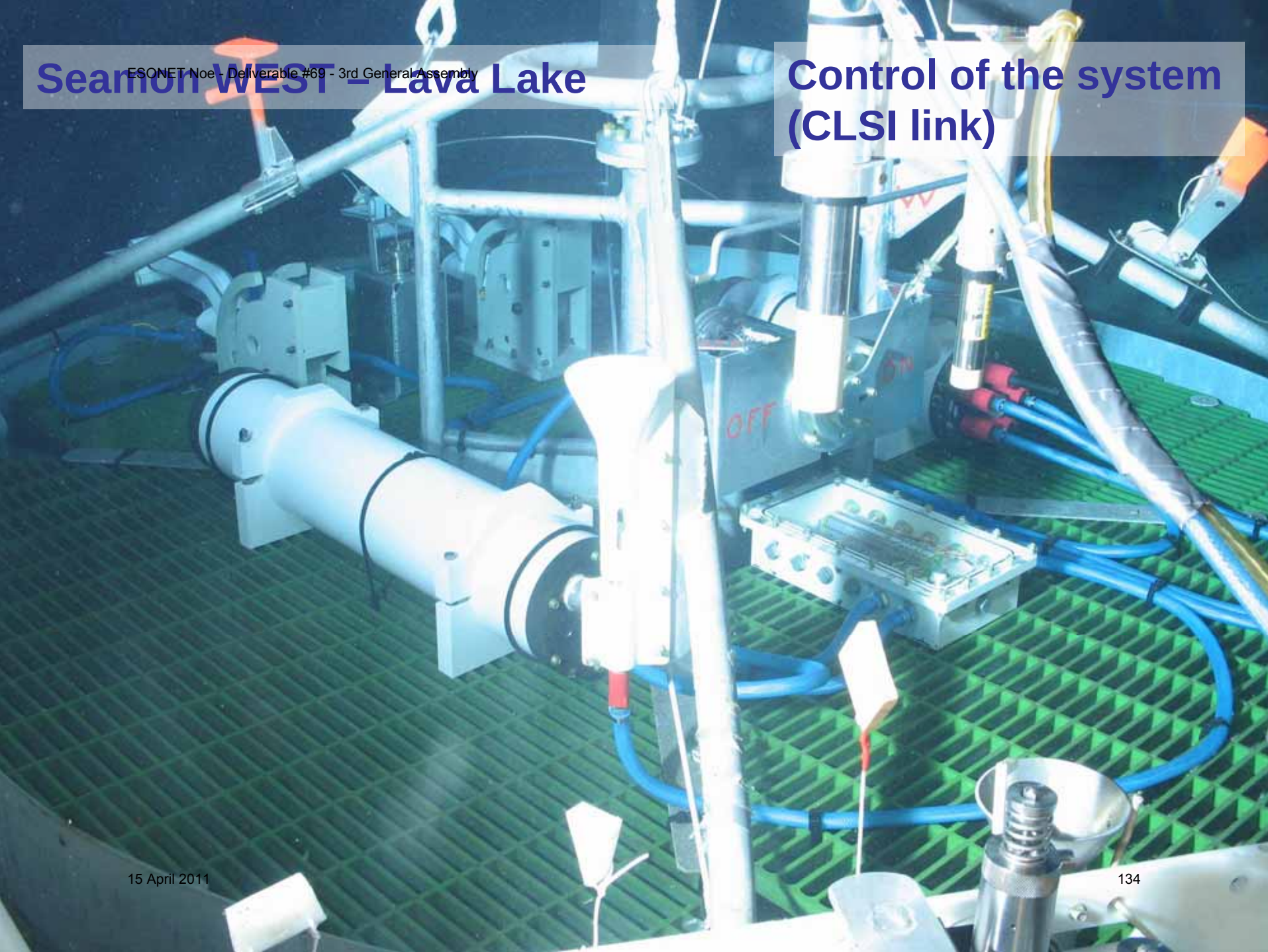
Seamon WEST – Lava Lake

Power ON



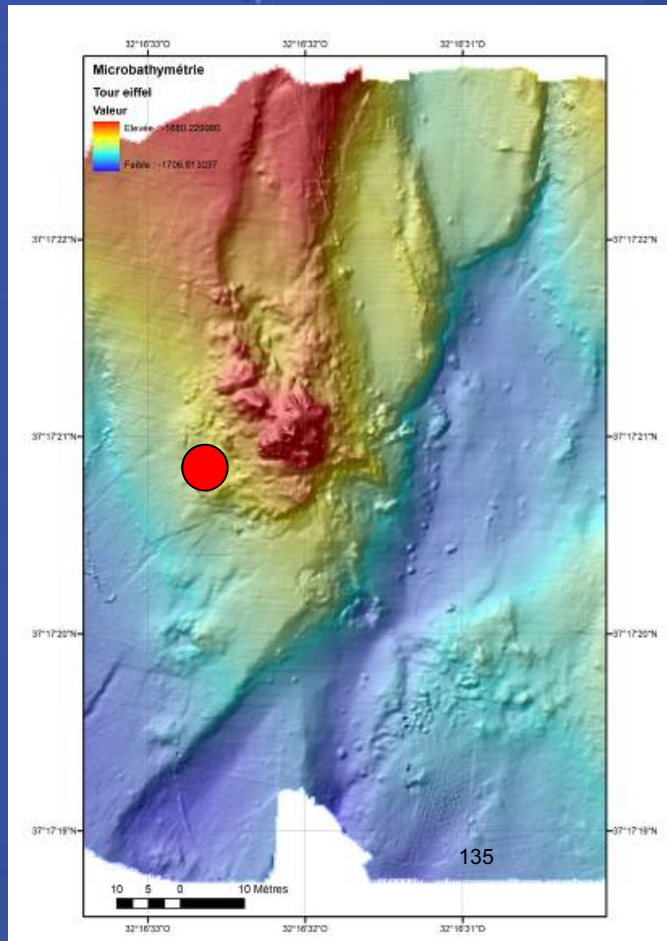
Seamon WEST – Lava Lake

Control of the system (CLSI link)



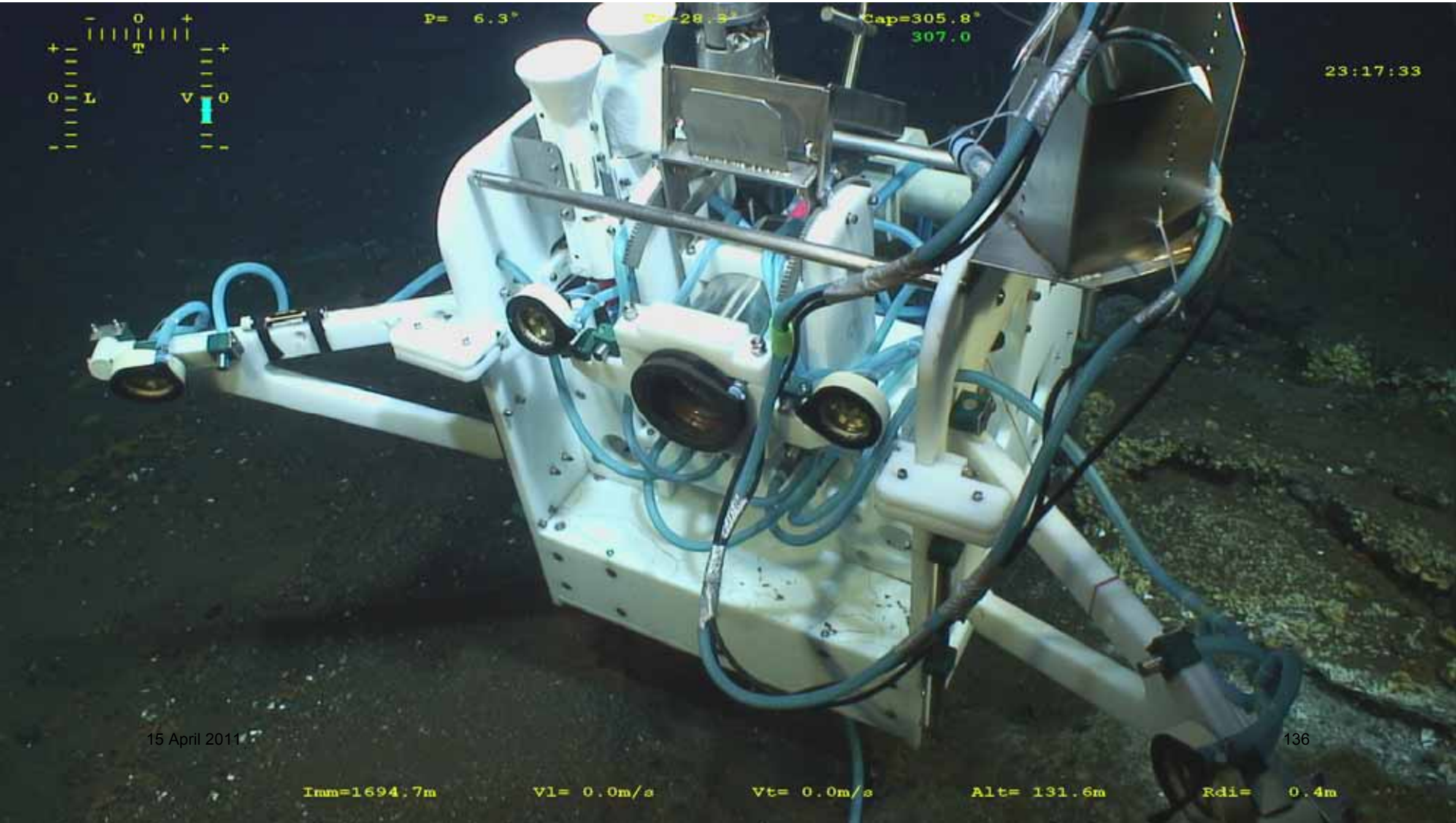
Seamon EAST – Tour Eiffel

1 Seamon station
TEMPO
NOCS
Cable mooring
Victor deployment



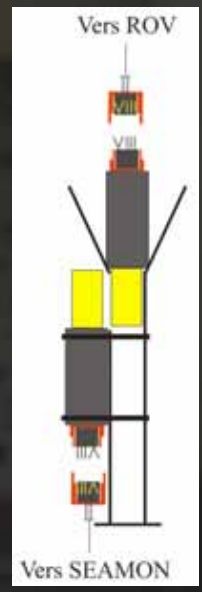
Seamon EAST – Tour Eiffel

TEMPO deployment



Seamon EAST – Tour Eiffel

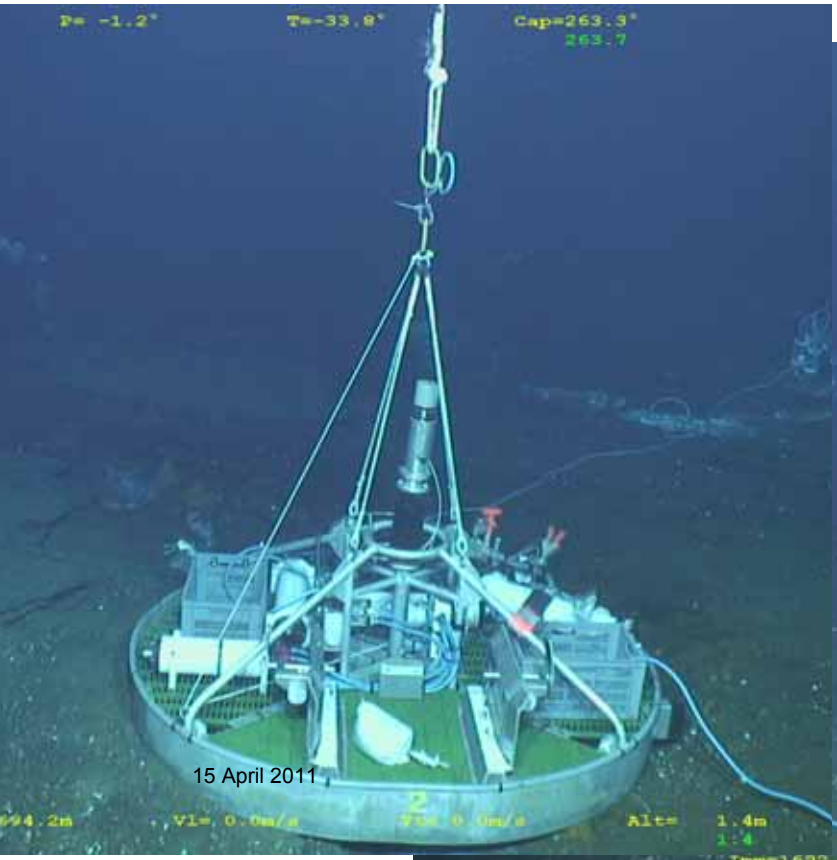
CLSI / WIFI link

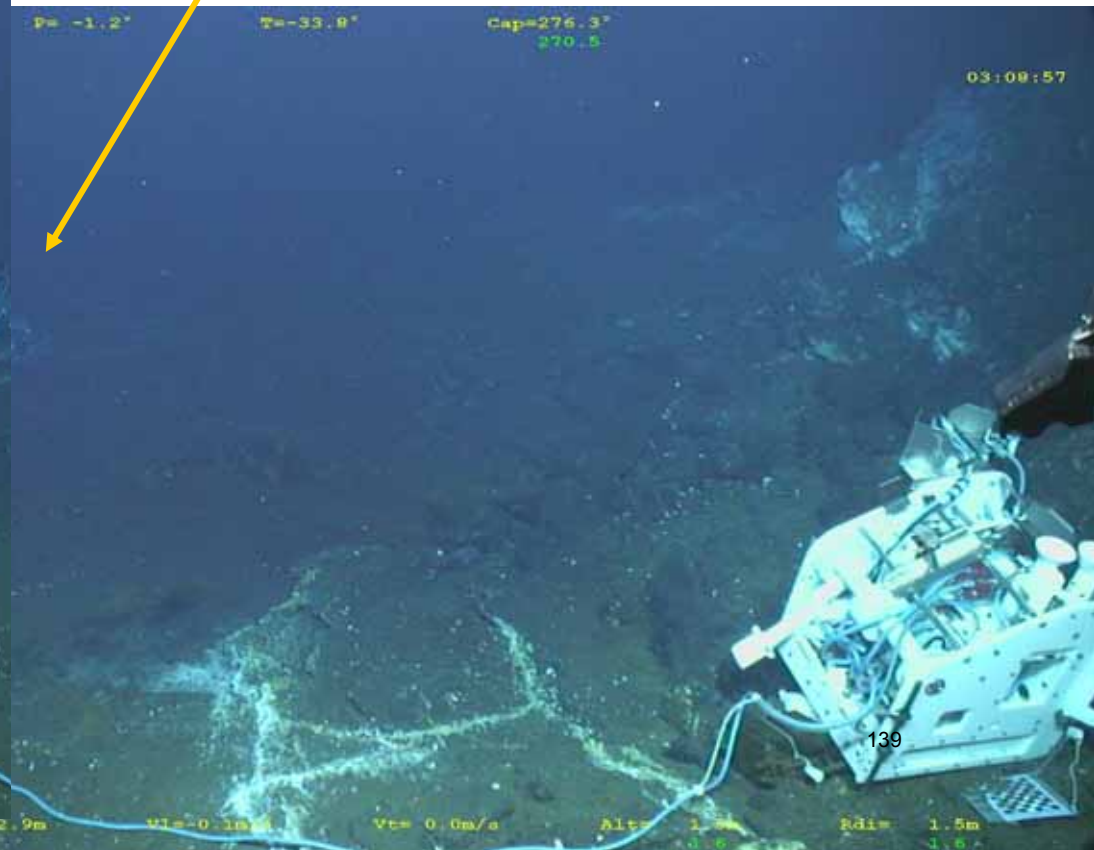


Seamon EAST – Tour Eiffel

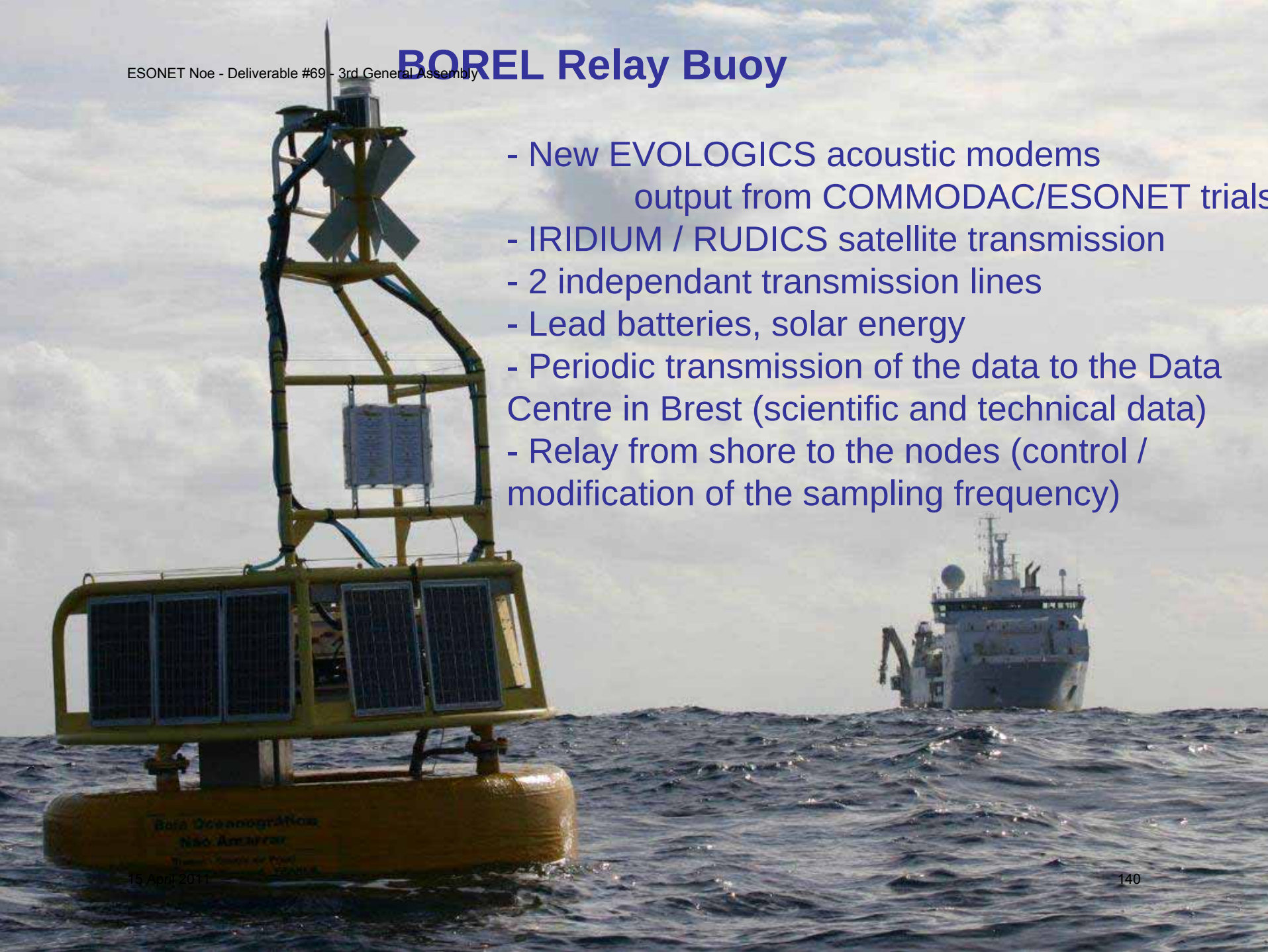
LED lights trial

Seamon EAST – Tour Eiffel





BOREL Relay Buoy

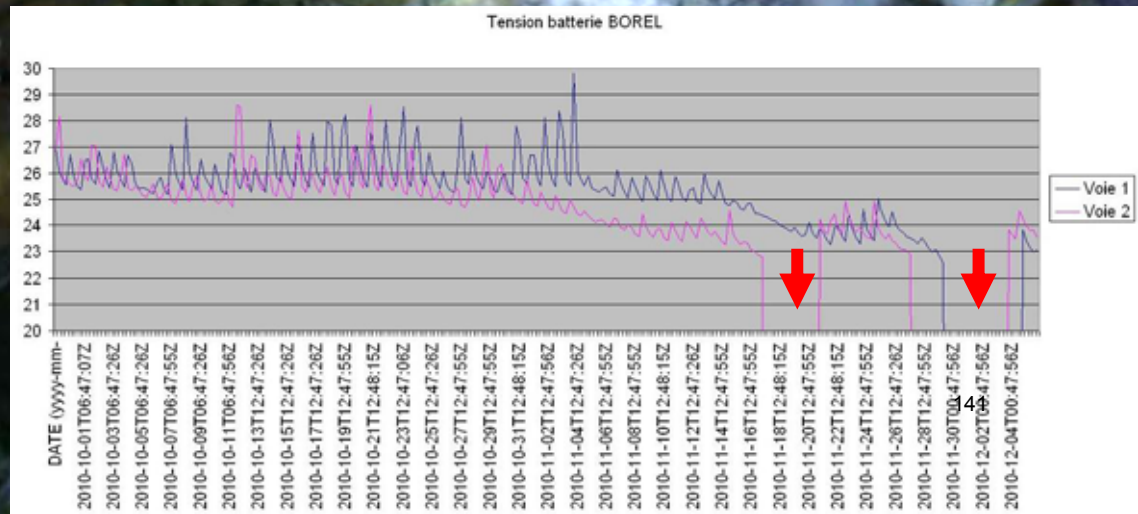


- New EVOLOGICS acoustic modems
  output from COMMODAC/ESONET trials
- IRIDIUM / RUDICS satellite transmission
- 2 independant transmission lines
- Lead batteries, solar energy
- Periodic transmission of the data to the Data Centre in Brest (scientific and technical data)
- Relay from shore to the nodes (control / modification of the sampling frequency)

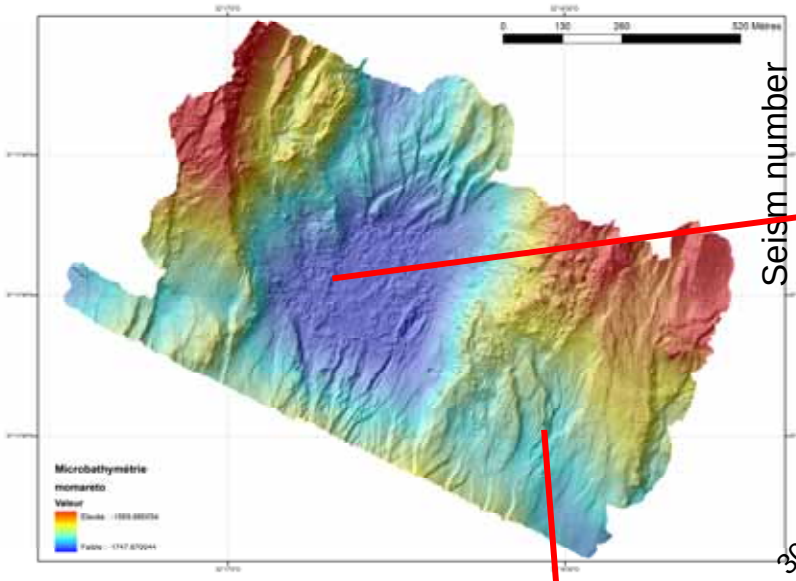
Results

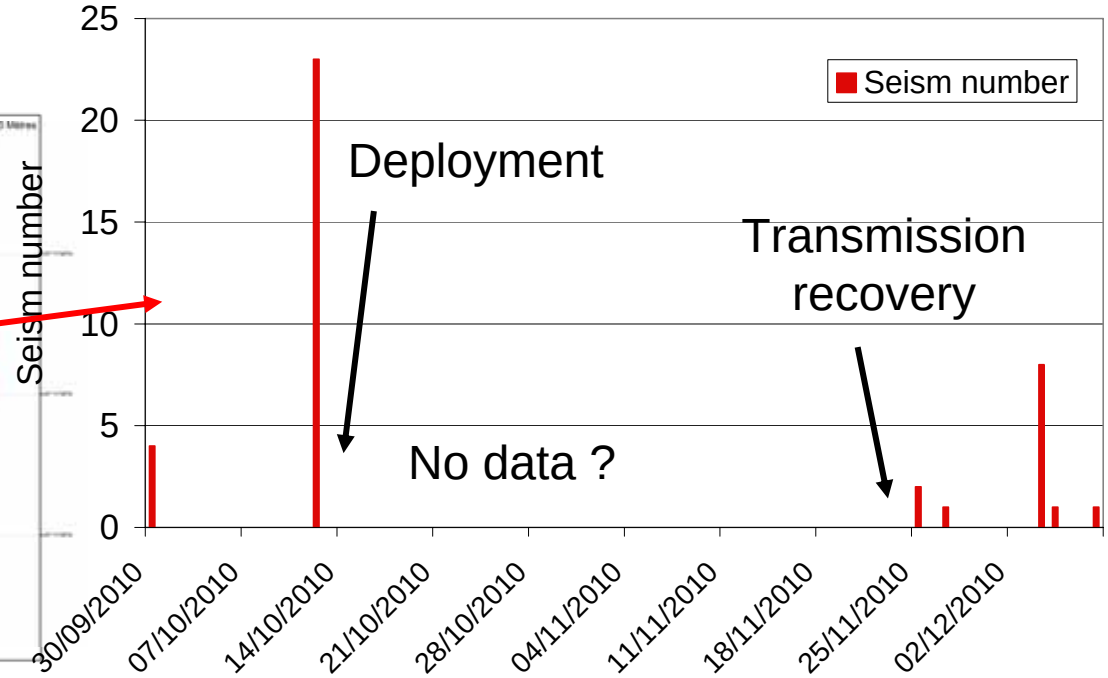
Validation of the deployment procedures (cable and ROV, underwater connection, WIFI link …)

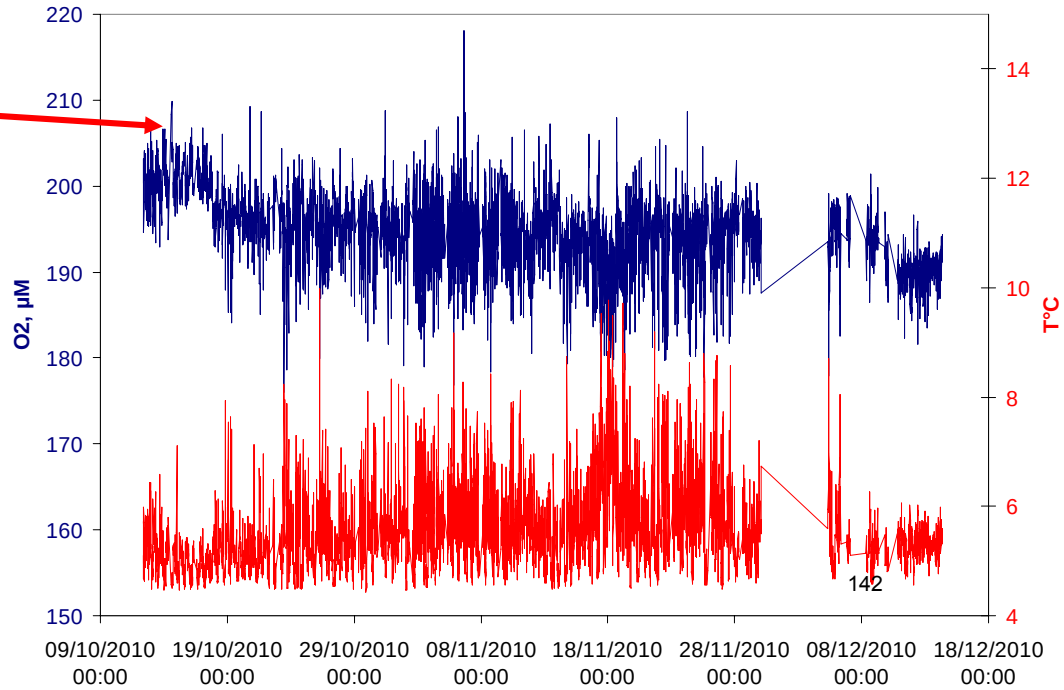
SMOOVE	Data transmission and storage
CHEMINI Fe	Data transmission and storage but hydraulic problem
Optode AANDERAA	T°C and [O2] data
Ironman	Mechanical problem, disconnected
OBS	Data storage, recent transmission
JPP	Data transmission 1 way, data storage
Technical data	
BOREL	Energy recharge undersized in winter



Results

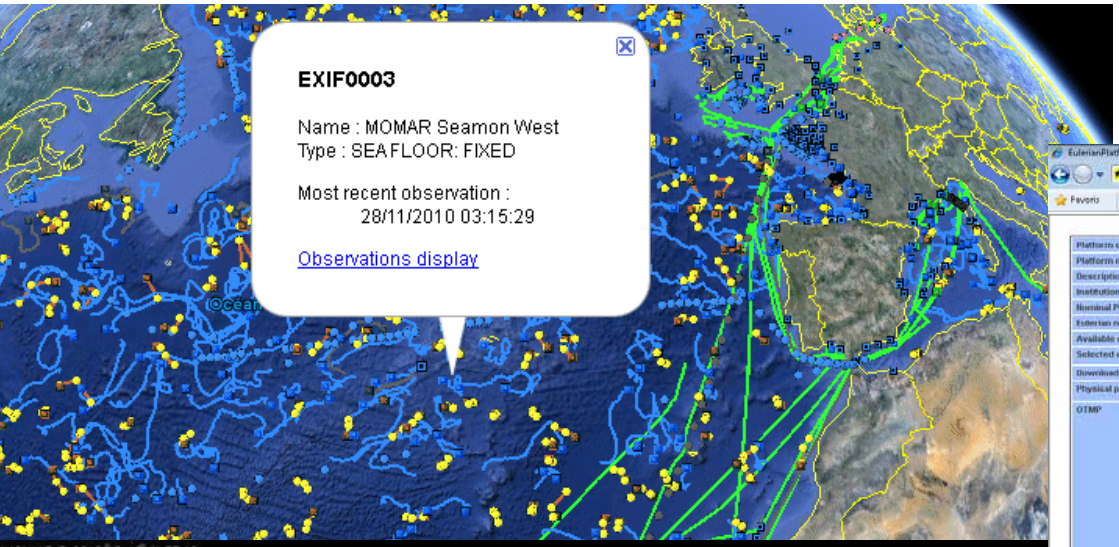

Microbathymétrie
monareto
Valeur


Seism number
Deployment
Transmission recovery
No data ?
25
20
15
10
5
0
30/09/2010
07/10/2010
14/10/2010
21/10/2010
28/10/2010
04/11/2010
11/11/2010
18/11/2010
25/11/2010
02/12/2010

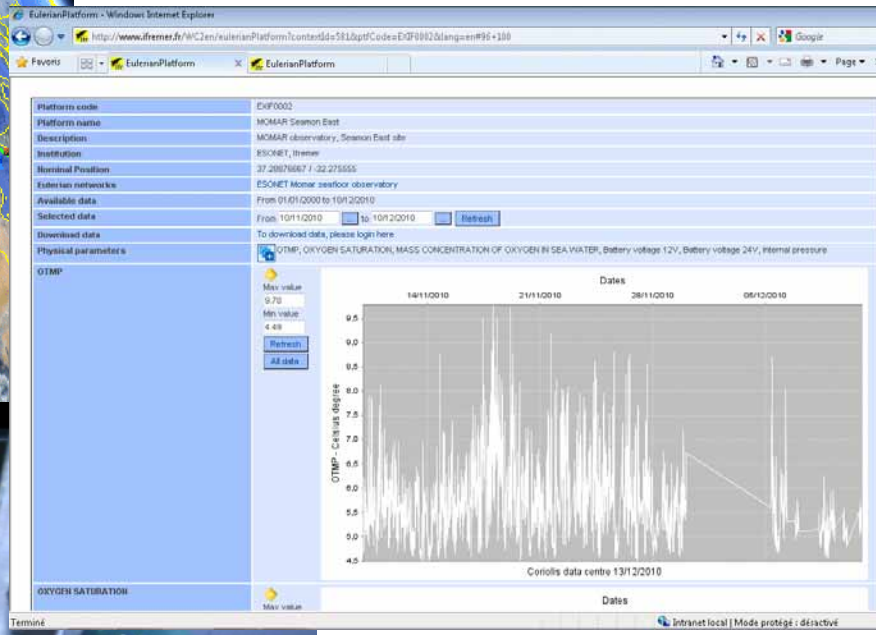

O2, µM
T°C
220
210
200
190
180
170
160
150
14
12
10
8
6
4
142
09/10/2010 00:00
19/10/2010 00:00
29/10/2010 00:00
08/11/2010 00:00
18/11/2010 00:00
28/11/2010 00:00
08/12/2010 00:00
18/12/2010 00:00

ESONET Momar data access

http://www.ifremer.fr/WC2en/allEulerianNetworks



The cruise
http://www.ifremer.fr/momarsat2010/



Perspectives

Scientific data integration and exploitation

Multidisciplinary data set

Recovery of the system in summer 2011 – MoMARSAT 2011

Redeployment in 2011?

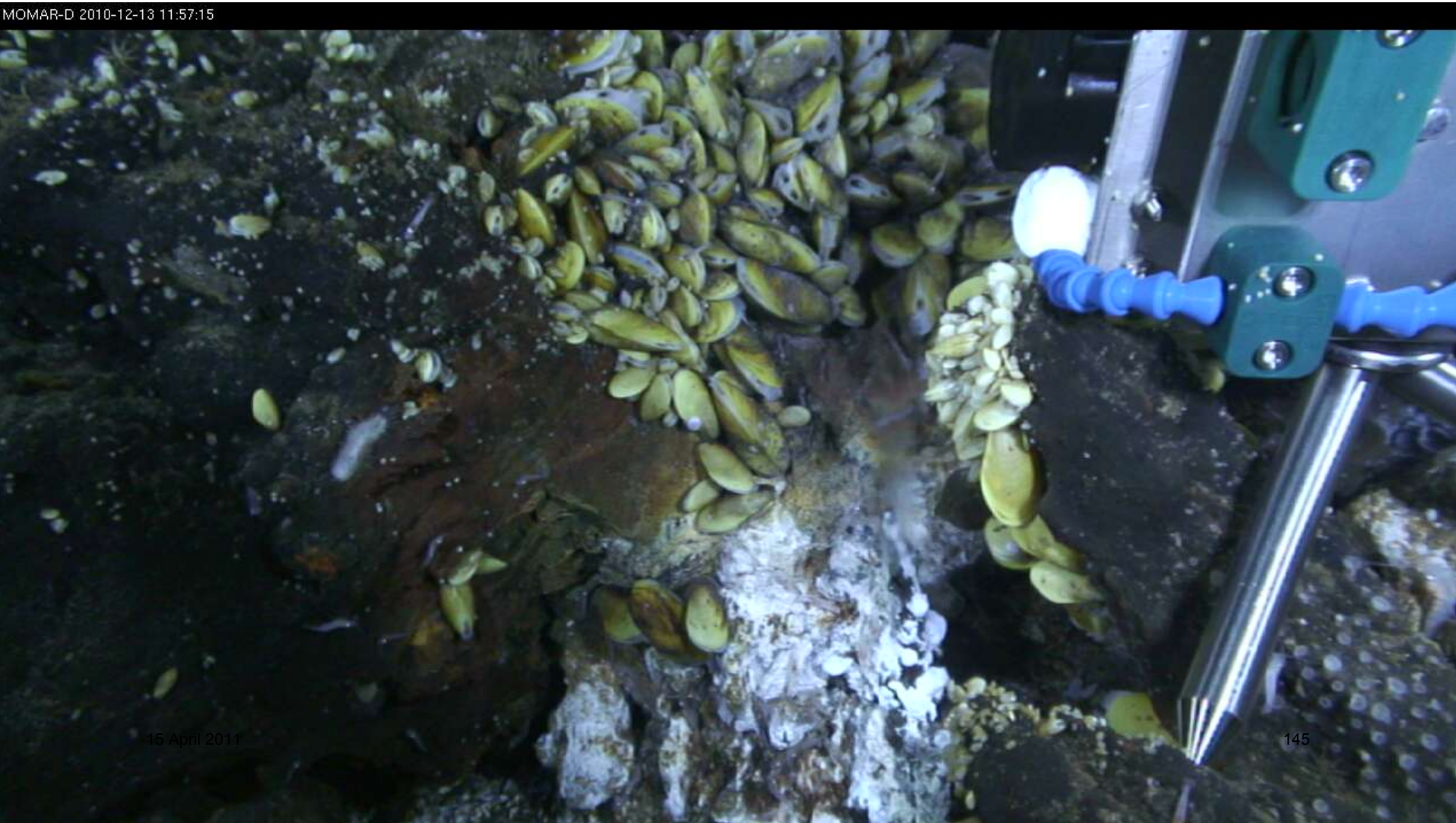
- EMSO framework,
- Recovery in 2012 with Portuguese vessel and ROV ?

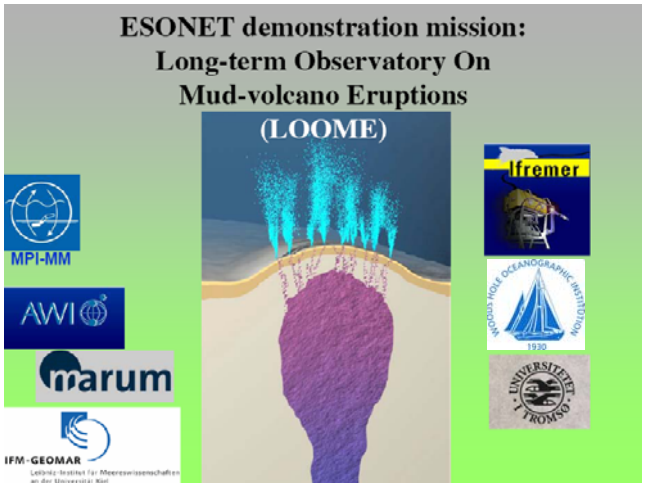
Technical points to improve

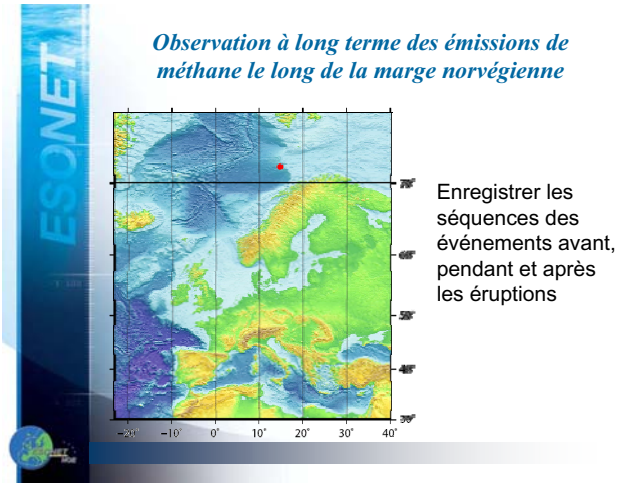
- Scientific sensors (CHEMINI and Ironman)
- Data transmission (OBS, JPP)
- Energy of the buoy : addition of an other energy source / aeolian
- Reduction of the consumption of the system
- New sensors ?

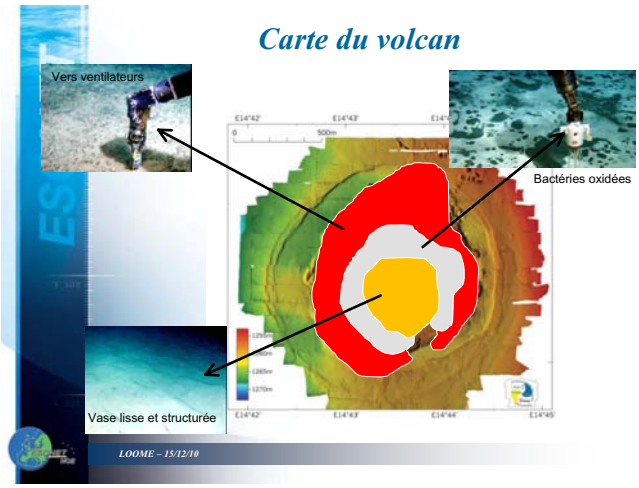
2010/12/13, 11h57:15

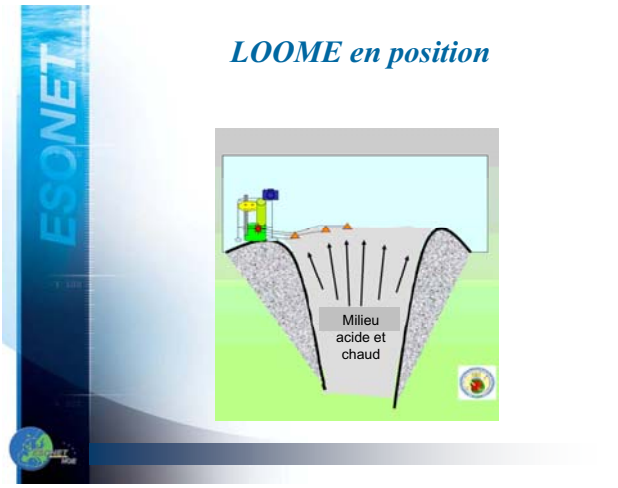
Tour Eiffel, Lucky Strike, Azores



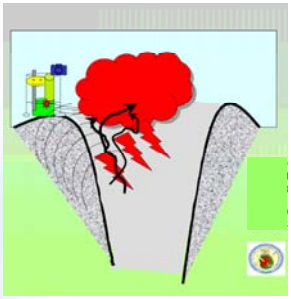

ESONET demonstration mission:
Long-term Observatory On
Mud-volcano Eruptions
(LOOME)
MPI-MM
AWI
marum
IFM-GEOMAR
Ifremer
WOODS HOLE OCEANOGRAPHIC INSTITUTION
1930
UNIVERSITETET I TROMSØ


Observation à long terme des émissions de méthane le long de la marge norvégienne
ESONET
Enregistrer les séquences des événements avant, pendant et après les éruptions


Carte du volcan
Vers ventilateurs
Bactéries oxidées
Vase lisse et structurée
LOOME – 15/12/10

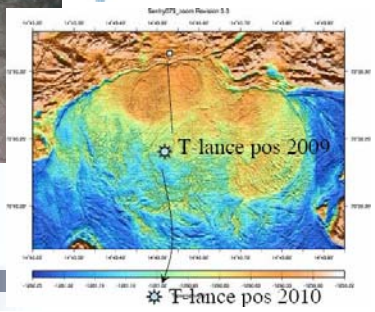

LOOME en position
ESONET
Milieu acide et chaud

Eruption volcanique



Nouvelle carte après 2 éruptions (octobre 2009 et juin 2010)

(carte en préparation)



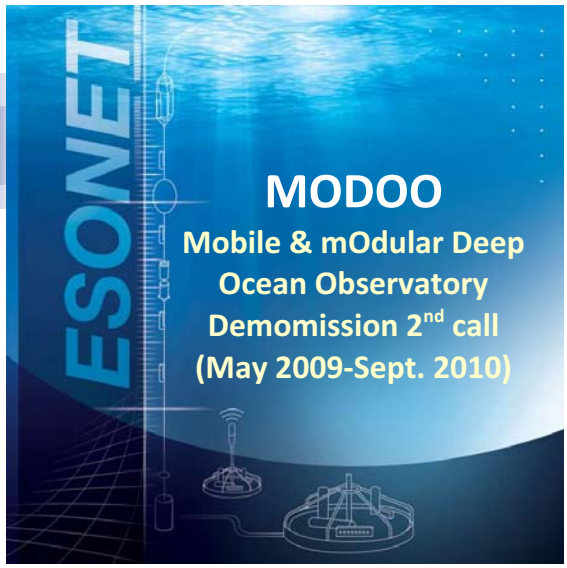
LOOME – 15/12/10

MODOO
Mobile & mOdular Deep Ocean Observatory

MODOO

15. Dec. 2010
Marseille

Partner:
IFM-GEOMAR
NIOZ
MRI
UNIABDN
NERC-NOC,S/L



Outline of talk

- MODOO Objective in ESONET
- Implementation
- Installation
  - Porcupine Node PAP
  - Azores Node MoMAR-D
- Summary
- "Sustainability" or MODOO after ESONET

MODOO
MOdular Deep Ocean Observatory

MODOO Objectives in ESONET

- Demonstrate the operation of a mobile observatory in ESONET NoE
  - Preparation
  - Installation
  - Data flow
- Joint installation of ESONET and EuroSITES to foster the exchange between the projects

MODOO
MOdular Deep Ocean Observatory

Implementation

- Outline concept of connection-nodes between modules (e.g. mooring, lander)
- Outline requirements for data flow (real-time, QC, event control, ...)
- Design & construct hardware & software for connection-nodes
- Hardware adaptation (lander, mooring)
- Testing of hardware components

MODOO
MOdular Deep Ocean Observatory

Implementation: DCD nodes

- MODOO connection-nodes: "Data collection and dissemination" (DCD) nodes
- Based on commercial Develogic HAM.NODE acoustic modem technology
- New aspects of "ESONET MODOO" DCD node:
  - Synchronization of all data streams (central clock)
  - "Convert" acoustic/inductive data streams
  - 6 serial ports logging & storage
  - Event control (2 way communication)

MODOO
MOdular Deep Ocean Observatory

Implementation: DCD nodes

- Easy configuration to implement new instrumentation e.g. Optode logging at Com2 of DCD node:

```
<Ports>
  <Com_2>
     <Baudrate>2400</Baudrate>
     <Handshake>None</Handshake>
     <Parity>Even</Parity>
    <Databits>7</Databits>
    <Stopbits>1</Stopbits>
    <Transceiver>232</Transceiver>
      <Instrument>Ins_1</Instrument>
  </Com_2>
</Ports>
```

MODOO
MOdular Deep Ocean Observatory

Data flow

- Link MODOO installation with EuroSITES data flow – connection to GDAC (Coriolis) → GEOSS
- Real-time data:
  http://www.eurosites.info/pap/data.php
- Work out real-time quality control procedures for non-standard "EuroSITES" data
- Two way communication for event control:
  - via NOC Southampton data server (PAP node)
  - Via ship based modem (Azores Node)

MODOO
MOdular Deep Ocean Observatory

Installation

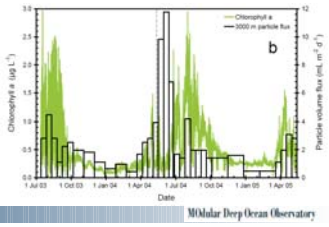
Installation at two ESONET nodes:

- Porcupine
- Azores

Installation: Porcupine Node

Scientific Mission:

- How do signals (e.g. productivity event) propagate from the surface to the deep ocean?
- Diversity of deep sea marine life
- Seismic activity at PAP



MODOO
MOdular Deep Ocean Observatory

Installation: Porcupine Node

- Technological mission:

Home lab

Satellite link

Surface buoy

Inductive link

Mooring

Acoustic link

Lander

MODOO
MOdular Deep Ocean Observatory

Installation: Porcupine Node

- Technological mission:

MODOO
MOdular Deep Ocean Observatory

Installation: Porcupine Node

- May 2010: System tests at NIOZ
- May/June 2010 - RRS James Clark Ross deployment cruise:
  - 1. June: Lander DCD node deployed
  - Lander DCD node & Release stopped working → no communication possible
  - 1. June: Mooring deployed (without DCD node)
  - Evidence from other instruments: Implosion of Lander glass spheres → BOBO Lander LOST!!

MODOO
MOdular Deep Ocean Observatory

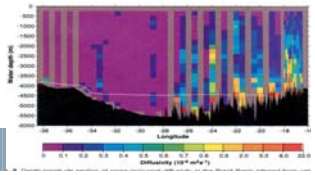
Installation: Porcupine Node

- EuroSITES mooring part of the installation is working well (see online data)
- BOBO lander and instrumentation lost (CTD, backscatter, passive acoustic, ADCP, seisometer, bottom pressure sensor, sediment trap, DCD node, Argos beacon, Benthos release)
- Major loss of "in kind" contributions to Demomission
- Future Plan: NOC,S summer 2011 expedition (H. Ruhl) with ROV to survey the site

MODOO
MOdular Deep Ocean Observatory

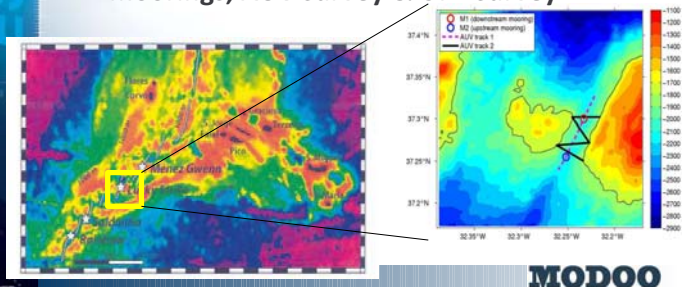
Installation: Azores Node

- RV Poseidon cruise August 2010: Opportunity to do further test MODOO system
- ESONET steering committee agreed
- Scientific Objective of cruise: Mixing in the deep ocean though tidal/topography interaction



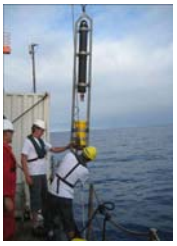
Installation: Azores Node

- Technological Objective: demonstrate two-way communication/event control
  2 moorings, AUV survey & CTD survey



Installation: Azores Node

- Install DCD node in mooring (2000m)
- Communicate with mooring using a ship based surface mooring (loan instrument)
- Download data from ADCP & Microcat
- Modify sampling ADCP via DCD node (event control)
- Great performance of system
- Test communication range:
  2.6km away from anchor good comm.
- Remotely downloaded data help to find "best spot/depth" for single point observations



Summary

- MODOO system design complete
- System worked – could not fully explored due to BOBO lander loss at PAP site
- Without ESONET this very fruitful and inspiring collaboration would have never taken place
- Surprisingly efficient project given the (too) short time available for the 2nd call demomission (May 2009 – Sept. 2010)
- Significant input for future observatory design

"Sustainability" - after ESONET

- German ministry of Science and Education has supported an extended network of MODOO components – MoLAB (lead: O. Pfannkuche)

"Sustainability" - after ESONET

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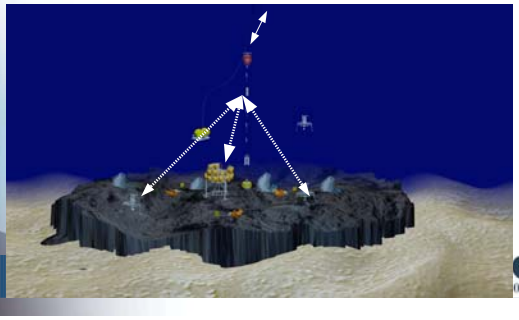
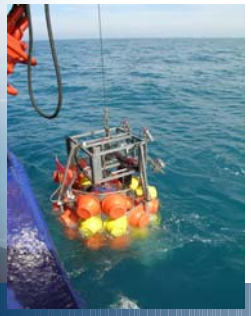


Molab

- Lessons learned from MODOO:
  Avoid glass sphere! New IFM-GEOMAR lander design using syntactic foam

Molab – Installation ROV & Video launcher

- Video controlled & Georeferenced installation of the modules



Thank you

ESONET LIDO - Demo Mission: the Iberian Margin (Cadiz) node

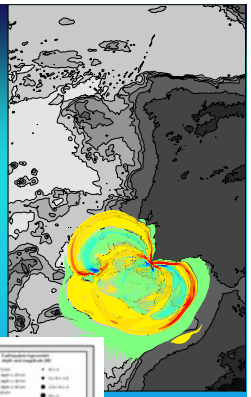
Belarmino Barata
FFCUL

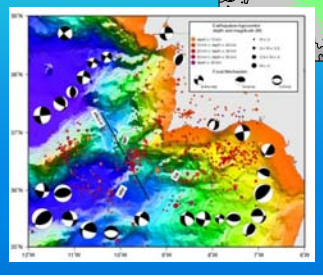
Location

The Iberian Node is located in the Gulf of Cadiz

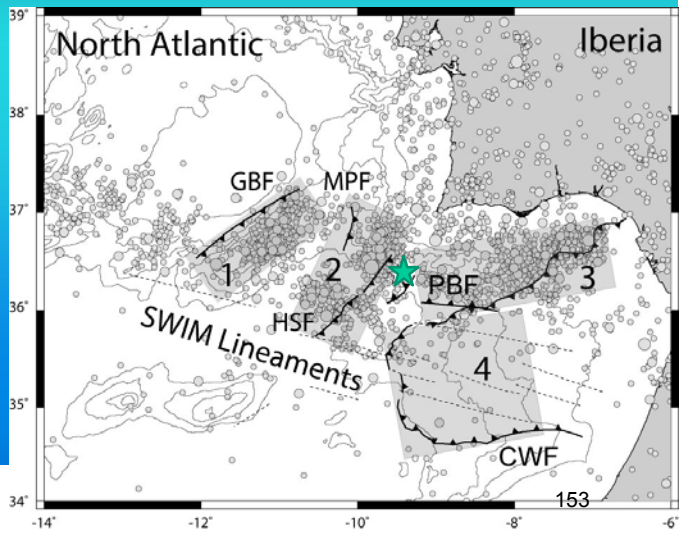
Iberian node >>

- Earthquake Generation;
- Tsunami Warning System;
- Mediterranean Outflow;
- Extensive mud volcanism.

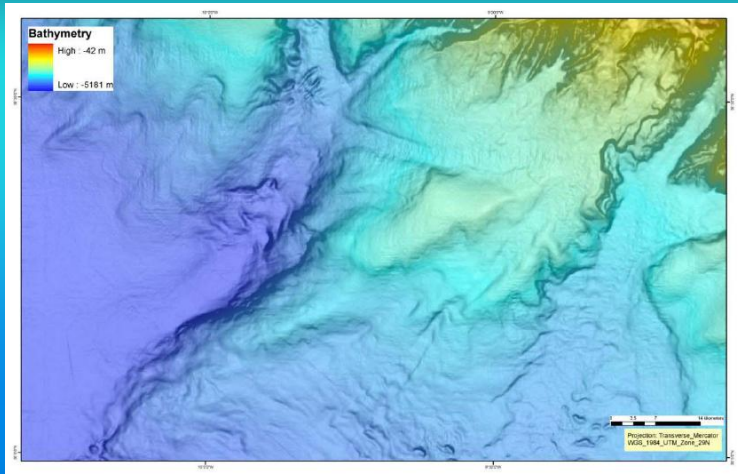




Several Active Structures >>



Local Surveys >>>



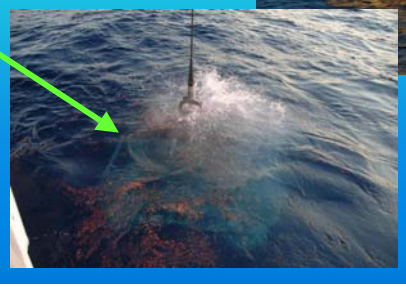
Cooperation with NEAMTWS ...

Seismic criteria for ATLANTIC

Depth	Location	(Mw)	Tsunami Potential	Bulletin Type
< 100 km	Under or very near the sea (< 30 km)	5.5 to 7.0	Small potential for a destructive local tsunami	Information Bulletin
		7.0 to 7.5	Potential for a regional tsunami < 1000 km	Regional Tsunami Watch
		7.5 to 7.9	Potential for a destructive regional tsunami < 1000 km	Regional Tsunami Warning Ocean-wide Tsunami Watch
		> 7.9	Potential for a destructive ocean-wide tsunami > 1000 km	Ocean-wide Tsunami Warning
	Inland (> 30 km)	5.5	No tsunami potential	Information Bulletin
= 100 km	All Locations	= 5.5	No tsunami potential	Information Bulletin

Iberian Pilot Station >>

NEAREST Abyssal Station
25 August 2007
22h 14 min TUC
3207 m, 150 km SW CSV



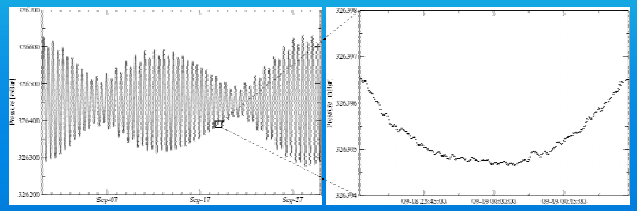
Data acquired 1st year >>

A M_L = 4.7 event was detected by GEOSTAR observatory (bottom trace) and also by a OBS deployed during NEAREST (top trace). Although the two sensors are separated by a distance of only 9 km and are deployed on seabeds of similar lithology, the bottom trace shows very good sensor-ground coupling. The upper trace is also clipped due to the high gain chosen for the NEAREST OBS.

figura4

Data acquired 1st year >>

One month of bottom pressure data acquired during the mission 2007-2008 by GEOSTAR (left) and the detail of one hour data (right).

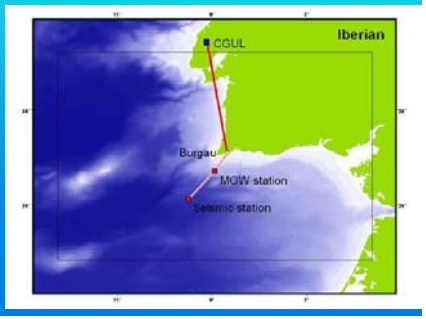


Iberian Demo Mission >>

- Cooperation with Sicily Node;
- Focused on mammal tracking;
- 1 year of continuous monitoring.

The need for a cabled station >>

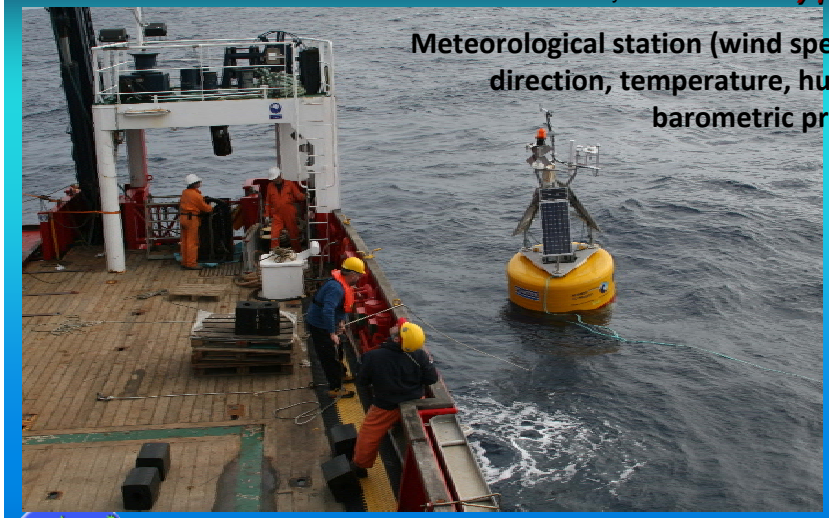
- Two periods of 1 year monitoring;
- Rough Sea conditions;
- Need to have real-time connection.



Portuguese Strategy >>

- Sea research is a government priority;
- Two research ships fully operating after 2010;
- One deep (6000m) ROV;
- OCEANOS consortium, gathering the most important marine operators and research institutions recently aproved;
- A particular role for Azores region.

Buoy payload



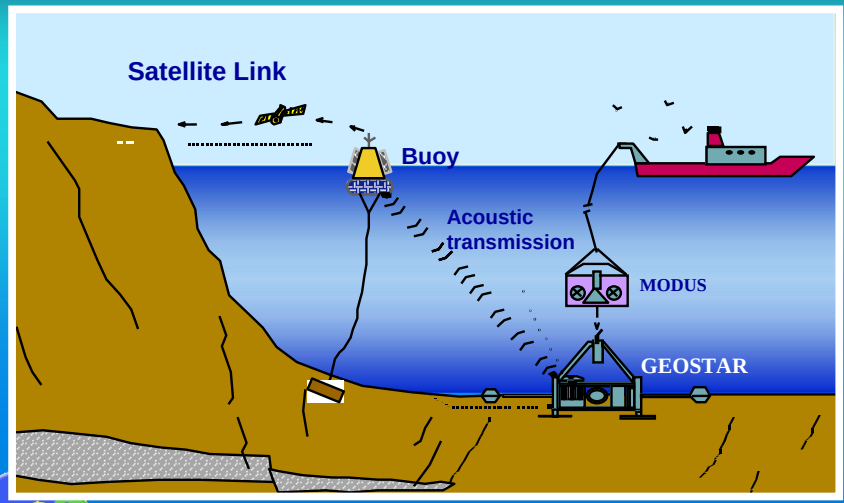
Meteorological station (wind speed and direction, temperature, humidity, barometric pressure)

GEOSTAR payload LIDO Cadiz Station

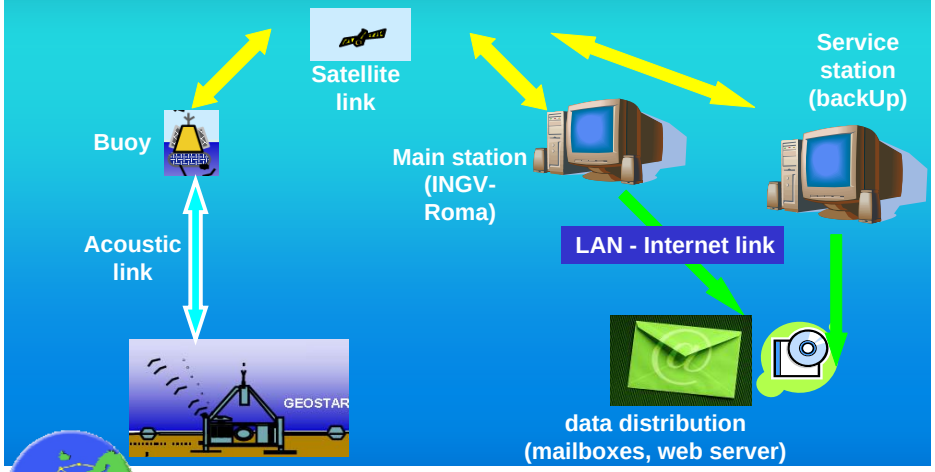
Environmental monitoring
CTD, ADCP, 3-Comp. single point current meter, turbidity meter

Geo-hazard
seismometer, low frequency hydrophone, accelerometer, gravity meter, absolute pressure gauge

Iberian Margin set-up



Iberian Margin: Communications and data distribution



Example of automatic periodic messages received by the system at sea (GEOSTAR + Buoy)

flavio.furlan	NEAREST BUOY STATUS FILE of 20/11/09 ore 00:00:00 - FILE RECEIVED ON 20/11/09 AT 03:42:03 CONVERSION I	20/11/09
flavio.furlan	NEAREST BUOY EVENTS CATALOG FILE of 20/11/09 ore 00:00:00 - FILE RECEIVED ON 20/11/09 AT 02:43:16	20/11/09
flavio.furlan	NEAREST BUOY DATA FILE of 20/11/09 ore 00:00:00 - FILE RECEIVED ON 20/11/09 AT 02:42:13 CONVERSION DO	20/11/09
flavio.furlan	NEAREST GEOS STATUS FILE of 20/11/09 ore 00:00:00 - FILE RECEIVED ON 20/11/09 AT 02:42:01 CONVERSION	20/11/09
flavio.furlan	NEAREST GEOS DATA FILE of 20/11/09 ore 00:00:00 - FILE RECEIVED ON 20/11/09 AT 02:41:50 CONVERSION DC	20/11/09
flavio.furlan	NEAREST BUOY EVENTS CATALOG FILE of 19/11/09 ore 18:00:00 - FILE RECEIVED ON 19/11/09 AT 22:41:42	19/11/09
flavio.furlan	NEAREST BUOY STATUS FILE of 19/11/09 ore 18:00:00 - FILE RECEIVED ON 19/11/09 AT 22:41:34 CONVERSION I	19/11/09
flavio.furlan	NEAREST BUOY DATA FILE of 19/11/09 ore 18:00:00 - FILE RECEIVED ON 19/11/09 AT 22:41:24 CONVERSION DO	19/11/09
flavio.furlan	NEAREST GEOS STATUS FILE of 19/11/09 ore 18:00:00 - FILE RECEIVED ON 19/11/09 AT 22:41:14 CONVERSION	19/11/09
flavio.furlan	NEAREST GEOS DATA FILE of 19/11/09 ore 18:00:00 - FILE RECEIVED ON 19/11/09 AT 22:41:04 CONVERSION DC	19/11/09
flavio.furlan	NEAREST BUOY EVENTS CATALOG FILE of 19/11/09 ore 12:00:00 - FILE RECEIVED ON 19/11/09 AT 16:42:11	19/11/09
flavio.furlan	NEAREST BUOY STATUS FILE of 19/11/09 ore 12:00:00 - FILE RECEIVED ON 19/11/09 AT 16:42:01 CONVERSION I	19/11/09
flavio.furlan	NEAREST BUOY DATA FILE of 19/11/09 ore 12:00:00 - FILE RECEIVED ON 19/11/09 AT 16:41:50 CONVERSION DO	19/11/09
flavio.furlan	NEAREST GEOS STATUS FILE of 19/11/09 ore 12:00:00 - FILE RECEIVED ON 19/11/09 AT 16:41:39 CONVERSION	19/11/09
flavio.furlan	NEAREST GEOS DATA FILE of 19/11/09 ore 12:00:00 - FILE RECEIVED ON 19/11/09 AT 16:41:27 CONVERSION DC	19/11/09
flavio.furlan	NEAREST BUOY EVENTS CATALOG FILE of 19/11/09 ore 00:00:00 - FILE RECEIVED ON 19/11/09 AT 04:42:06	19/11/09
flavio.furlan	NEAREST BUOY STATUS FILE of 19/11/09 ore 00:00:00 - FILE RECEIVED ON 19/11/09 AT 04:41:58 CONVERSION I	19/11/09
flavio.furlan	NEAREST BUOY DATA FILE of 19/11/09 ore 00:00:00 - FILE RECEIVED ON 19/11/09 AT 04:41:47 CONVERSION DO	19/11/09
flavio.furlan	NEAREST GEOS STATUS FILE of 19/11/09 ore 00:00:00 - FILE RECEIVED ON 19/11/09 AT 04:41:37 CONVERSION	19/11/09
flavio.furlan	NEAREST GEOS DATA FILE of 19/11/09 ore 00:00:00 - FILE RECEIVED ON 19/11/09 AT 04:41:25 CONVERSION DC	19/11/09

TECHNICAL WORK

on GEOSTAR included:

- Integration of a new model of underwater acoustic modem
- Seismometer refurbishment
- New mechanical support for the pressure sensor
- Sensors recalibration

on the communication buoy included:

- Integration of a new model of surface acoustic modem
- New mooring line
- Software upgrade
  - Automatic creation and transmission of a periodic event catalogue
  - Buoy attitude measurements added to the technical data
  - Management of the new acoustic modem

Long term tests were carried out in 2009 to verify the stability of the whole system and the reliability of the communication system.

Communication system

- GEOSTAR is designed to communicate with a shore station by means of a system composed of
  - bi-directional acoustic link
  - moored relay buoy
  - satellite (Globalstar) link
- every six hours the following periodic messages are automatically produced and delivered to a list of users
  - summary of GEOSTAR scientific data
  - summary of GEOSTAR technical data
  - summary of buoy scientific data
  - summary of buoy technical data
  - event catalog
- a warning message is delivered to the shore station if the on-board prototype of tsunameter detects anomalies in the pressure and seismic signals.

THANK YOU / OBRIGADO

GRAZIE !

HELLENIC NODE: During and after ESONET

V. Lykousis[1], A. Tselepides[2] and K.Nittis[1]

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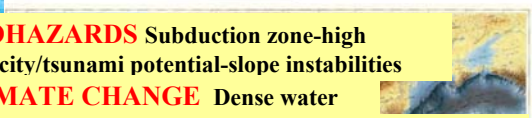
[2]University of Pireous
vlikou@ath.hcmr.gr, ttse@her.hcmr.gr, knittis@ath.hcmr.gr

General Assembly, Marseille, 13-16th Dec. 2010

Science objectives

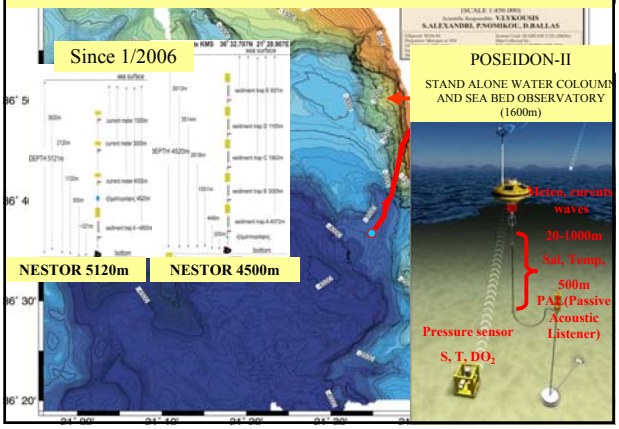
- **GEOHAZARDS** Subduction zone-high seicmicity/tsunami potential-slope instabilities
- **CLIMATE CHANGE** Dense water convection Adriatic vs. Aegean
- **BIOACOUSTICS** Sperm whale route E. Med (Sicily-S. Crete-Levantine)
- **BIODIVERSITY** Deep extreme environments/mud volcanoes/brine lakes

HERMES
HERMIONE
SESAME
MARINERA
KM3NET
TRANSFER
SEHELARC

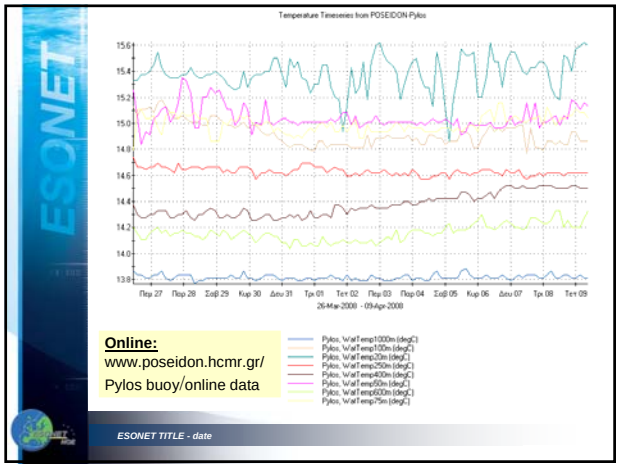


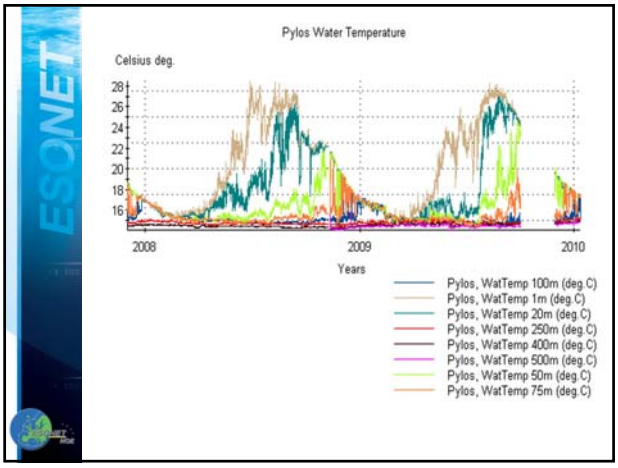
Infrastructure at the node - offshore

Since 1/2006



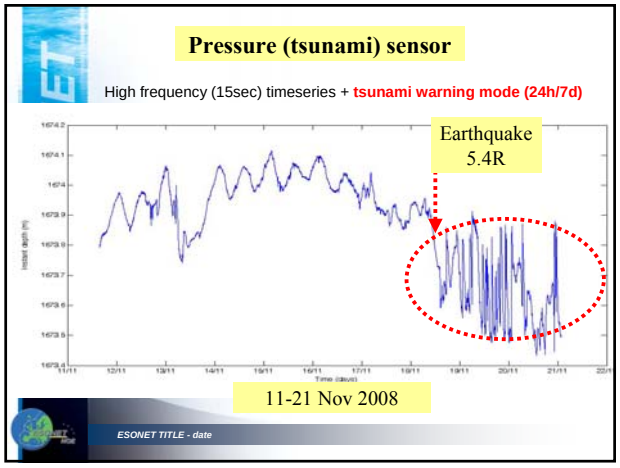
POSEIDON-II
STAND ALONE WATER COLOUMN AND SEA BED OBSERVATORY (1600m)

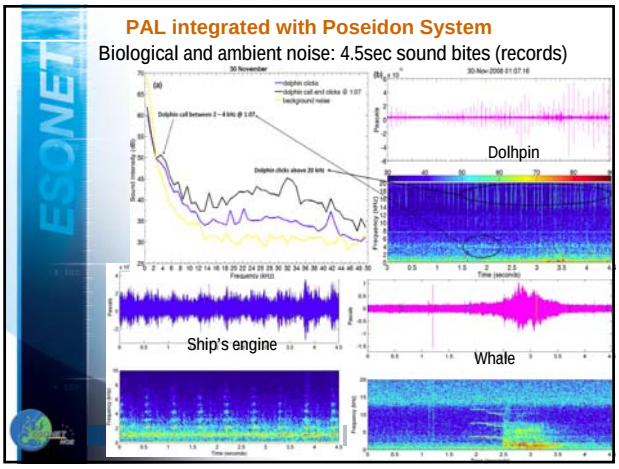


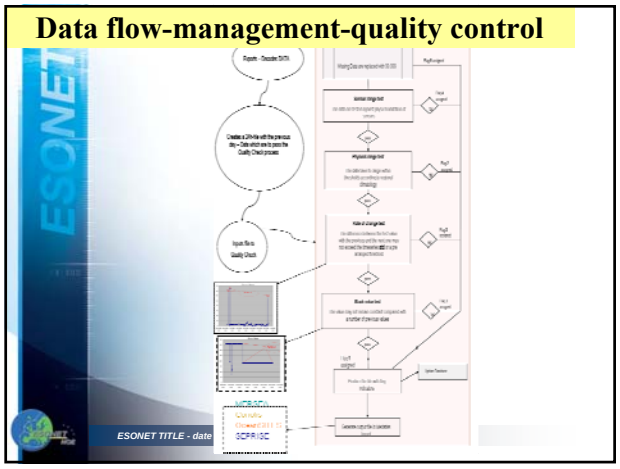


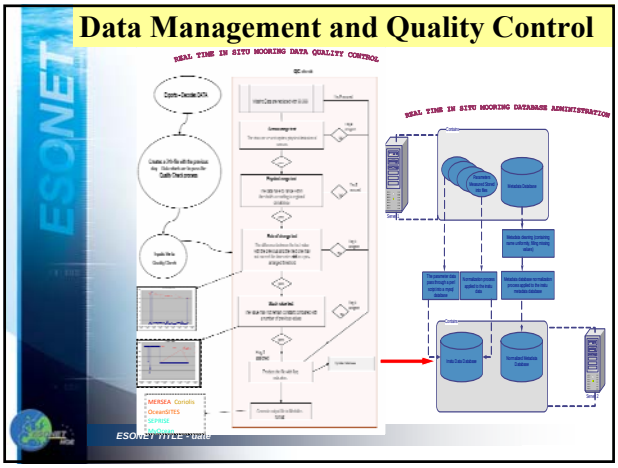
Pressure (tsunami) sensor

High frequency (15sec) timeseries + **tsunami warning mode (24h/7d)**



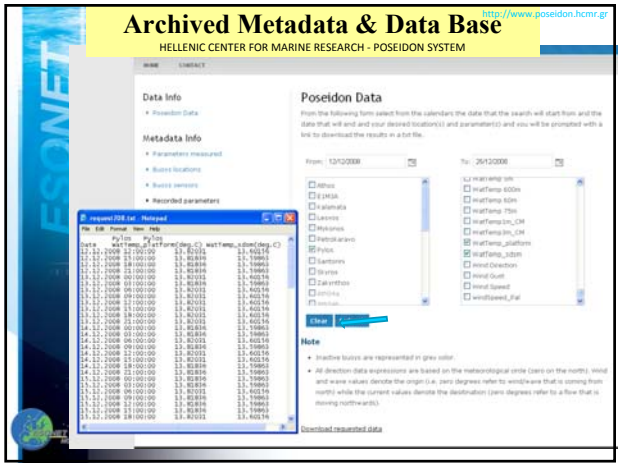

PAL integrated with Poseidon System
Biological and ambient noise: 4.5sec sound bites (records)
Dolhpin
Ship's engine
Whale

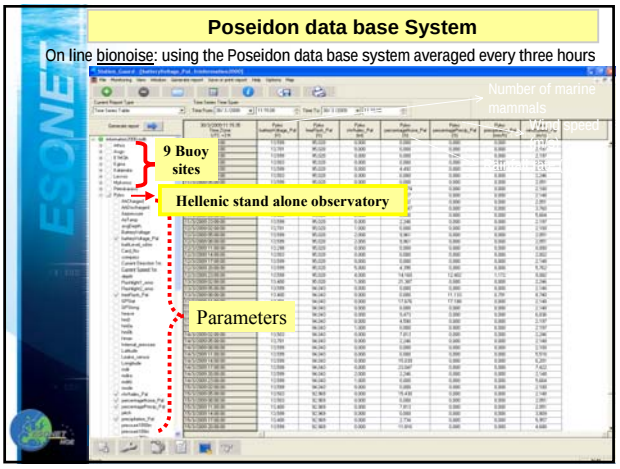

Data flow-management-quality control
ESONET TITLE - date

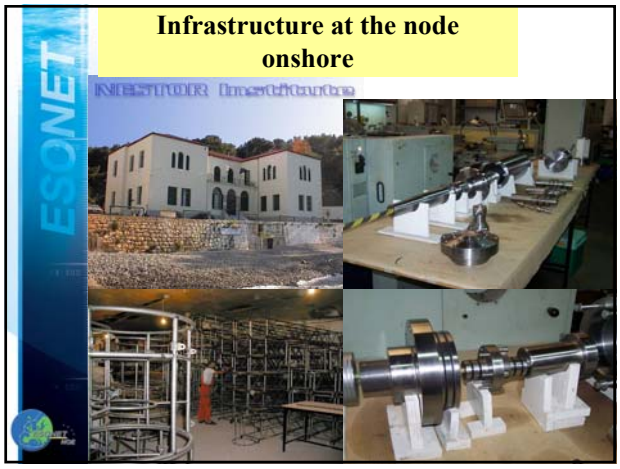

Data Management and Quality Control
REAL TIME IN SITU MOORING DATA QUALITY CONTROL
REAL TIME IN SITU MOORING DATABASE ADMINISTRATION
ESONET TITLE - date

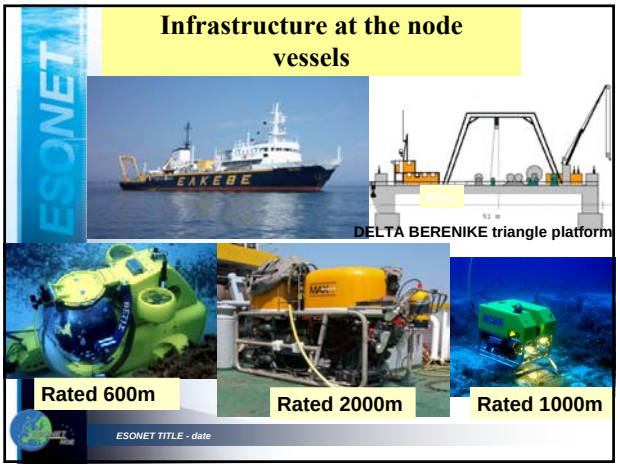

Data and information products dissemination
Online Data Service
http://www.poseidon.hcmr.gr

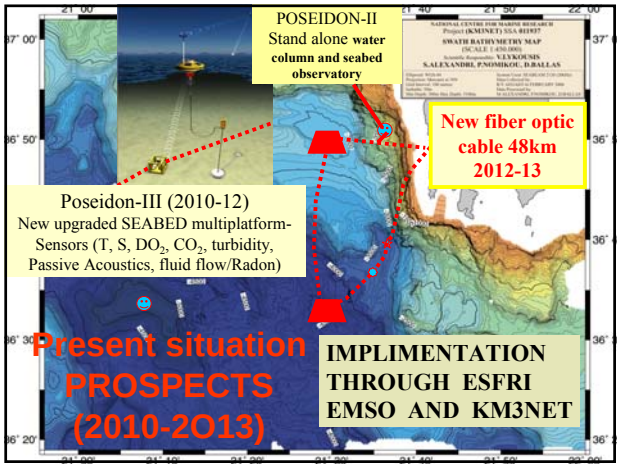

Data Base Access
http://www.poseidon.hcmr.gr
poseidon system
Archived Metadata & Data Base

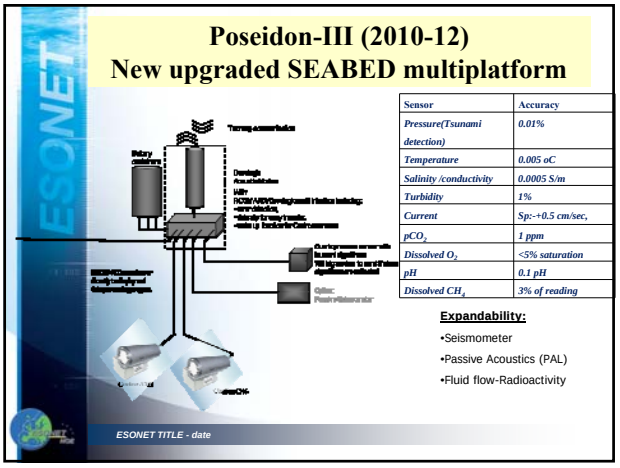

Archived Metadata & Data Base
http://www.poseidon.hcmr.gr
HELLENIC CENTER FOR MARINE RESEARCH - POSEIDON SYSTEM
Poseidon Data
Data Info
Metadata Info


Poseidon data base System
On line bionoise: using the Poseidon data base system averaged every three hours
Number of marine mammals
9 Buoy sites
Hellenic stand alone observatory
Parameters


Infrastructure at the node onshore


Infrastructure at the node vessels
DELTA BERENIKE triangle platform
Rated 600m
Rated 2000m
Rated 1000m
ESONET TITLE - date


POSEIDON-II
Stand alone water column and seabed observatory
New fiber optic cable 48km 2012-13
Poseidon-III (2010-12)
New upgraded SEABED multiplatform-
Sensors (T, S, DO2, CO2, turbidity,
Passive Acoustics, fluid flow/Radon)
Present situation
PROSPECTS
(2010-2013)
IMPLIMENTATION THROUGH ESFRI EMSO AND KM3NET

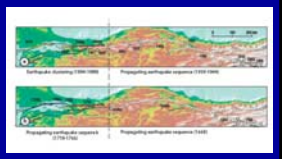

Poseidon-III (2010-12)
New upgraded SEABED multiplatform
Sensor
Accuracy
Pressure(Tsunami detection)
0.01%
Temperature
0.005 oC
Salinity /conductivity
0.0005 S/m
Turbidity
1%
Current
Sp:-+0.5 cm/sec,
pCO2
1 ppm
Dissolved O2
<5% saturation
pH
0.1 pH
Dissolved CH4
3% of reading
Expandability:
•Seismometer
•Passive Acoustics (PAL)
•Fluid flow-Radioactivity
ESONET TITLE - date

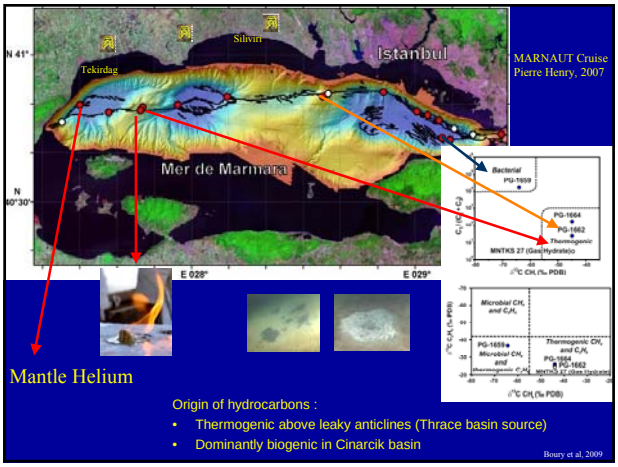
ESONET / MARMARA-DM Demonstration Mission

Objective : to contribute to the establishment of optimized permanent seafloor observatories for earthquake related hazards monitoring in the Marmara Sea

The Sea of Marmara area : an unique place for seafloor observatories

- Social demand in highly exposed, populated area
- Unique geological setting : small size, fault cyclicity, relatively « well identified and within reach » scientific problems, etc
- High deformation rates (~15 to 20 mm/y)
- Gas emissions and fluid seepages along the fault





MARNAUT Cruise
Pierre Henry, 2007

Mantle Helium

Origin of hydrocarbons :

- Thermogenic above leaky anticlines (Thrace basin source)
- Dominantly biogenic in Cinarcik basin

Boury et al, 2009

Marine Operations (WP2)

R/V Le Suroit Cruises ("Marmesonet"), conducted by IFREMER :

- nov. 4th – nov 26th, 2009 : acoustic detection of gas emissions ; Site surveys (AUV microbathymetry) ; deployment of BOB (acoustic gas bubble detector) ;
- nov. 29th – dec. 14th, 2009 : high resolution, 3D seismic survey on Western High.

R/V Urania Cruises (Marmara-2009 and Marmara-2010) conducted by ISMAR :

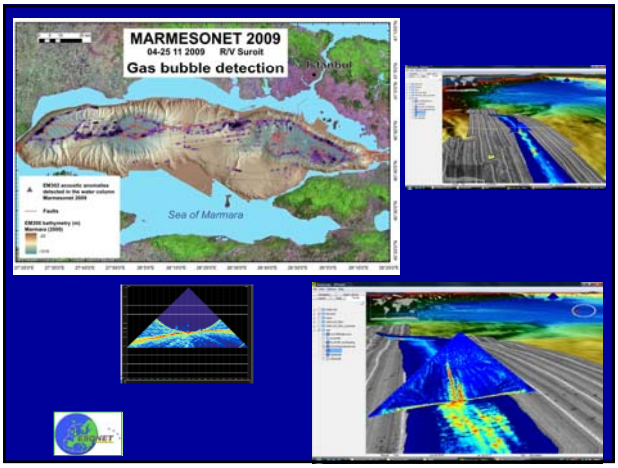
- Sept. 22nd – Oct. 12th, 2009 : deployment of SN-4 (entrance of Izmit Gulf) and Ifremer instruments ; en-route surveys ; coring and sampling of dissolved gas in the water column.
- Sept. 25th – Oct. 16th, 2010 : recovery of SN-4 ; en-route surveys ; core and pore fluid sampling for geochemical analysis

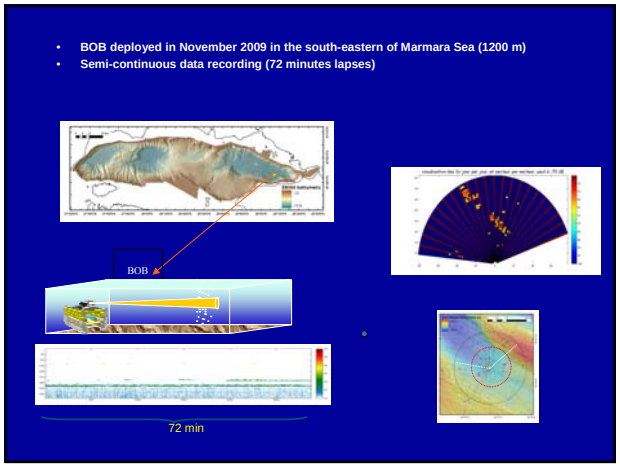
R/V Yunuz Cruise conducted by ITU :

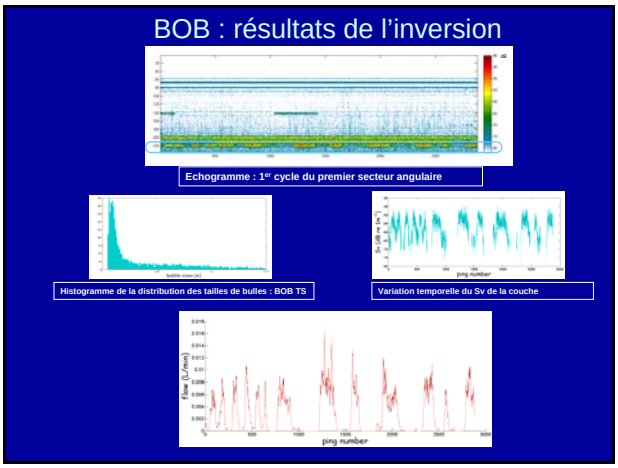
March 2010, recovery of all instruments (SN4, 10 OBSs and 5 piezometers) that were deployed with R/V Urania in October 2009. SN-4 was re-deployed again using the same vessel.

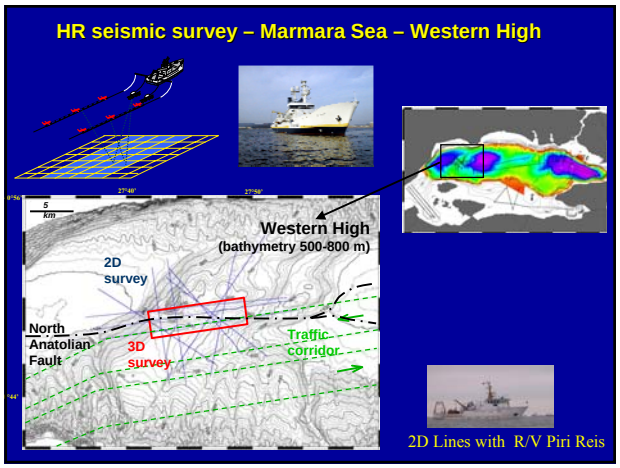
R/V Piri Reis Cruise conducted by DEU (Izmir) :

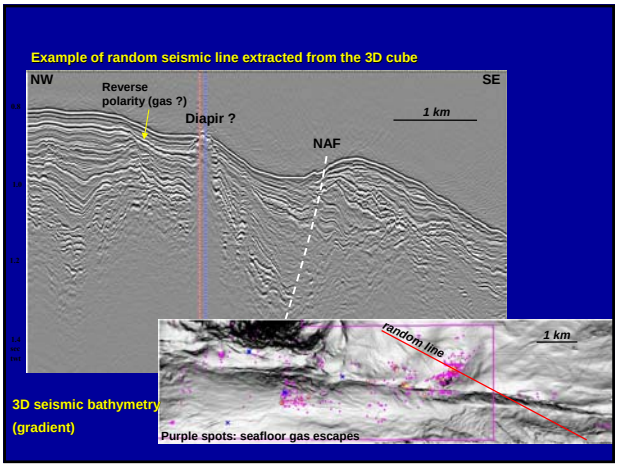
June 2010, seismic data acquisition, including : i) Long-offset, 2D seismic data over the 3D High-Res seismic box shot with R/V Le Suroit in october 2009 ; and ii) high resolution seismic images below seafloor observatory site 2.

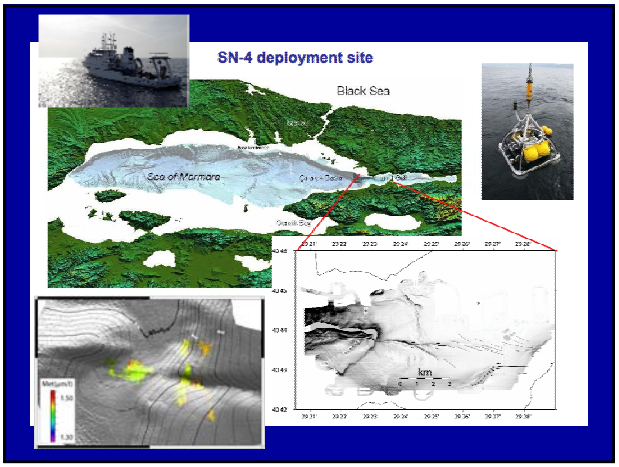

MARMESONET 2009
04-25 11 2009 R/V Suroit
Gas bubble detection
Istanbul
Sea of Marmara


BOB deployed in November 2009 in the south-eastern of Marmara Sea (1200 m)
Semi-continuous data recording (72 minutes lapses)
BOB
72 min

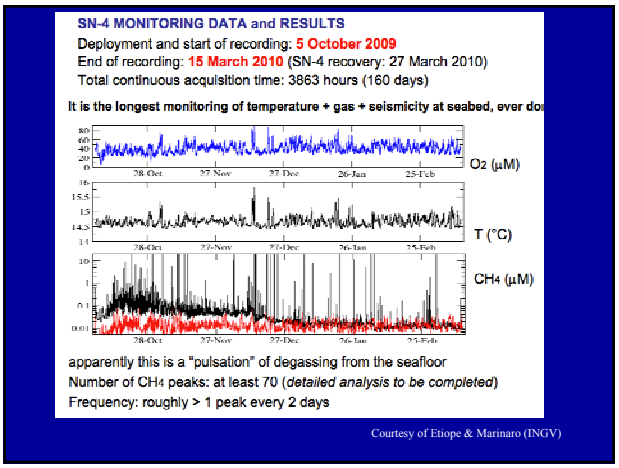

BOB : résultats de l'inversion
Echogramme : 1er cycle du premier secteur angulaire
Histogramme de la distribution des tailles de bulles : BOB TS
Variation temporelle du Sv de la couche
ping number

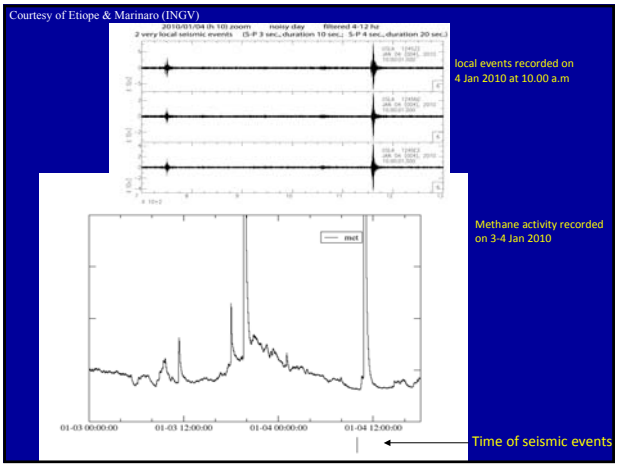

HR seismic survey – Marmara Sea – Western High
Western High
(bathymetry 500-800 m)
2D
survey
North
Anatolian
Fault
3D
survey
Traffic
corridor
2D Lines with R/V Piri Reis


Example of random seismic line extracted from the 3D cube
NW
SE
Reverse polarity (gas ?)
Diapir ?
NAF
1 km
random line
1 km
3D seismic bathymetry (gradient)
Purple spots: seafloor gas escapes

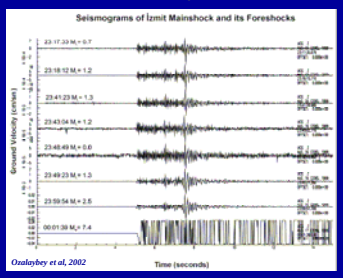

SN-4 deployment site
Black Sea
Sea of Marmara
km


SN-4 OBSERVATORY
Multiparameter seafloor station for long-term monitoring of seismicity, oceanographic and gas-seepage processes
All sensors are managed by a data acquisition and control system, with the same time reference
Autonomy: variable, up to 1 year
SEISMOMETER
CMG-40T
METHANE SENSORS (Franatech)
CTD (Seabird)
AANDERAA OXYGEN SENSOR
Acoustic Current Meter
NOBSKA
Backscattering Meter
WET Labs
Courtesy of Etiope & Marinaro (INGV)


SN-4 MONITORING DATA and RESULTS
Deployment and start of recording: 5 October 2009
End of recording: 15 March 2010 (SN-4 recovery: 27 March 2010)
Total continuous acquisition time: 3863 hours (160 days)
It is the longest monitoring of temperature + gas + seismicity at seabed, ever do
O2 (µM)
T (°C)
CH4 (µM)
apparently this is a "pulsation" of degassing from the seafloor
Number of CH4 peaks: at least 70 (detailed analysis to be completed)
Frequency: roughly > 1 peak every 2 days
Courtesy of Etiope & Marinaro (INGV)

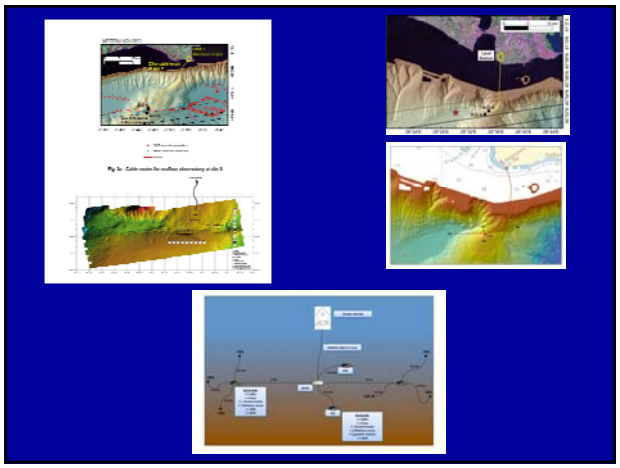


Increases in seismic activity preceded the Izmit and Düzce earthquakes



Major discovery (to be published soon in Science) by Michel Bouchon's group :

- evidence of low frequency earthquakes (tremors) about 45 minutes prior to the Izmit rupture
- Very characteristics and recognizable signal
- signals originating within less than 300 m from the hypocenter



Conclusion

MARMARA-DM Main achievements
(see poster by Namik Cagatay, ITU)

-Sites selection & Site surveys

- Seafloor Observatory Design

- Sensor selection & testing

- Costs estimates / Proposals from manufacturers

- Turkish Consortium including AFAD (Disaster and Emergency Management Presidency of Turkey)

- MARDEP Proposal ready to be presented to Turkish authorities in spring 2011

- MARQUAKE Proposal submitted to EU/FP7 on nov 16th, 2010

ESONET
General Assembly

15 December 2010
Marseille

15 Minutes

Participants:
INFN, INGV, BEUTH, Tecnomare, CNRS, IFREMER

Test at Cabled deep-sea Site in Sicily

Giorgio Riccobene
INFN-LNS, Catania
riccobene@lns.infn.it

Test Site Activity

Standardise procedures and operations in cabled deep-sea sites

Institutions involved

INFN, INGV, BEUTH, Tecnomare, CNRS, IFREMER

Two sea campaigns

2100 m w.d. and 3500 m w.d.

Joint tests and operations

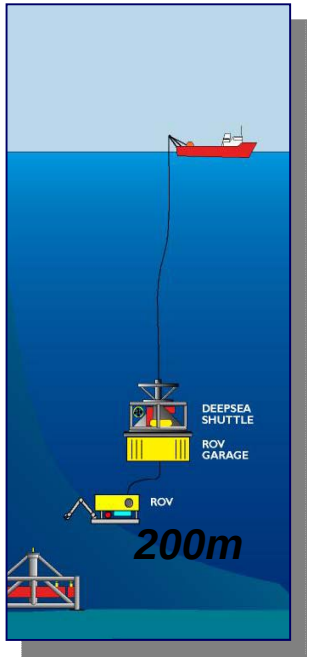
Deep sea-deployments
ROV connection tests
Cabled observatories management

The PEGASO ROV

ROV Cougar Seaeye with 2 manipulators, upgraded to 4000 m operative water depth.

New Acoustic Positioning System

The ROV moves horizontally (200 m tether cable)



ROV ready for Capo Passero operation (starting on December 15)

Test Site Activity: Capo Passero 3500 m w.d.

Sea Campaign December 2010

Site:

East Sicily - Capo Passero - 3500 m depth

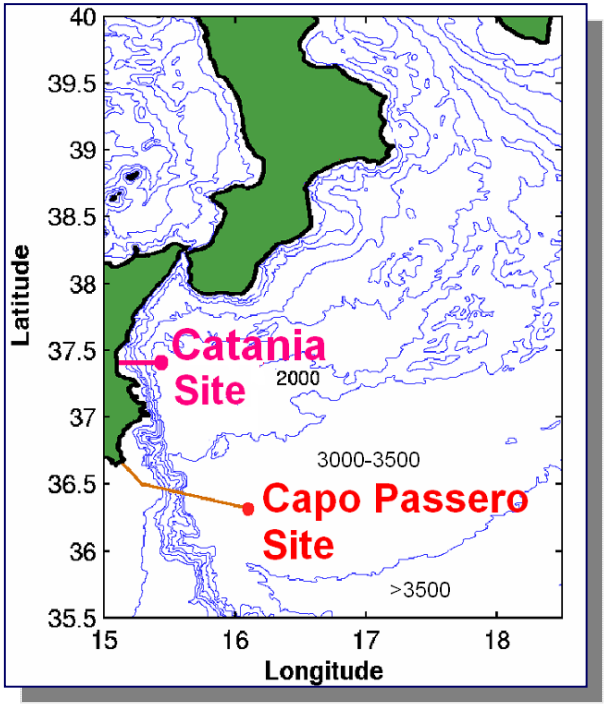
Instrumentation:

ANTARES Mini-Line

PEGASO ROV

Ship:

Certamen Cable Layer Ship (Elettra Tlc)



Technical goals:

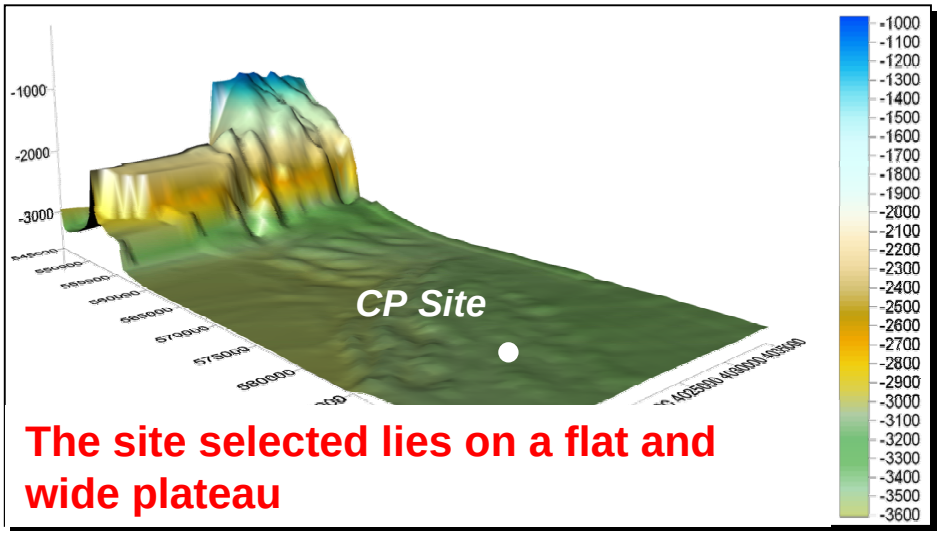
joint operations (deployment, connection) using PEGASO ROV at 3500m w.d.
joint test of ANTARES technical solutions at 3500m depth
test of 100 km –long MEOC at 10 kVDC with sea-return
test of Alcatel Junction Box and ODI e.o. HV hybrid connectors

Science goals:

environmental site monitoring (bioluminescence, sea currents)

East-Sicily: Capo Passero infrastructure

Shore Laboratory in Capo Passero Harbour



The site selected lies on a flat and wide plateau

Capo Passero host an infrastructure suitable for the km³-scale neutrino telescope installation (KM3NeT)

Shore laboratory:
Power supplier 10 kV - 50 kW
Data Acquisition Room
Optical Fiber to LNS (June 2011)

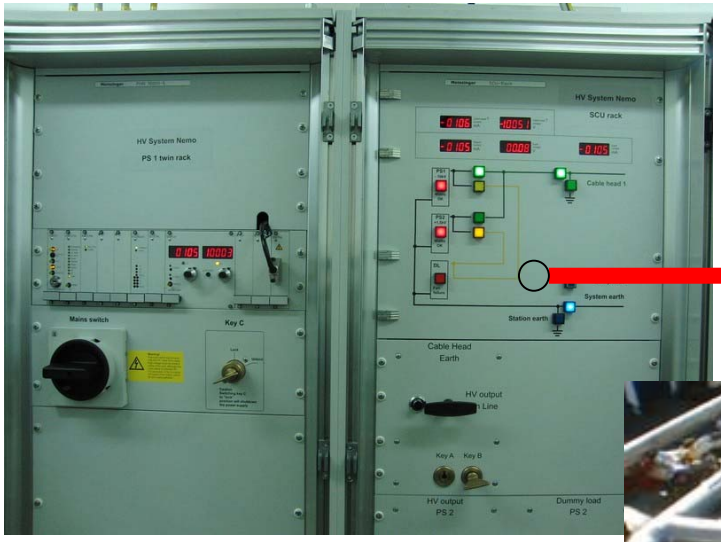
Submarine cable
100 km - 20 fibres, DC-sea return

Present submarine Infrastrcture
- DC/DC Converter 10 kV-375 V
10 kW
- 3 ROV e.o. output connectors

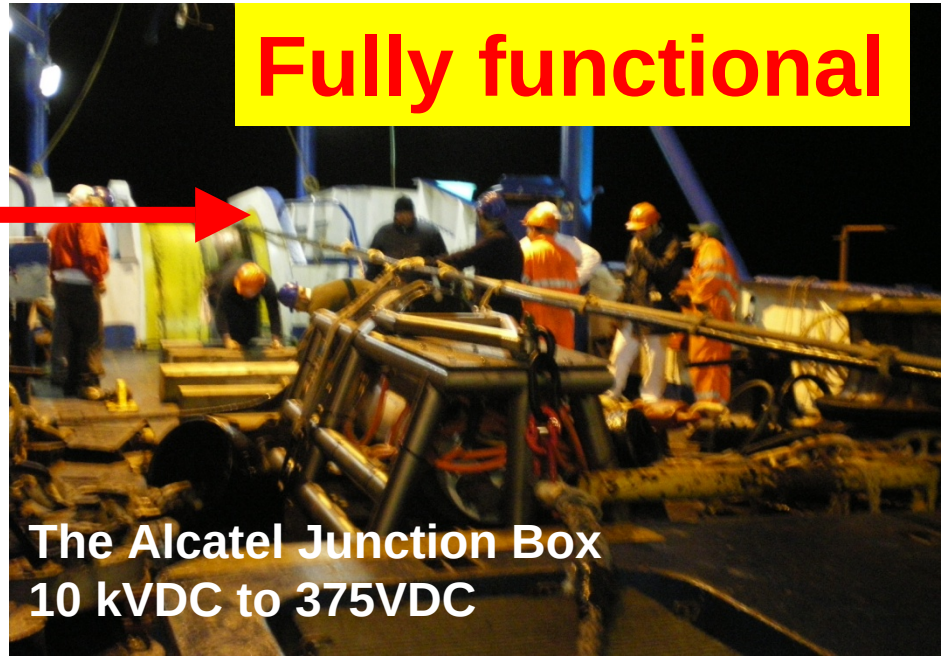
East-Sicily: the Capo Passero Junction Box

Deployment: November 2009

Alcatel shore power supply (50 kW, 10 kVDC max) and line power converter installed in the Capo Passero shore Lab



100 km cable



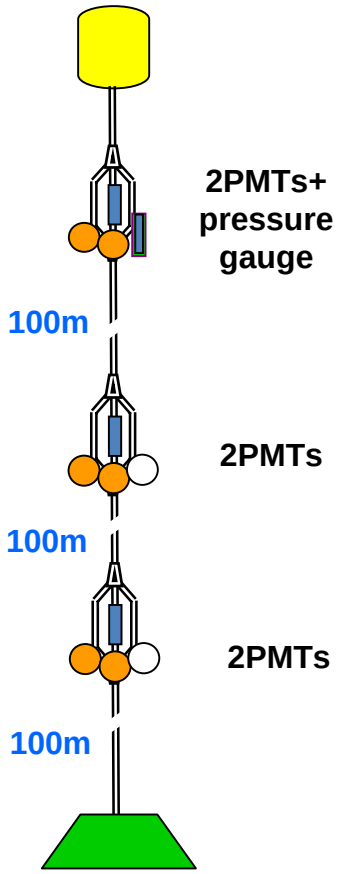
3 ROV mateable e.o. outputs

ODI
Rolling Seal
hybrid

NRH Series
6 ways
4 optical
2 electircal

Test Site Activity at Capo Passero

December 15, 2010 -Joint sea operations:
Deployment of the ANTARES Mini-Line
-joint ROV connection tests
- joint shore DAQ tests



Comparison of ANTARES structure and instrumentation response to:
external solicitations (sea currents)
Bioluminescence stimulated by the structure

Monitoring of the Capo Passero site with an apparatus similar to ANTARES

Test Site Activity: Catania Test Site 2100 m w.d.

Sea Campaign January 2011

Site:

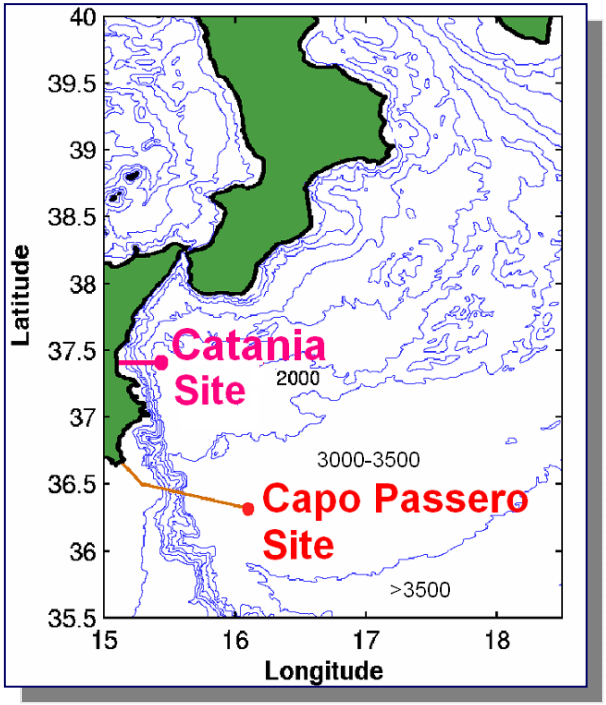
East Sicily - Catania - 2100 m depth

Instrumentation:

LIDO seafloor observatories (SN1 and bioacustic module)
MODUS
PEGASO ROV
NEMO JB

Ship:

Certamen Cable Layer Ship (Elettra Tlc)

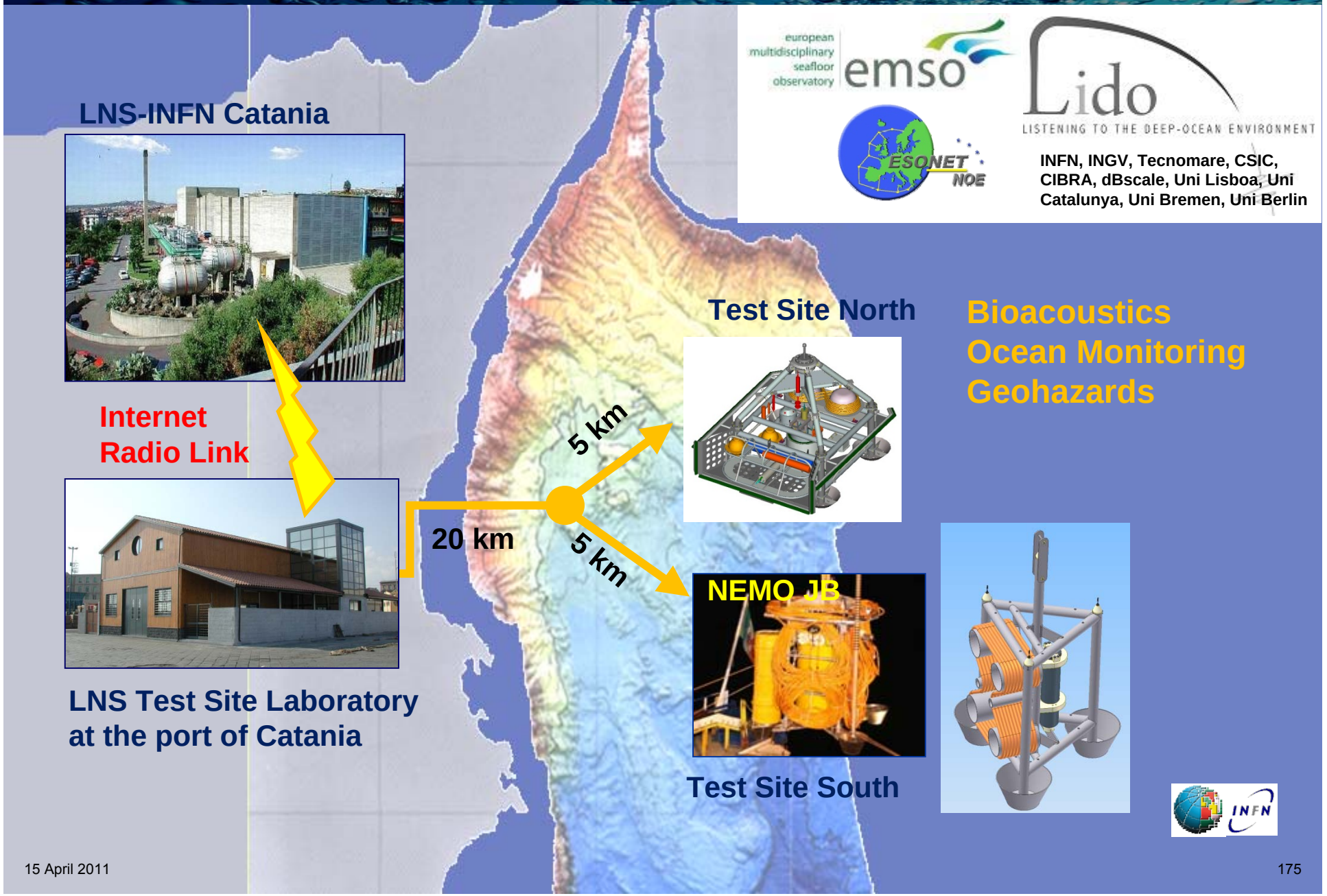


joint multi-deployment and connection operations with MODUS and PEGASO ROV
joint tests of deep-sea connections with PEGASO ROV at 2000m depth
test of the NEMO Junction Box with Earth and Sea Science instrumentation

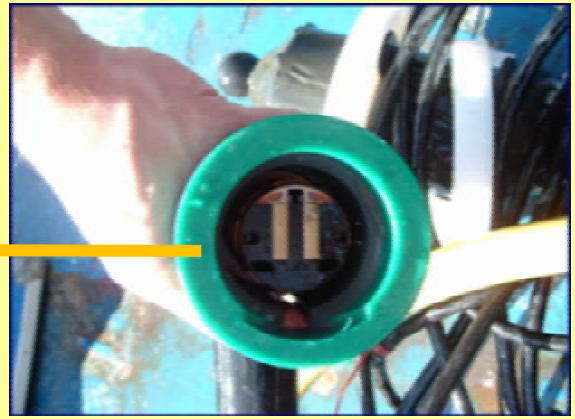
Science goals:

geophysics, bio-acoustics and environmental site monitoring

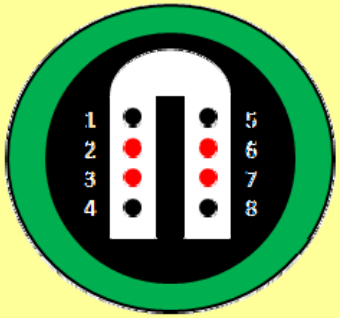
Test Site activity: Catania cable layout



Test Site activity: Catania cable and terminations



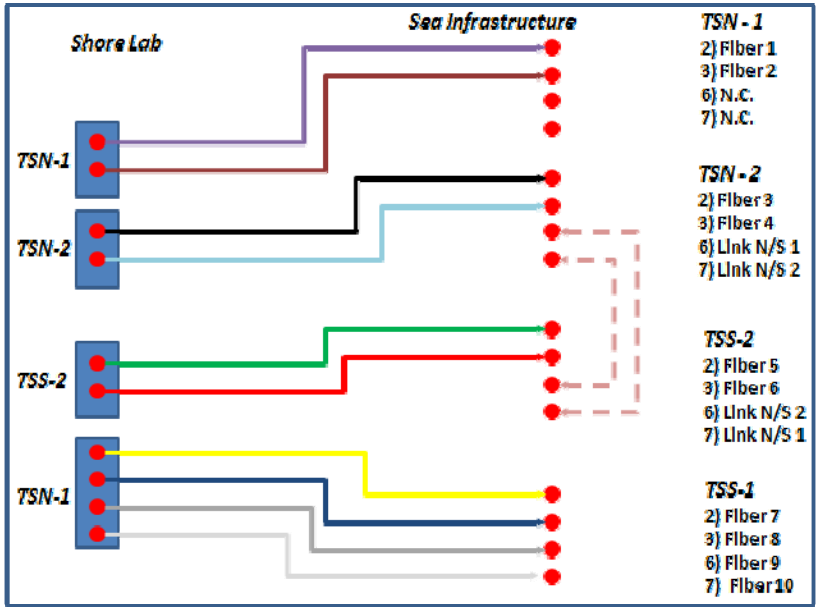
ODI ROV-mateable Rolling Seal hybrid connector 8 ways



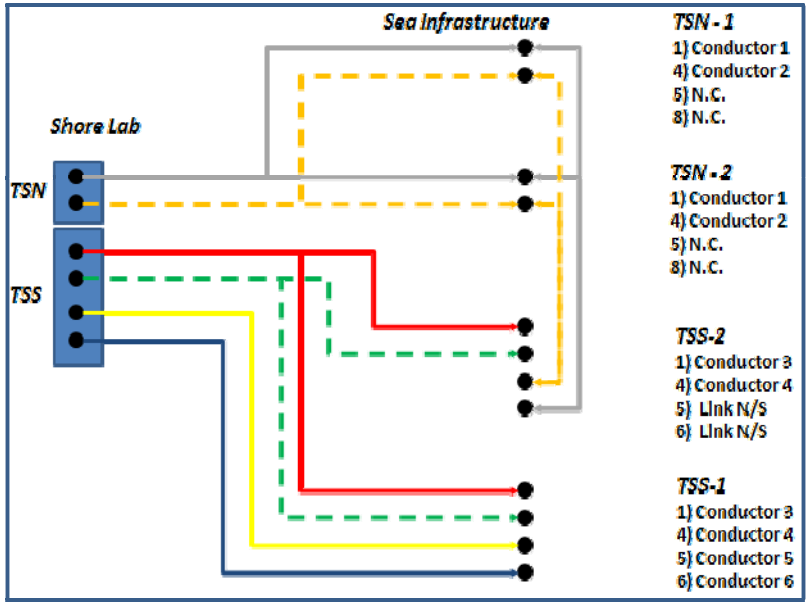
Pin numbering

1) Electrical pin
2) Single Mode fiber
3) Single Mode fiber
4) Electrincal pin
5) Electrical Pin
6) Single Mode Fiber
7) Single Mode Fiber
8) Electrical Pin

Optical Connections



Electrical Connections



East-Sicily: the JB at Catania TS South

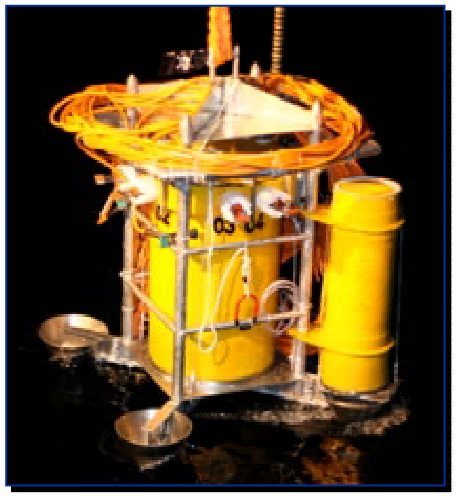
700 VAC (3-phase) 10 kVA power supply is installed on-shore

Two output e.o. ROV mateable connectors available

Power load per outup connector:
1.5 kVA - 380 VAC (3-phase)

Optical fibre link:
DWDM (optional CWDM)

JB-Output 1			JB-Output 2		
	Electrical	Optical		Electrical	Optical
Pin 1	Phase R		Pin 1	Phase R	
Pin 2		1540 - 1545 nm	Pin 2		1525 - 1545 nm
Pin 3		1538 - 1607 nm	Pin 3		1570 - 1576 nm
Pin 4	Phase S		Pin 4	Phase S	
Pin 5	Phase T		Pin 5	Phase T	
Pin 6		1546 - 1552 nm	Pin 6		N.C.
Pin 7		1528 - 1607 nm	Pin 7		N.C.
Pin 8	Neutral		Pin 8	Neutral	



Test site activity: Deployment and connections

Lido
LISTENING TO THE DEEP-OCEAN ENVIRONMENT

Catania Test Site – North

Refurbshed SN1 with OνDE onboard:
- 3-axis broadband seismometer
- 2 Low frequency hydrophones
- 3 axis accelerometer and gyro
- Absolute pressure gauge
- Differential pressure gauge
- Scalar and vectorial magnetometers
- Single point 3-axis current meter
- Acoustic doppler current profiler
- Conductivity, temperature and depth meter
- 4 large bandwidth hydrophones

Catania Test Site - South

NEMO-Acoustic station:
- 4 large bandwidth hydrophones
- Off-shore GPS time stamping
- Compass and tilt meter

New payload

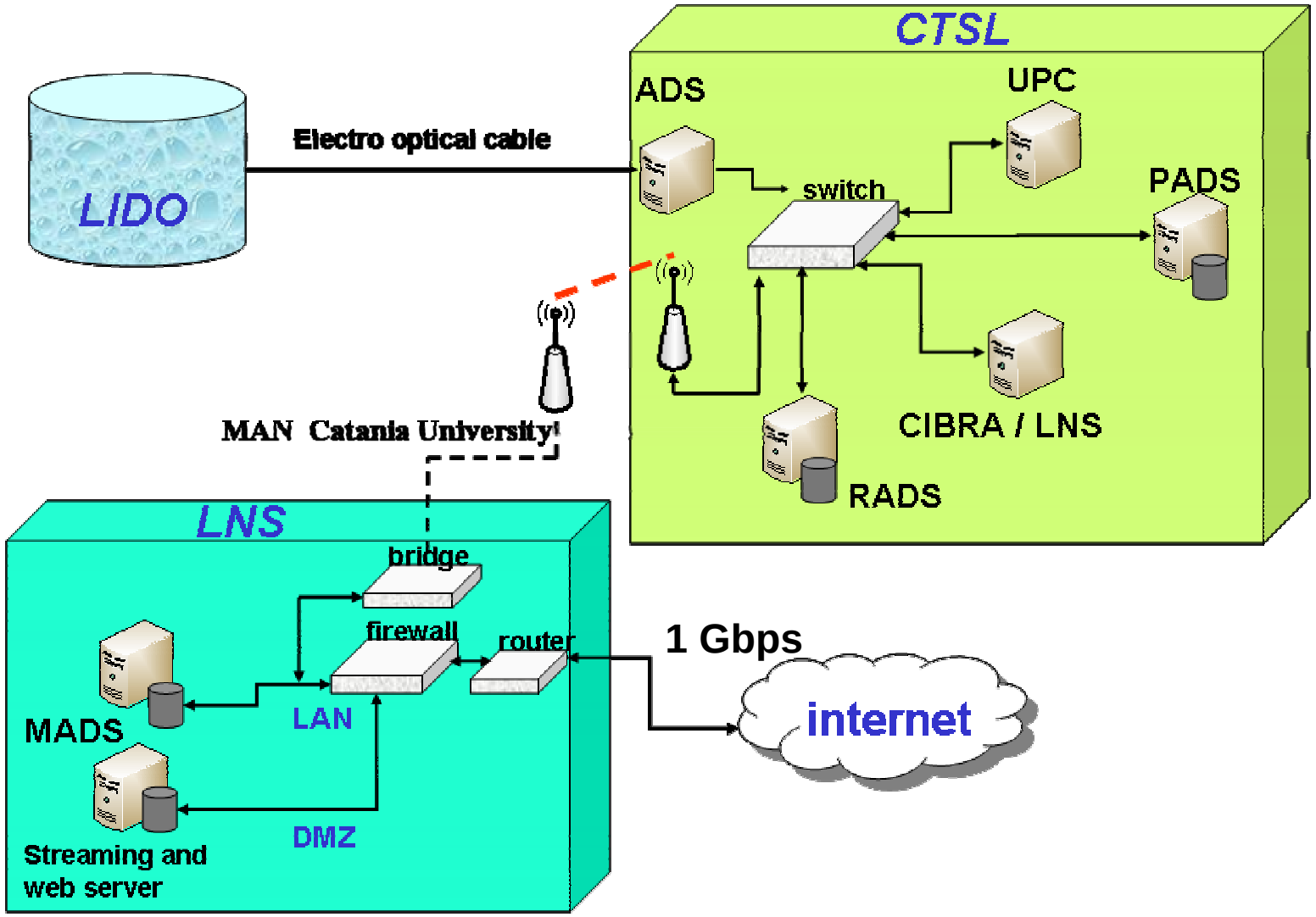
Sensor	rate	Model
3-C broad-band seismometer *	100 Hz	Guralp CMG-1T (0.0027-50 Hz)
Differential Pressure Gauge (DPG)	10 Hz	Prototype Univ. California-St. Diego
Hydrophone (Geophysics)	200 Hz	OAS E-2PD
Hydrophone (Geophysics)	2000 Hz	SMID (0.05-1000 Hz)
4+4 Hydrophones (Bio-acoustics)	96 /192 kHz **	SMID (100-70000 Hz)
Absolute Pressure Gauge (APG) *	15 s	Paroscientific 8CB4000-I
3-C Accelerometer + 3-C Gyro (IMU) *	100 Hz	Gladiator Technologies Landmark 10
Gravity meter	1 Hz	Prototype IFSI-INAF
Scalar magnetometer	1 Hz	Prototype INGV
Vectorial magnetometer	1 Hz	Marine Magnetics Sentinel (3000 m)
ADCP	1 profile/h	RDI Workhorse Monitor (600 kHz)
CTD + Turbidity meter	1 s/h	SeaBird SBE-37SM-24835 + Wet Lab
3-C single point current meter	2 Hz	Nobska MAVS-3

* tsunami early warning system

** 96 kHz at TSN, 192 kHz at TSS

LIDO Data management

Data management: from deep sea to the Internet



Storage Area Network on Fiber Channel

Catania TS shore facilities

The Catania Test Site shore laboratory has:

Large construction hall (20m x 10m x 5 m)
Data acquisition hall
Power suppliers (under UPS)
Electronics workshops
Conference room
20'' pressure test chamber (400 bar)
32 Mbps radio link to LNS-INFN.

The port of Catania is the logistic base of Elettra-Tlc, member of MECMA and owner of the Teliri and Certamen C/L vessels.

LNS is one of the four major laboratories of INFN.

LNS is connected (now at 1 Gbps) to the Italian Internet Infrastructure for Scientific Research (GARR)

LNS hosts the main Storage Units and Servers (e.g. For LIDO-DM) and it is a node of the European GRID

ESONET TITLE

Date
City

Minutes of presentation

Participants

Test Experiment in Koljö Fjord – Progress and plans

Per Hall, Christoph Waldman, Mikhail Kononets, Robert Huber and Anders Tengberg

Objectives

- Test observatory for advanced environmental monitoring systems
- Easy access
- Easy exchange of nodes
- High flexibility
- High quality assurance through monthly monitoring data
- Infrastructure and software being standard commercially available

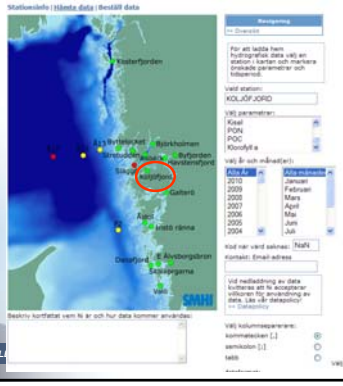
ESONET TITLE - date

ESONET TITLE - date

ESONET TITLE - date

Quality Assurance!

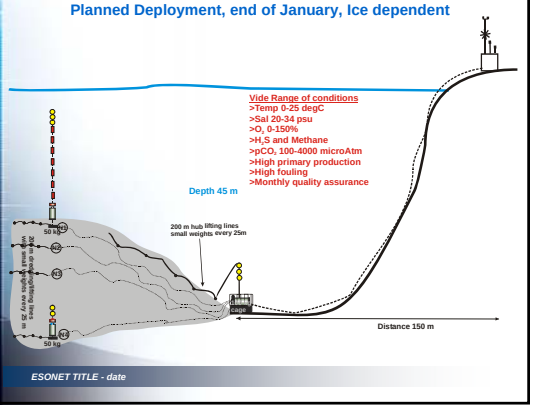
- The Swedish Meteorological and Hydrological Institute (SMHI) is doing monthly sampling in the Koljöfjord
- Data available about 1 month after sampling on the Internet. Data exists since 1934.
- Measured parameters: Temp, Sal, O_2, pH, H_2S, Nutrients, Chl etc.



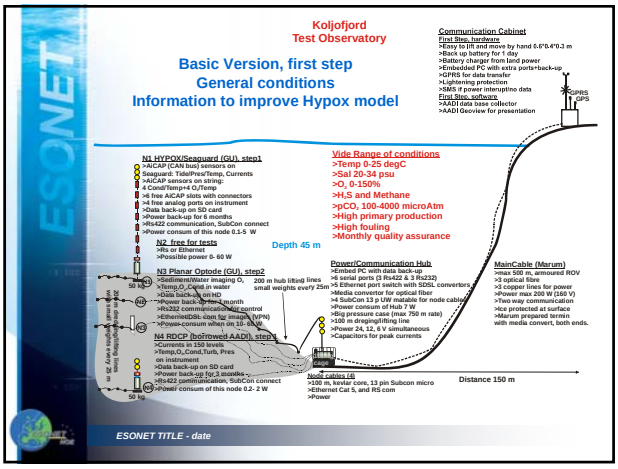
ESONET TITLE

Koljofjord
Test Observatory

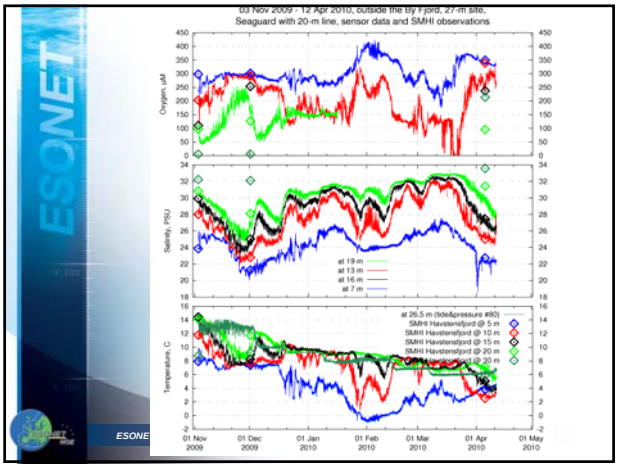
Planned Deployment, end of January, Ice dependent

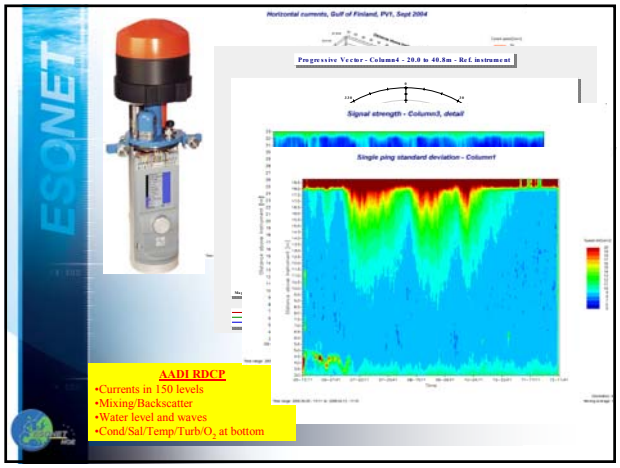


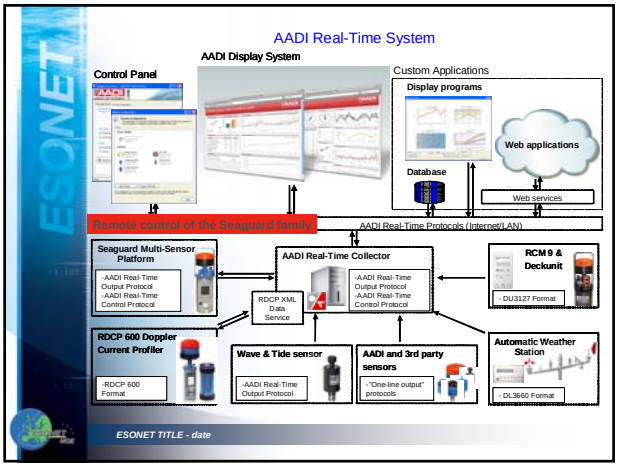
ESONET TITLE - date

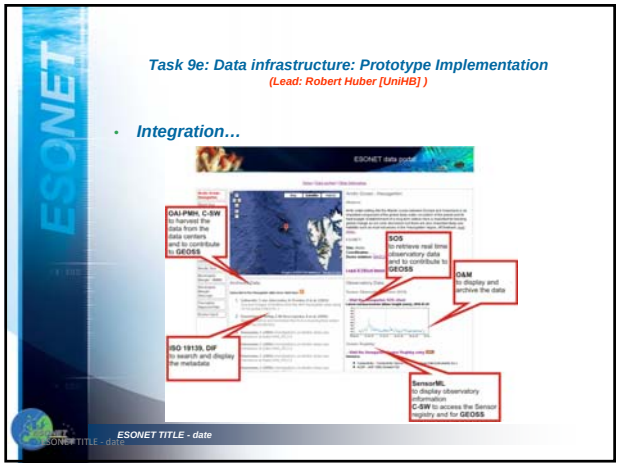

Koljofjord
Test Observatory
Basic Version, first step
General conditions
Information to improve Hypox model
Communication Cabinet
First Step, hardware
>Easy to lift and move by hand 0.6*0.4*0.3 m
>Back up battery for 1 day
>Battery charger from land power
>Embedded PC with extra ports+back-up
>GPRS for data transfer
>Lightening protection
>SMS if power interuptino data
First Step, software
>AADI data base collector
>AADI Geoview for presentation
GPRS
GPS
N1 HYPOX/Seaguard (GU), step1
>AICAP (CAN bus) sensors on
Seaguard: Tide/Pres/Temp, Currents
>AICAP sensors on string:
4 Cond/Temp+4 O2/Temp
>6 free AICAP slots with connectors
>4 free analog ports on instrument
>Data back-up on SD card
>Power back-up for 6 months
>Rs422 communication, SubCon connect
>Power consum of this node 0.1-5 W
Vide Range of conditions
>Temp 0-25 degC
>Sal 20-34 psu
>O2 0-150%
>H2S and Methane
>pCO2 100-4000 microAtm
>High primary production
>High fouling
>Monthly quality assurance
N2 free for tests
>Rs or Ethernet
>Possible power 0- 60 W
Depth 45 m
Power/Communication Hub
>Embed PC with data back-up
>6 serial ports (3 Rs422 & 3 Rs232)
>5 Ethernet port switch with SDSL convertors
>Media convertor for optical fiber
>4 SubCon 13 p UW matable for node cables
>Power consum of Hub 7 W
>Big pressure case (max 750 m rate)
>100 m draging/lifting line
>Power 24, 12, 6 V simultaneous
>Capacitors for peak currents
MainCable (Marum)
>max 500 m, armoured ROV
>3 optical fibre
>3 copper lines for power
>Power max 200 W (160 V)
>Two way communication
>4ce protected at surface
>Marum prepared termin
with media convert, both ends.
N3 Planar Optode (GU), step2
>Oxygen/Water imaging O2
>Temp,O2,Cond in water
>Data back-up on HD
>Power back-up for 1 month
>Rs232 communication, Host control
>Ethernet/DSL coax for images (MPN)
>Powe consum when on 10- 60 W
200 m hub littop lines
small weights every 25m
N4 RDCP (borrowed AADI), step3
>Currents in 150 levels
>Temp,O2,Cond,Turb, Pres
on instrument
>Data back-up on SD card
>Power back-up for 3 months
>Rs422 communication, SubCon connect
>Powel consum of this node 0.2- 2 W
Node cables (4)
>100 m, kevlar core, 13 pin Subcon micro
>Ethernet Cat 5, and RS com
>Power
Distance 150 m
ESONET TITLE - date

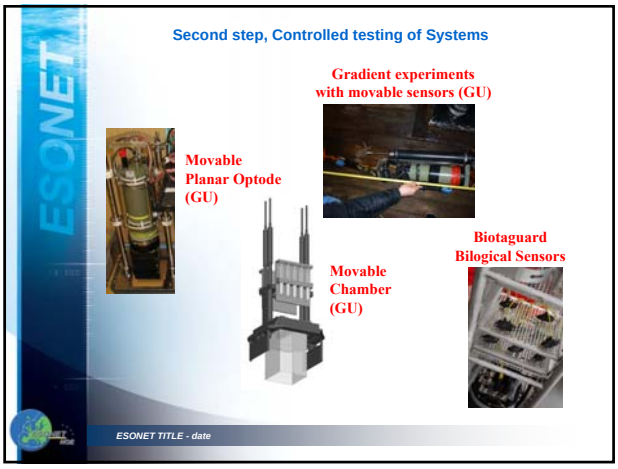

CO2
CO2
CO2
HYPOX Seaguard with 20 m string
•Currents at one level
•Water level and waves
•Cond/Sal at 4 levels
•O2 at 4 levels
•Temp at 9 levels
•6 Empty slots

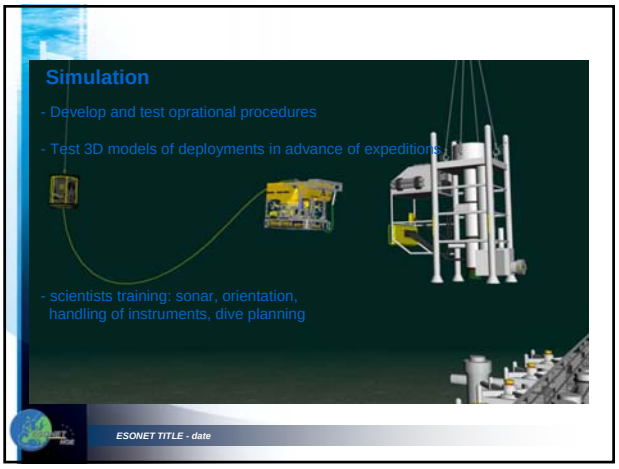

03 Nov 2009 - 12 Apr 2010, outside the Bly Fjord, 27-m site,
Seaguard with 20-m line, sensor data and SMHI observations
Oxygen, µM
Salinity, PSU
Temperature, C
at 19 m
at 13 m
at 16 m
at 7 m
SMHI Havstensfjord @ 5 m
SMHI Havstensfjord @ 10 m
SMHI Havstensfjord @ 15 m
SMHI Havstensfjord @ 20 m
01 Nov 2009
01 Dec 2009
01 Jan 2010
01 Feb 2010
01 Mar 2010
01 Apr 2010
01 May 2010

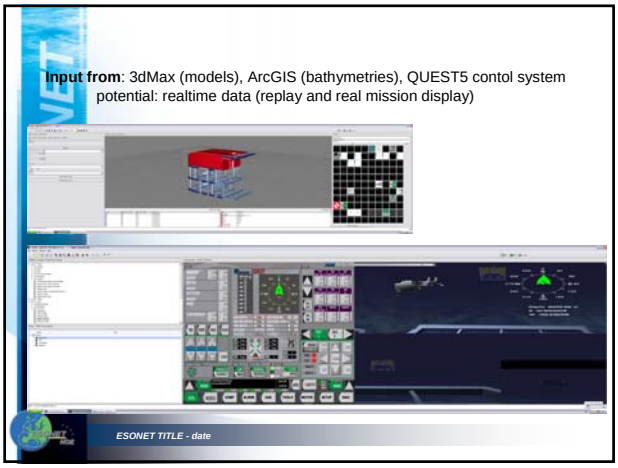

AADI RDCP
•Currents in 150 levels
•Mixing/Backscatter
•Water level and waves
•Cond/Sal/Temp/Turb/O2 at bottom


AADI Real-Time System
AADI Display System
Control Panel
Custom Applications
Display programs
Web applications
Database
Web services
Remote control of the Seaguard family
AADI Real-Time Protocols (Internet/LAN)
Seaguard Multi-Sensor Platform
AADI Real-Time Collector
RCM 9 & Deckunit
RDCP XML Data Service
RDCP 600 Doppler Current Profiler
Wave & Tide sensor
AADI and 3rd party sensors
Automatic Weather Station
ESONET TITLE - date


Task 9e: Data infrastructure: Prototype Implementation
(Lead: Robert Huber [UniHB])
Integration…
ESONET TITLE - date


Second step, Controlled testing of Systems
Gradient experiments with movable sensors (GU)
Movable Planar Optode (GU)
Movable Chamber (GU)
Biotaguard Bilogical Sensors
ESONET TITLE - date


Simulation
- Develop and test oprational procedures
- Test 3D models of deployments in advance of expeditions
- scientists training: sonar, orientation, handling of instruments, dive planning
ESONET TITLE - date


Input from: 3dMax (models), ArcGIS (bathymetries), QUEST5 contol system
potential: realtime data (replay and real mission display)
ESONET TITLE - date

4.5.3 WP7: Education and outreach

Presented by L. Thomsen (JUB)

L. Thomsen started with a presentation of the Website (D49): there is one section for training and one section for outreach materials. The website is available in several languages: French, German, English, Swedish, and Spanish. In addition, some pages were translated in Russian, Bulgarian…
It was created an update of the different DM sites when data will be available as for MODOO or LIDO

- In the training section all details on workshops (past and future workshops) are included
- In the outreach section teaching aids are online and downloadable they are progressively added to the website.
- In the school pages, we can find animated introduction on a number of marine processes + some marine species.
- In addition some links to European projects/programmes and links to DMs (DM summary D32) are available.

During the ESONET contract 2 training workshops were organised by JUB in 2008 and 2009 (It was very successful! feedback was very positive).
Other deliverables deal with CSS, D63on carbon capture and storage. We can also see pages on equipments/instruments/modules-crawlers used. ESONET movies and media are also available on this website.

During the WP7 presentation ESONET movies were shown by Sylvain Ghiron (SOPAB/Oceanopolis).

- The Ocean under observation
- Deep-Sea observatories… Internet in the ocean.

WP7 review

ESONET TRAINING AND OUTREACH

Summary of WP7 activity

Minutes of presentation

Dec 15th 2010

Participants

Autun Purser
Laurenz Thomsen
Jacobs Uni. Bremen
& other partners

Training and Outreach website (D49)

WEBSITE SETUP

A key deliverable for WP7 was the development and maintenence of a training and outreach website.

Subsections for Training and Outreach materials.

WP7 review – Marseille, 15th Dec 2010

Training and Outreach website (D49)

WEBSITE LANGUAGES

Initial website translated into several languages:

French, German, Swedish, Spanish

A reduced selection of key pages translated into:

Belgian, Turkish, Russian

Spanish translated page example

Training and Outreach website (D49)

WEBSITE UPDATES

Wherever possible, website content kept current, e.g.:

Links to first ESONET data from MODOO soon after data started to arrive.

Link to LIDO data when first available.

Link to podcast on ESONET project.

MODOO
MOdular Deep Ocean Observatory

Lido
LISTENING TO THE DEEP-OCEAN ENVIRONMENT

Science and the Sea

Training and Outreach website (D49)

TRAINING SECTION

Kept updated with:

Details of forthcoming workshops

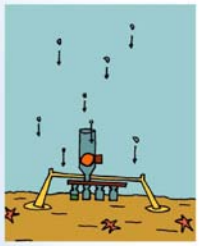
Details and reviews of previous workshops

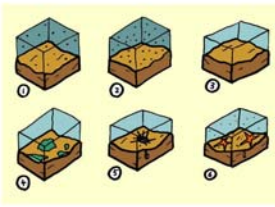
Training and Outreach website (D49)

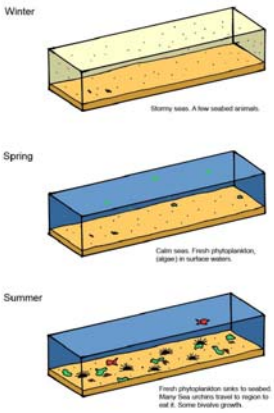
OUTREACH SECTION

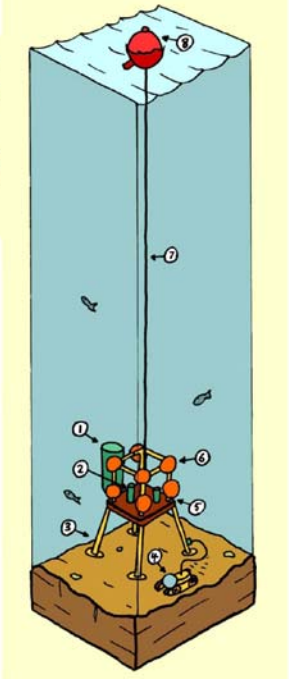
Online and downloadable teaching aids progressively added to the website during the lifetime of the project.

Focus on presenting case for TIME SERIES MARINE RESEARCH.









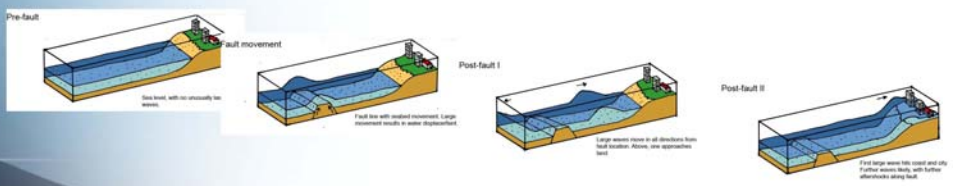
WP7 review – Marseille, 15th Dec 2010

Training and Outreach website (D49)

SCHOOL PAGE

A school page is attached to the main training and outreach page.

This page contains animated introductions to a number of marine processes related to ESONET activity.



WP7 review – Marseille, 15th Dec 2010

Training and Outreach website (D49)

LINKS

As requested, ESONET outreach page is (in many cases reciprocally) linked to a selection of European FP6 and FP7 programmes.

marbef

EuroSITES
European Ocean Observatory Network

CARBOOCEAN

Oceans
EUR-OCEANS
CONSORTIUM

HERMIONE

Poseidon System

Monitoring, Forecasting and Information System for the Greek Seas

WP7 review – Marseille, 15th Dec 2010

Website Demo mission summaries (D32)

Introductory pages are online for five demo mission sites.

Wherever possible, links to project data have been provided from these summary pages.

Introductory pages can be updated if material provided by the demo missions.

MoMAR

Lido
LISTENING TO THE DEEP-OCEAN ENVIRONMENT

ITU/ESONET
Esonet Marmara DM

MODOO
MOdular Deep Ocean Observatory

+ LOOME

WP7 review – Marseille, 15th Dec 2010

Training and Outreach website (D64)

Two training workshops organised by Jacobs University Bremen.

2008 - Workshop aimed at bringing together technicians and students from various ESONET partners.

2009 - Workshop held in association with Bremen IEEE conference, aimed at further integrating ESONET technicians, building collaborations and introducing new sensors and infrastructure options available from industry.

WP7 review – Marseille, 15th Dec 2010

Training workshops (D64)

PARTICIPATION AT BREMEN WORKSHOPS

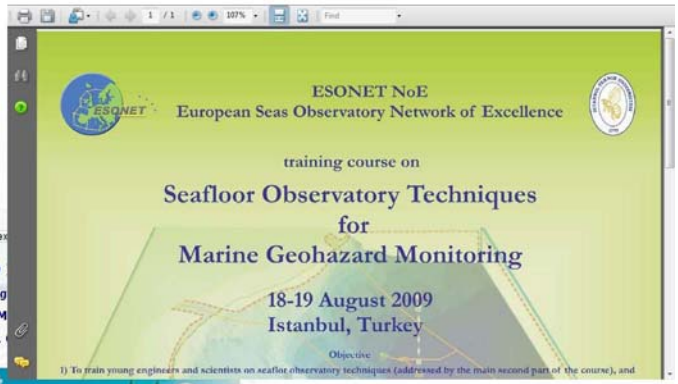
Representatives from many ESONET partners attended or presented at the Bremen workshops. (15+ participants per workshop).

Feedback from participants was positive:-

WP7 review – Marseille, 15th Dec 2010

Training workshops (D64)

Further training workshops have been organised by other ESONET partners, e.g. Marine Geohazard Monitoring training workshop, Istanbul, Turkey, 2009.



WP7 review – Marseille, 15th Dec 2010

School Materials – online (D49)

A selection of interactive educational features are available online -

ONLINE QUIZ

- Online quiz introducing sets of data (such as generated by observatories) and use of this data.

As with the majority of educational material produced for ESONET NoE, focus again on TIME SERIES

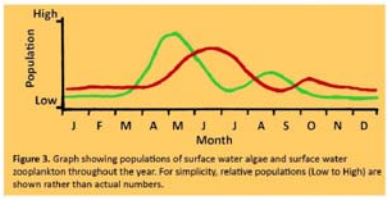


Figure 3. Graph showing populations of surface water algae and surface water zooplankton throughout the year. For simplicity, relative populations (Low to High) are shown rather than actual numbers.

Phyto- and zooplankton

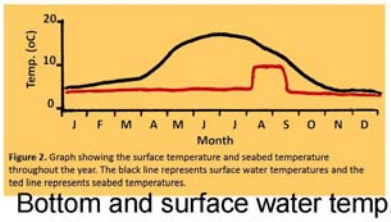


Figure 2. Graph showing the surface temperature and seabed temperature throughout the year. The black line represents surface water temperatures and the ted line represents seabed temperatures.

Bottom and surface water temp.

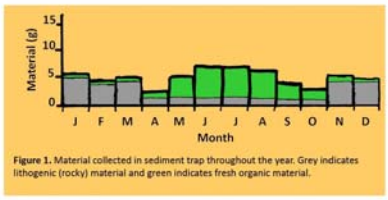


Figure 1. Material collected in sediment trap throughout the year. Grey indicates lithogenic (rocky) material and green indicates fresh organic material.

Particle flux and lability

WP7 review – Marseille, 15th Dec 2010

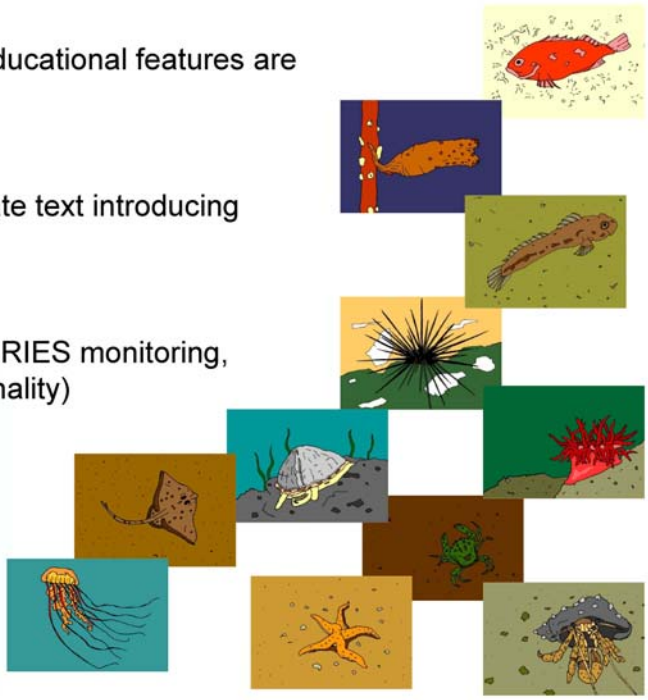
School Materials – online (D49)

A selection of interactive educational features are available online -

MARINE SPECIES

- Simple game and associate text introducing common marine species

Again, focus on TIME SERIES monitoring, (invasive species, seasonality)



WP7 review – Marseille, 15th Dec 2010

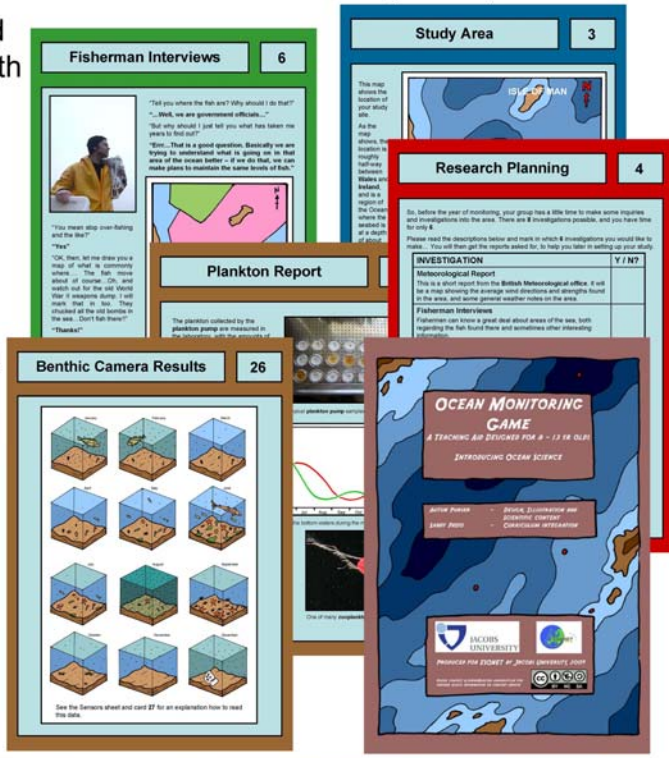
School Materials - Downloadable (D49)

Downloadable teaching aid produced in association with educators.

Takes the form of a collaborative game for students.

Students take on roles of demo mission leaders and decide how to spend the project budget...

...depending on which sensors and design choices they made, they get different data results with which to answer research questions.

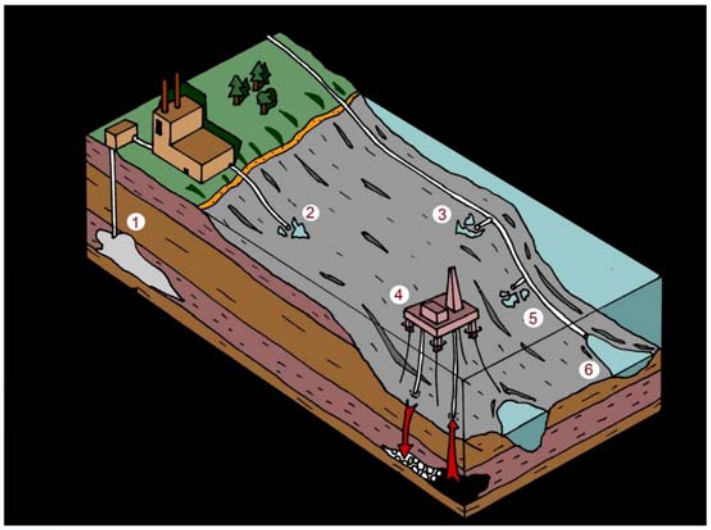


WP7 review – Marseille, 15th Dec 2010

Further Deliverables – CSS introduction (D63)

Introductory, animated, interactive module on Carbon Capture and Storage (CSS) is online.

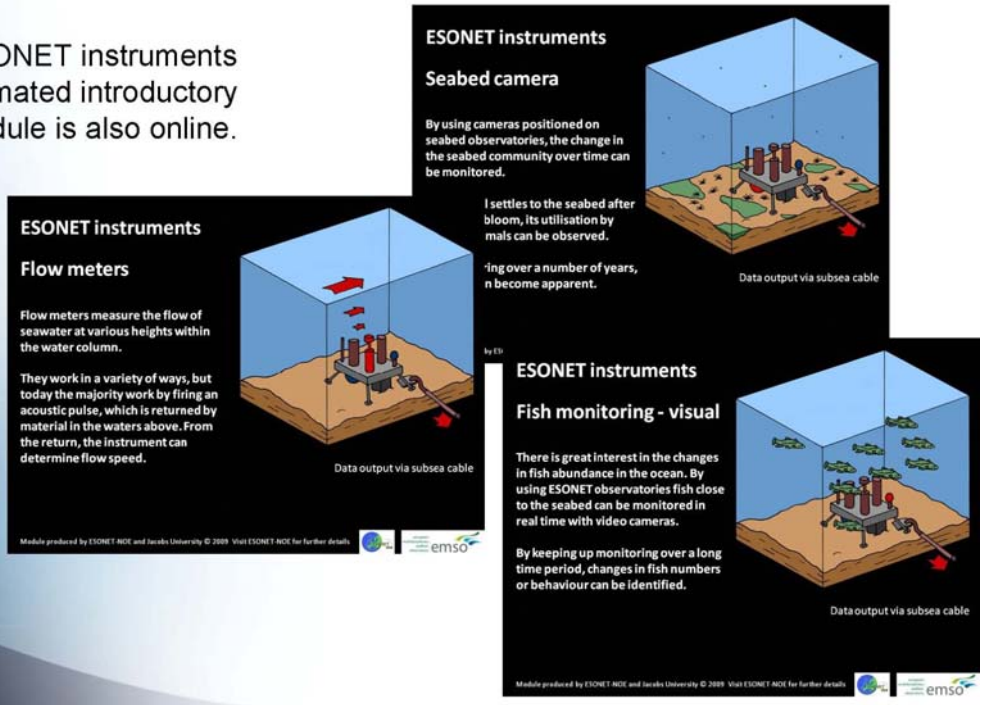
Available as an ESONET branded standalone application.



WP7 review – Marseille, 15th Dec 2010

Further introductory modules - Equipment

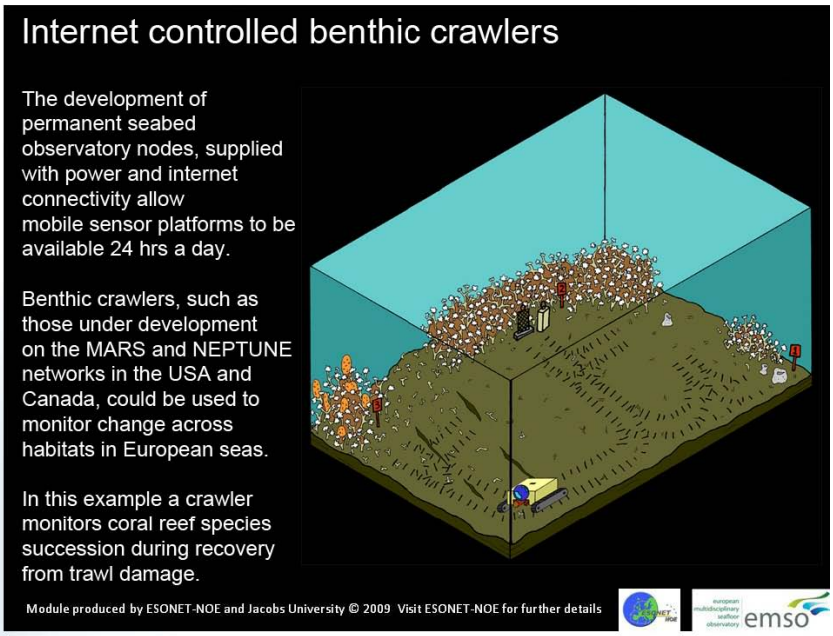
ESONET instruments animated introductory module is also online.



WP7 review – Marseille, 15th Dec 2010

Further introductory modules - crawlers

Online module introduces research crawlers and explains the value of time series data.



WP7 review – Marseille, 15th Dec 2010

ESONET movies and media (D77)

Two movies shown today.

Various ESONET NoE participants have taken part in a number of television and radio presentations and interviews (e.g. Ana Colaco, Uni Azores).

Where material is available online, links can be attached to the Education and Outreach page when provided to Jacobs University Bremen.

Web terminal (D30)

Two computer terminals delivered to public aquaria. A third to be shipped early 2011.

The absence of realtime data from the Demo missions has made the presentation of live data on these terminals impossible.

A possible alternative use for the terminals would be to present various aspects of ESONET NoE work via an interactive installation.

Future possibilities

Outreach material currently only available on the Education and Outreach website for online use will be converted to flash applications for use by successive projects, with the ESONET brand attached.

Currently downloadable teaching aids / flash applications will be available for use by successive projects.

There is the opportunity to encapsulate output from the demo missions into ESONET NoE branded interactive educational modules or teaching aids – if material is presented to us at Jacobs University Bremen for us to do so.

4.5.4 Neptune Canada

Presented by Christopher Barnes (unpublished slides)

The Neptune Canada project was presented in a general context first, then focusing on more specific aspects like:

The scientific requirement for such an infrastructure

- Gigabits of bandwidth
- Kilowatts of power
- Precision timing
- Hundreds, perhaps thousands, of attached devices
- 3000m water depth rating
- 25-year design life
- Resilient network, moderate operating costs
- Over 60TB/yr data flow initially
- Expandable and extendable: 5è10 nodes

He reminded the Principal elements in building a regional cabled observatory: the last decade:

- Vision, articulation, concept
- Science priorities, experiments
- Ownership and liability
- Funding proposals/O&M costs
- Science requirements: engineering, DMAS
- Engineering: network design, power and communications, wet plant, shore station, backhaul
- Permits and Rights of Way
- Route surveys, node sites, GIS
- Operation/Data Centre
- DMAS/Cyber: in-house development, evolving technologies, distributed databases, storage
- Education and outreach
- Special stakeholders: First Nations, fishers, navies
- Communications: sci/public communities, media, partners
- Partnerships: institutions, funders, foundations, international.
- Socio-economic benefits
- Time, contingency, renewal, expansion costs

Installation and Operating Funding awarded 2003-2012:143.2M€

Integration of observatory hardware network:

- Subsea wet plant, 800km backbone cable; 120km spur cable, 5 nodes and 12 junction boxes
- Extension cables (170; 60km) from nodes to sensors
- Over 600 connectors
- Network of 130 instruments (40 types) and 400+ sensors
- Refurbished Shore Station at Port Alberni (1,100m2)
- Backhaul line (10Gbsec - shore station to UVic)

- Instrument Testing Facility (Marine Technology Centre)
- Operations, data and observatory control centre at UVic
- Vessel/ROV for installation and maintenance

Data flow and archiving (first ten months):

- Managing the vast data flow of about 60 terabytes/year is a major challenge
- In the first ten months, nearly 10TB of data from 410, 853 files were archived with 1,395,000,000 Scalar Data points from 186 sensors
- 7,900 registered users from 98 countries
- 74,183 data searches by 1,434 distinct users
- 61,529 Flickr searches (photo archive)
- 720,142 views of YouTube videos
- All data and imagery are free and available at:

Slides not publishable for non ESONET public

4.5.5 Approvals in General Assembly

After the presentation of ESONET activities by WP leaders, information on financial matters and all administrative issues with the associated discussion, 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 from 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	Wednesday 15 December 2010			
Place	Palais du Pharo Marseille			
		Decision		
Approval #1	The Grant allocations done since the former General Assembly are approved	Yes: 24	No: 1	Abstention: 1
Approval #2	The General Assembly supports the Steering Committee and coordination for the final budget transfers	Yes: 25	No: 0	Abstention: 1
Approval #3	The General Assembly supports the establishment of an ESONET label. It gives a mandate to the Steering Committee to transfer its sustained use to the expected EMSO permanent legal body	Yes: 26	No: 0	Abstention: 0
Approval #4	The General Assembly expresses its will to continue the networking activity after the end of ESONET NoE contract, as anticipated for instance within VISO	Yes: 26	No: 0	Abstention: 0

Approval #5	The General Assembly expresses its will to present a position statement on the use of observatory infrastructures for monitoring industrial activities	Yes: 25	No: 0	Abstention: 1

26 persons voted.
As result all topics are approved.

4.5.6 Press Conference (Restricted access during lunch time)

Staff from IFREMER communication Unit invited journalist from the French Press to participate to the Wednesday meeting and organised a Press conference at lunchtime.
Several journalists from famous French newspapers like “Le Figaro”, La Provence”, Le Marin, La Croix participated. In addition one journalist from the Press French Agency, the so-called AFP came. They all listen to 5 scientists involved in ESONET Demonstration Missions (DMs) and the coordination team: L. Geli (Marmara DM), PM. Sarradin (MOMAR DM) B. Ferré (LOOME DM), M. André (LIDO DM) C. Tamburini (Ligurian Sea and Test Experiment), R. Person and I. Puillat. Those scientists were asked by the coordination team to speak in French for the French press. Each scientist had an average of 10 minutes timeslot to speak. Then a questions and answers session took place. Several persons were also interviewed aside from the meeting. Several articles were published: of which by AFP Press on the web, one in the (paper) written national press in the FIGARO and one in the written press by la Croix (and also on their website)

Here are the articles published on Internet:
« Premiers résultats d'ESONET, réseau d'observation de la mer en temps réel »
published on daily-bourse.fr - 2010-12-15 see: http://www.daily-bourse.fr/premiers-resultats-d-ESONET-reseau-d-observation-d-Feed-AFP101215173714.r0d9k5xv.php
“Premiers résultats d'ESONET, réseau d'observation de la mer en temps réel »
published on Romandie News.com - 2010-12-15see:
http://www.romandie.com/infos/News2/101215173714.r0d9k5xv.asp
“Premiers résultats d'ESONET, réseau d'observation de la mer en temps réel »
published by Agence France Presse_Fil Gen - 2010-12-15
and also on http://www.terre-finance.fr/Premiers-resultats-d-ESONET-reseau-d-observation-d-vtptc-8253.php

The article published on the web is here below

Premiers résultats d'ESONET, réseau d'observation de la mer en temps réel
MARSEILLE, 15 déc 2010 (AFP) - L'IFREMER a présenté mercredi à Marseille les premiers résultats du programme européen ESONET, qui vise à l'implantation dans les prochaines années sur douze sites sous-marins en Europe d'observatoires permanents placés au fond des océans pour surveiller la mer en temps réel.

Ces "observatoires fond de mer", équipés d'instruments de mesure, permettront la collecte de données scientifiques sous-marines afin de prévenir les risques naturels et d'analyser les conséquences en mer du réchauffement climatique, selon l'IFREMER qui coordonne le projet ESONET (European sea observatory network of excellence).

"Nous avons besoin d'instruments de mesure dans l'eau sur de longues périodes, notamment pour étudier l'impact des changements climatiques, ce que ne permettent pas les

missions temporaires en bateaux", a expliqué à la presse Ingrid Puillat, coordinatrice adjointe du projet qui facilitera à terme l'harmonisation et le partage des données scientifiques au niveau européen. "Un observatoire fond de mer permet également d'avoir plusieurs instruments de collecte pour des disciplines différentes", a-t-elle ajouté.

Réunis à Marseille pendant trois jours, une centaine de scientifiques européens associés à ESONET devaient échanger jusqu'à jeudi sur les résultats de travaux préparatoires en vue de l'installation d'observatoires sur des sites sous-marins sensibles, tels que les failles sismiques.

Onze sites hauturiers et un site côtier ont été d'ores et déjà répertoriés dans les eaux européennes, en océan Arctique, en mer Noire et au large de la Turquie.

Selon Louis Geli, géophysicien à l'IFREMER, les analyses préliminaires dans la mer de Marmara en vue de la création d'un observatoire permanent pour surveiller l'activité sismique au sud d'Istanbul, ont donné des "résultats très prometteurs".

Michel André, chercheur à l'université de Catalogne (Espagne), a évoqué un champ de recherches "considérable", grâce aux observatoires permanents, sur la pollution sonore engendrée par l'activité humaine (transport maritime, parcs éoliens, etc.) et ses conséquences sur la vie marine.

Le programme ESONET, financé par l'Union européenne, réunit 13 pays européens et la Turquie. Quelque 300 chercheurs et ingénieurs sont associés à ses travaux.

The article published by La Croix newspaper the 2010-12-28: « Les océanographes à la conquête du fond des mers » is here after.

la Croix

Date : 27/12/2010
Pays : FRANCE
Page(s) : 12
Rubrique : France
Diffusion : 96262

Les océanographes à la conquête du fond des mers

Dans le cadre d'un projet européen, l'Ifremer installe une douzaine d'observatoires sous-marins destinés à surveiller les mouvements de notre planète en temps réel

Il y a eu en son temps la bouée-laboratoire «Précontinent I», créée par le commandant Cousteau en 1965 au large de Marseille, ou les «maisons sous la mer» de l'architecte Jacques Rougerie. Aujourd'hui, les océanographes sont en train de concrétiser ce qui semblait à l'époque une utopie: l'accès permanent des chercheurs aux fonds sous-marins. Un projet qui était au cœur du colloque international que vient d'organiser l'Institut français de recherche pour l'exploitation de la mer (Ifremer) à Marseille.

En collaboration avec 13 pays européens, plus la Turquie, l'institut participe au réseau-projet d'excellence Esonet (European Seas Observatory Network), mis sur pied pour quatre ans (2007-2011). L'objectif de la réunion était de faire le point sur les 12 stations scientifiques, sous-marines et pluridisciplinaires, qui sont actuellement en cours d'installation au fond des eaux européennes, de l'océan Arctique à la mer Noire en passant par l'Atlantique et la mer de Marmara. Au-delà de l'harmonisation nécessaire des méthodes et des instruments de mesure, les chercheurs en ont profité pour faire le bilan des expériences conduites dans quelques sites, plus avancés que les autres.

En Méditerranée par exemple, dans la mer de Ligurie, des hydrophones permettent d'écouter le bruit des fonds sous-marins. Ils servent essentiellement à étudier la communication entre mammifères marins (baleines et dauphins), mais aussi à détecter les avalanches sous-marines comme il s'en produit dans le canyon du Var, et les craquements de la croûte terrestre. Fort de cette expérience, Michel André, professeur de l'Université polytechnique de Barcelone (Catalogne) travaille d'ailleurs maintenant au large de Cadix, de la Sicile, au Canada et même au Japon.

Non loin de là, près de l'île de Porquerolles, à environ 20 km de La Seyne-sur-Mer (Var), est enfoui à 2400 m de profondeur un télescope sous-marin d'un genre particulier. Baptisé Antares, il sert à capter les «neutrinos», ces particules cosmiques qui, traversant la Terre de part en part, ressortent par les fonds sous-marins et se transforment en lumière grâce aux photomultiplicateurs *(lire* La Croix *du 20 novembre 2003). «Profitant de cet immense filet, alimenté électriquement par un câble relié à la côte, nous avons installé une panoplie d'instruments mesurant en temps réel la température, la salinité, le taux d'oxygène et la vitesse des courants. Des données nécessaires au suivi du changement climatique, qui sont transmises ensuite par acoustique – une sorte de WiFi sous-marin – jusqu'à la station en bord de mer»*, explique Christian Tamburini, océanographe au CNRS. S'y ajouteront bientôt des instruments destinés à mesurer les courants des fonds marins, qu'on négligeait jusqu'à maintenant et s'avèrent être plus importants qu'on ne le pensait.

« Les expériences sous-marines durent désormais dix à vingt ans et non plus seulement quatre ans. »

Autre site stratégique: la station d'observation sismique permanente des fonds marins de la mer de Marmara, au sud d'Istanbul, où passe la faille nord-anatolienne. Les sismologues attendent en effet à cet endroit un séisme de grande ampleur d'ici à 2040. Par chance, le segment intact de cette faille – la dernière secousse avait engendré le séisme d'Izmit, à l'est de la Turquie, qui a fait 20000 morts en 1999 –, long de 60 km, passe sous la mer, au-dessus d'un champ pétrolifère et gazier. Des bulles de méthane remontent donc, plus ou moins régulièrement, du fond situé à – 700 m. *«L'idée, c'est de mesurer très finement ces bulles (débit, dimension, composition), en espérant qu'une augmentation de leur émission pourra être un signe de l'initiation d'un séisme, qui n'est pas un phénomène qui se produit du jour au lendemain»*, explique Louis Géli, directeur du département géosciences à l'Ifremer. Ce projet unique au monde, issu d'une collaboration turco-européenne coordonnée par l'Ifremer, devrait coûter 12 millions d'euros.

Si les océanographes investissent de plus en plus les fonds marins, ce n'est toutefois plus en chair et en os comme on l'imaginait dans les années 1960 mais au moyen de capteurs automatisés et, s'il le faut, à l'aide de robots filoguidés, comme le Victor 6000. *«D'autre part, les expériences sous-marines durent désormais dix à vingt ans et non plus seulement quatre ans»*, explique Ingrid Puillat, coordinatrice adjointe d'Esonet à l'Ifremer. Un point commun avec la conquête aérospatiale. Avec un avantage, les chercheurs disposant désormais d'Internet pour transmettre leurs données, les images sont accessibles sur leurs sites au grand public…

DENIS SERGENT

The Figaro newspaper article published the 2010-12-17 “Des observatoires sous-marins pour prendre le pouls des mers » :

LE FIGARO

Date : 17/12/2010
Pays : FRANCE
Page(s) : 14
Rubrique : Sciences Médecine
Diffusion : (338618)

Des observatoires sous-marins pour prendre le pouls des mers

Un vaste projet européen va installer douze laboratoires high-tech immergés autour du continent.

JEAN-LUC NOTHIAS

OCÉANOGRAPHIE Écouter battre le cœur d'un volcan sous-marin, voir les sources hydrothermales qui jaillissent du plancher océanique à 300 °C, mesurer les paramètres de composition et de déplacement de l'eau, regarder le fond des mers respirer, se déformer, observer la faune et la flore marine... Et tout cela en direct et en continu sur de longues périodes de plusieurs mois. Tel est le but du programme Esonet (European Sea Observatory Network of Excellence), un vaste projet européen regroupant 14 pays et réunissant 300 chercheurs, ingénieurs et techniciens ainsi que d'importants moyens techniques, tant en terme de technologie que de moyens à la mer. Les acteurs de ce projet, lancé en 2007, coordonné par l'Ifremer, viennent de tenir cette semaine leur assemblée générale à Marseille.

Transmettre en continu et en temps réel toutes les informations enregistrées

« *Nous avons besoin d'instruments de mesure immergés sur de longues périodes, notamment pour étudier l'impact des changements climatiques* », a expliqué Ingrid Puillat, coordinatrice adjointe du projet. Jusqu'ici, les données étaient principalement recueillies par des missions temporaires en bateaux ou par des instruments immergés qu'il fallait aller rechercher pour obtenir les données enregistrées.

L'ambition d'Esonet est d'installer douze observatoires sous-marins, véritables laboratoires placés au fond des mers et des océans bordant l'Europe, océan Atlantique et Arctique, mer du Nord, Méditerranée, mer Noire, qui puissent transmettre en continu et en temps réel, via des satellites ou des câbles, toutes les informations qu'ils enregistrent. Et que les chercheurs puissent, dans certains cas, modifier à distance les réglages des instruments. Ceux-ci sont capables, suivant les missions qui leurs sont confiées, de mesurer la pression, la salinité, le taux d'oxygène, la vitesse des courants, les ondes acoustiques et des données sismiques. Des images photo et des vidéos seront également disponibles.

Les 12 sites retenus, qui commenceront à être équipés de ces observatoires en 2011 avec du matériel déjà testé, sont douze sites « sensibles » du point de vue de la planète : zone de formation des eaux profondes, zones hydrothermales, zone à fort risque sismique (et donc à tsunami). Ce suivi en temps réel devrait ainsi permettre de mieux prévenir les risques naturels et de mieux mesurer l'impact des changements globaux sur le milieu marin. ■

These article series output to another article in “Le Monde” later, the 9th February 2011.

Le Monde
Mercredi 9 février 2011

Dépollution en Chine
Les mesures antipollution instaurées par la Chine lors des Jeux olympiques de 2008 réduiraient de près de moitié le risque de cancer du poumon chez les Pékinois, si elles étaient pérennisées, selon une étude américaine. Il en résulterait 10 000 cas de cancer en moins.

Chauves-souris et spores
Plus d'un million de chauves-souris sont mortes depuis 2007 dans l'est des Etats-Unis d'un syndrome du « nez blanc » attribué à un spore. Les grottes du reste du pays doivent être fermées au public pour éviter sa propagation, estime le Centre pour la diversité biologique d'Arizona.

EXPO « Les survivants de l'extrême »
Cette exposition interactive du Palais de la découverte, à Paris, invite à comprendre comment la vie réussit à s'épanouir dans les conditions les plus hostiles, terres arides ou glaciales, milieux sans lumière ou presque sans oxygène… www.universcience.fr

Des observatoires sous-marins pour surveiller la Terre

L'Europe veut se doter de capteurs océaniques à l'écoute des risques naturels et du changement climatique

Reportage

Brest
Envoyé spécial

Pour veiller sur notre planète, les chercheurs ont d'abord déployé dans l'espace une flottille de satellites scrutant le niveau des mers, le volume des calottes glaciaires ou l'étendue des massifs forestiers. Aujourd'hui, c'est dans les abysses qu'ils veulent immerger des observatoires permanents. Ces oreilles et ces yeux leur permettront de mieux connaître les écosystèmes marins, mais aussi d'étudier les phénomènes générateurs de catastrophes naturelles – séismes, tsunamis ou glissements de terrain –, ainsi que l'impact du réchauffement sur l'océan profond.

Douze observatoires seront disséminés de l'océan Arctique à la Méditerranée

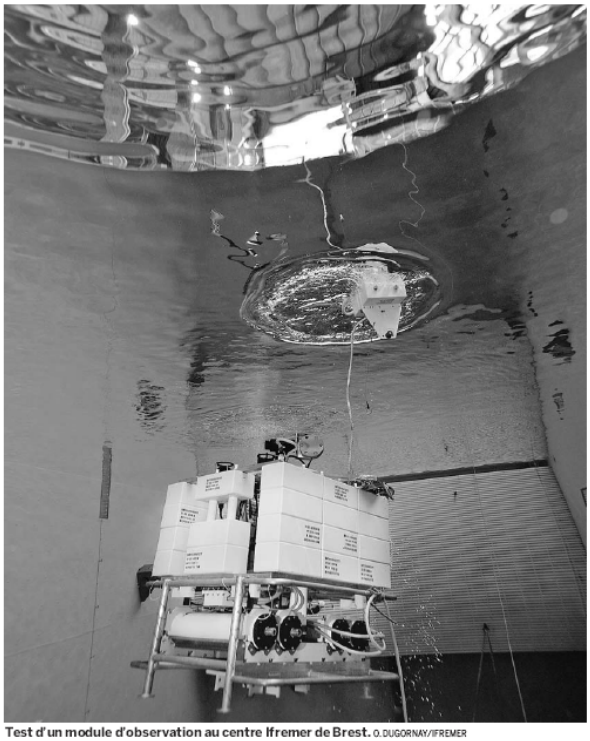
Le Canada et le Japon ont été les premiers à se doter, en 2009 et 2010, d'un maillage de stations sous-marines de mesures scientifiques, localisées notamment dans des zones sismiques. Aux Etats-Unis, un programme similaire, gelé sous le gouvernement de George W. Bush, a été relancé par l'administration Obama. A son tour, l'Europe s'apprête, avec le projet Esonet (European Seas Observatory Network), à mettre en place un réseau de douze observatoires disséminés, entre 2 000 et 3 000 mètres de fond, de l'océan Arctique à la Méditerranée.

Au centre de Brest de l'Institut français de recherche pour l'exploitation de la mer (Ifremer), Ingrid Puillat coordonne les opérations. Le site finistérien héberge le système de traitement de toutes les données océanographiques. Sur son écran, la chercheuse affiche les images reçues de l'un des premiers observatoires déjà en service, au large des Açores, où il a été installé en octobre 2010 par un robot téléopéré. On y voit des colonies de bivalves associées à des sources hydrothermales crachant des eaux brûlantes chargées en soufre. Toutes les six heures, de nouvelles images de cette zone volcanique, située dans une aire marine protégée, sont recueillies par une bouée de surface et transmises à un satellite qui les redirige vers des stations terrestres.

« Avec les campagnes océanographiques classiques, nous ne pouvons collecter que des mesures ponctuelles, commente Ingrid Puillat. *Désormais, nous disposerons, presque en temps réel, de séries d'observations sur de longues durées. Pour étudier les effets du changement climatique en particulier, il faut accumuler des données sur plusieurs décennies. »*

Les « laboratoires » sous-marins, gros parallélépipèdes, cylindres ou nacelles construits en matériaux anticorrosion, équipés d'une batterie électrique et reliés à la surface par un câble ou un système de liaison acoustique, sont conçus pour rester immergés pendant une dizaine d'années au moins. Pourvus de caméras, ils seront aussi munis d'une panoplie d'instruments scientifiques : sismomètres, courantomètres, capteurs de température, de salinité et d'acidité, sondes acoustiques, détecteurs d'oxygène et de CO_2…

Dans un bassin d'essais agité d'un mouvement de houle, des ingénieurs brestois testent le fonctionnement de l'un de ces équipements, « Bob » pour Bubbles Observatory module. Ce capteur de bulles a déjà effectué son baptême, fin 2009, dans la mer de Marmara, au-dessus de la faille nord-anatolienne dont la rupture menace l'agglomération d'Istanbul d'un séisme majeur. Les chercheurs ont repéré, le long de cette faille, des dégazages de méthane qui pourraient être des signaux précurseurs de secousses.



Test d'un module d'observation au centre Ifremer de Brest. O. DUGORNAY/IFREMER

« Dans notre compréhension des mécanismes des séismes, raz-de-marée, éruptions volcaniques ou éboulements sous-marins – permettant une éventuelle prévention –, nous manquons de recul, souligne Jean-François Rolin, responsable des observatoires de fond de mer à l'Ifremer. *Il est urgent de commencer à collecter des données. »*

Les repères font également défaut pour analyser, sur le long terme, la réponse au réchauffement du milieu océanique qui, par la circulation thermohaline des masses d'eau, ainsi que les échanges de gaz carbonique avec l'atmosphère, joue un rôle crucial dans la machine climatique. La station de mesures prévue dans l'océan Arctique en sera un banc d'observation privilégié. *« Alors que la couverture de glace permanente est, par endroits, en train de disparaître, c'est le moment d'aller étudier cette dynamique »,* dit Jean-François Rolin.

D'autres équipements seront outillés pour suivre, en continu, l'évolution des stocks de poissons, les déplacements de mammifères marins ou la biodiversité de l'océan profond. De tels observatoires, dont la mise en place doit s'étaler sur plusieurs années, pourraient également servir, lors de marées noires comme celle provoquée, au printemps 2010, par l'explosion, de la plate-forme *Deepwater Horizon* dans le golfe du Mexique, à un contrôle de l'état des eaux indépendant des compagnies pétrolières. ■

Pierre Le Hir

Un réseau transocéanique

12 sites Les zones sélectionnées pour les observatoires sont, du nord au sud, l'océan Arctique, la marge continentale norvégienne, la mer du Nord, le fjord Koster (sud de la Suède), la plaine abyssale Porcupine (près de l'Irlande), la mer Noire, la mer de Ligurie, la mer Ionienne, la mer de Marmara, le plateau continental espagnol, la partie orientale de la Méditerranée et l'archipel des Açores.

14 pays Sont partie prenante l'Allemagne, la Belgique, la Bulgarie, l'Espagne, la France, la Grèce, l'Irlande, l'Italie, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni, la Suède et la Turquie.

500 millions d'euros C'est le coût estimé de l'installation du réseau complet, dont le fonctionnement annuel est évalué à 15 millions d'euros.

“Les Echos” article « Le fond des oceans placé sur écoute » was issued on Monday February 28th 2011 (last day of the project!) by Paul Molga. Here-after:

MER

Le fond des océans placé sur écoute

La santé des mammifères marins pourrait être affectée par le bruit des moteurs de navire.

Demain s'achèvent les travaux du réseau européen Esonet (European Sea Observatory Network of Excellence) coordonnés par l'Ifremer depuis 2007 pour préparer la mise en place d'un bataillon de 12 observatoires reliés entre eux dans le fond des mers du globe. « *Le projet est maintenant mûr et prêt à être déployé après son inscription sur la liste des grandes infrastructures Esfri* [European Strategy Forum on Reasearch Infrastructures] », s'enthousiasme l'océanographe Roland Person, qui a supervisé cette première phase.

Quelque 300 chercheurs et ingénieurs de 14 pays ont participé à ce chantier préparatoire. « *Nous avons réussi à démontrer notre savoir-faire et notre capacité à collecter individuellement des données intéressantes pour la compréhension des phénomènes océaniques profonds*, détaille le chercheur. *En reliant maintenant ces plates-formes de mesure pour enregistrer sur une base commune des paramètres physico-chimiques de l'eau comme la pression, la salinité ou le taux d'oxygène, mais aussi des ondes acoustiques, et des données sismiques, l'Europe disposera d'un outil de surveillance en temps réel de la mer pour prévenir les risques naturels, suivre à long terme les évolutions climatiques et mesurer leurs impacts sur le milieu marin.* »

Smog acoustique

L'observatoire germano-norvégien AOEM installé sur la zone d'écoulement entre l'océan Arctique et l'Atlantique Nord permet par exemple de mesurer la quantité de méthane relarguée dans l'eau sur un point stratégique des courants marins gelé en surface la plupart de l'année, et impossible à surveiller autrement.

Un autre projet, validé par Esonet, a déployé un réseau d'écoute pour enregistrer en direct l'activité sonore du fond des mers. « *Nous voulons mesurer le smog acoustique généré par les routes maritimes et les effets de cette propagation de basses fréquences sur la santé des mammifères marins* », explique le professeur Michel André, qui dirige le laboratoire de bioacoustique appliquée à l'université de Catalogne. Avec, à terme, l'espoir d'une réglementation pour encadrer le niveau de décibels émis par les moteurs de navires.

> « Le projet est maintenant mûr et prêt à être déployé. »
>
> **ROLAND PERSON**, RESPONSABLE DE LA PREMIÈRE PHASE DU PROJET EUROPÉEN

La mission MoMarsat conduite en octobre aux Açores est une autre illustration. Elle a permis d'installer à 1.700 mètres de profondeur sur la dorsale médio-atlantique des caméras pour suivre 24 heures sur 24, un an durant, l'intimité des habitants de cette oasis de vie. « *On espère autant de ces images que si on avait posé nos caméras sur la face cachée de la Lune* », résume Jozée Sarrazin, écologue au département d'étude des écosystèmes profonds à l'Ifremer.

Malgré ces résultats encourageants, le financement du programme à suivre – baptisé « Emso » (European Multidisciplinary Seafloor Observatory) – reste improbable. L'installation par câblage du réseau complet a été estimée à 500 millions d'euros avec un coût de fonctionnement annuel de 15 millions. Outre l'Ifremer, trois partenaires seulement sont aujourd'hui prêts à suivre. P. M.

PLUS SUR LE WEB

Retrouvez l'intégralité des articles de la rubrique Sciences sur : lesechos.fr/sciences

5 VISO MEETING

5.1 Introduction

ESONET is coming to an end, marked by the last ESONET yearly meeting that took place in Marseille (France) from the 13th to the 17th of December. The objective of this 2nd workshop was to ensure the continuity of the effort made by the ESONET-EMSO community, and to lead towards the construction of the observatories to help answering the questions and emergency actions mentioned during the 1st workshop. We also aimed at answering some questions related to the construction and the success of such a structure.

5.2 Agenda

Second workshop for a European Virtual Institute of Scientific Users of Deep-Sea Observatories16 December 2010 in Marseille (France)		
	Topic	Speaker
08:30	Welcome/introduction	Bénédicte Ferré, UiT (Norway)
08:35	VISO - the vision	Bénédicte Ferré, UiT (Norway)
08:50	EUR-OCEANS Consortium as a follow-up structure of the EUR-OCEANS FP6 Network of Excellence	Bénédicte Ferré on behalf of Pierre-François Baisnée, IRD (France)
09:10	Towards an integrated sustained open ocean observing network around European	Richard Lampitt, NOCS (United Kingdom)
09:30	NEPTUNE Canada: future issues, plans and collaboration opportunities with VISO/EMSO	Chris Barnes, UVIC (Canada)
09:50	Participation to Neptune Canada by European teams	Laurentz Thomsen, JUB (Germany)
10:10	***Coffee break***	
10:30	Discussion	Chaired by Bénédicte Ferré (UiT, Norway), Henry Ruhl (NOCS, UK), Fiona Grant (IMI, Ireland), Jean-François Rolin (IFREMER, France), Laura Beranzoli (INGV)
12:30	***End of workshop***	

5.3 List of attendees

First Name	Last Name	Institution	Country	email
Dursun	Acar	**ITU EMCOL**	Turkey	dursunacaracar@hotmail.com
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5.4 Debriefing of the main discussions

Here are the conclusions of the workshop:

The 2nd VISO workshop was successfully carried out and confirmed the commitment of partners to ensure the continuity of ESONET and the work that has been done during the 4-years project. Past experiences from other countries and projects revealed some issues that need to be taken care of, i.e. the decision to adopt between a consortium agreement and a legal personality (P.F. Baisnée) and the need to consider ourselves as a community without frontiers (C. Barnes). One of the main points was to define the best way to speak in a coherent voice for a better position for funding (R. Lampitt). Some solutions already exist and partners need to consider them (i.e. FP7 infrastructure, GOOS, European Environment Agency, MyOcean, SeaDataNet, EMODNET). A good solution for a bigger impact is international

collaboration, like the successful German mobile system Wally tested within NEPTUNE Canada (L. Thomsen).
A list preparation defining topics and activities to be taken care of by different partners/institutions after the ESONET project ends in 2011 has been started.
The community voted for a new name for VISO: ESONET Vi (ESONET the Vision) which needs to be finalized and formalized to the EU.

The first actions decided are to create a MoU (Memorandum of Understanding) between committed partners using the consortium agreement of ESONET NoE as a basis, and build an ERIC (European Research Infrastructure consortium) for building up the funding structures for the future.

More information and slides are available on deliverable D72 “Scenario of VISO implementation”, led by UiT.

6 SOUTHERN FRANCE REGIONAL ISSUES

An opportunity was offered during this General Assembly for a meeting with local authorities on Wednesday with the press. Several invited responsible persons were not able to attend.

It was then decided to allocate instead a time slot on the last day for two talks:

- Gérard Riou is the Director of the Mediterranean Center of Ifremer including Toulon, Sete and several Ifremer stations. One of the Departments of this Center is the Submarine Intervention Department which was active in ESONET on ROV interoperability studies (WP2), on several demonstration missions and test experiments in the Ligurian Sea. He was formerly head of a Direction including Brest Multidisciplinary Subsea Observatory team.
  He devoted his talk to the explanation of the strong support of IFREMER to subsea observatories issues during the last two decades. The region Provence Alpes Côtes d'Azur (PACA) provides funding for underwater technologies, several projects (PRIMA, BJS,DeepSeaNet) for components of deep sea observatories received budgets for equipment purchase. The cooperation with neutrino telescope projects and tsunami warning projects (RATCOM) offers a good opportunity for an implementation of a permanent observatory in the Ligurian Sea area. The industrial issues are extremely important in order to justify economically and not only scientifically the public money involvement. The group of industrial company Pôle Mer PACA is the interface towards companies in the marine industrial and services sectors. A cabled observatory for industrial test purpose, south of Porquerolle Island, is under project by Pôle Mer PACA members.

- Claude Vallée is a researcher in astroparticle physics with a long experience in research infrastructure management. He is now at CNRS particle physics center in Marseille, in charge of the new neutrino telescope MEUST and relations with associated science.
  He presented the status of the Ligurian Sea node of ESONET through the recent funding requests of MEUST and EMSO Ligure. He provided information on the earth-sea science extension of Antares connected in November during an ESONET supported cruise call TEXREX (Test EXperiment Réseau d'EXcellence). The extension of the Antares neutrino telescope offers several connectors to scientific instruments on a junction box (BJS). The real time data from the seafloor is now available from several sensors. The infrastructure complies with ESONET standards. (see also Deliverable D59 on Test Experiments).

7 AFTER ESONET MEETING : A conclusion of ESONET NoE activities

7.1 Introduction

AFTER ESONET MEETING

• How do we keep collaboration after the end of ESONET NoE?

This question is central to any Network of Excellence supported by the European Commission. ESONET has launched two main initiatives in this direction: EMSO infrastructure included in the ESFRI roadmap and supported by EC for a Preparatory Phase and the VISO discussed during the previous session, concluding on ESONET Vi.
This last plenary session of the General Assembly week offered the opportunity of a review of the commitments of each partner of ESONET in the future and shared ideas of joint initiatives.

7.2 Agenda

1. Commitment through EMSO

   - Status of EMSO Preparatory Phase.

   - The representation of all institutes in EMSO Preparatory Phase is done through one partner per nation in EMSO PP (12 partners -all partners in ESONET NoE- from 12 countries). How can we keep an enlarged community networked around these core institutes.

2. Formal groups and working groups were established by ESONET. What are their plans for continuation of the activity?

Discussion.
What are the perspectives of continuation of the committees and groups active inside the NoE during the 4 years: in VISO/ESONET Vi, in EMSO, at international level, through existing EC projects, through new projects to be launched, etc?

3. Status of sustained ESONET regional groups.

For each ESONET site, a group of scientists and stakeholder has been identified or constituted. The status of these groups in the future will range from the constitution of legal entities to lobbying groups.
Comment and discussion of the questionnaire sent to regional groups.

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7.4 Commitment through EMSO

Paolo Favali, EMSO coordinator from INGV, presented the first achievements of EMSO Preparatory Phase. An evaluation by the European Commission took place a few weeks before and was successful. He presented the slides shown to the European Commission. The establishment of a legal entity called EMSO ERIC is under preparation. ERIC means European Research Infrastructure Consortium, it is a new legal entity defined by European law and voted by European Parliament.

Jean-François Rolin presented the question of the difference between ESONET and EMSO PP membership. The representation of all institutes in EMSO Preparatory Phase is done through one partner per nation in EMSO PP (12 partners -all partners in ESONET NoE- from 12 countries). They have funding Agency mandate, and represent other institutes (NOCS/UAberdeen, INGV/CNR-INFN-CONISMA-OGS-SZN, Ifremer/CNRS, …).
Four issues can be mentioned:

1. PESOS membership could not be addressed in absence of PESOS representatives.

2. EMSO PP partnership is limited to core partners. As representative from their countries, they are expected to be “strongly interacting organisations”. They should have a representative and federative role at each ESONET EMSO member state level.

3. ESONET-Vi membership must be enlarged with respect to:

   - Potentially associated partner of EMSO ERIC

- Potentially regional actor of EMSO ERIC (represented by an EMSO ERIC partner through the participation inside the EMSO Departments who gather observatory owners and stakeholders)

4. Nostalgy (!) of ESONET « good old time » will be fulfilled hopefully by the renewed "Vision" of ESONET-Vi.

A working group around ESONET Steering Committee will make proposals on the content of ESONET Vi during the next months.

7.5 Future of activities

Formal working groups were established by ESONET NoE. What are their plans for continuation of the activity?
JR. Rolin proposed to complete a synthetic table in plenary session (see table here after) were each group of activities and its corresponding working group are assigned to one or several future activities (EMSO ERIC) or still running activities (EUROFLEET for instance) after ESONET.

AFTER ESONET MEETING (Marseille 16th December 2010)

Formal groups and working groups were established by Esonet. What are their plans for continuation of the activity?

	EMSO PP	EMSO ERIC	ESONET-Vi	EUROFLEETS	Existing EC project	Specific EC project	EC I3 proposal	ANNUAL WORKSHOP	INTERNATIONAL
❑ Scientific Council and Scientific Work Package (WP3)	(a)		(b)					(c)	x
Time series analysis								(d)	
Acoustics including tomography			(e)						
❑ Technical and Operational Council as well as programming capabilities shown for the Demonstration missions of WP4 (f)	x		(g)	(h)					(i)
Underwater intervention group **(j)**	x	x		x					x
Technical Expert groups (k)									
Test and calibration group with expertise on components, material, mechanical and electrical interfaces. (l)	x	(m)							
❑ Data Management council and WP9 (n)		x	(o)		(p)	(q)		(r)	(s)
❑ ESONET Label	x		x		(t)				x
❑ Sensor web group in charge of sensor interoperability and ESONET Yellow Pages	x		x		(t)			(u)	(v)
ESONET Yellow Pages (with sensor group mostly)			x		(w)	(w)			
❑ Outreach and ESONET web sites, ESOnews.			x		x		x		x
❑ PESOS (Providers of Equipment and Services for Observatory Systems)									

	EMSO PP	EMSO ERIC	ESONET-Vi	EUROFLEETS	Existing EC project	Specific EC project	EC I3 proposal	ANNUAL WORKSHOP	INTERNATIONAL
See sensor web group and Yellow pages (y)									
▫ Legal group	x	(z)							
▫ Exchange of personnel		x	(aa)		(bb)				x

Comments and discussions

a) The scientific activity inside ESONET will be followed by a strong commitment of the same community in EMSO PP.

b) ESONET Vi will take into account the whole group of scientists and motivate it to support the EMSO ERIC activity.

c) One annual workshop or more are necessary in Europe

d) Data analysis, relation with scientific models, treatment of images and time series are one activity of the scientific group. It has been addressed during the Best Practices Workshops. Annual meeting and tutorials are foreseen.

e) This specific acoustic group is willing to continue a common work started during the Best Practice Workshops. They are one discipline among many and shall work with other ESONET disciplines.

f) A new name must be given to this important collaborative issue on logistics matters.

g) ESONET Vi will take into account the whole group of engineers and motivate it to support the EMSO ERIC activity.

h) EUROFLEETS and the existing ship time sharing consortium OFEG play a key role in the future ship time and ROV logistics.

i) The participants from Neptune Canada and MBARI stressed the interest of such collaboration including training visits.

j) The advisory by specialists in subsea intervention who worked on ESONET is necessary for the preparatory phase of EMSO and the future.

k) Other groups of specialists such as quality management, environmental assessment, engineering disciplines, …

l) These specialities have been addressed during the Best Practices Workshops.

m) Important for EMSO ERIC infrastructure collaboration.
n) This activity must be continuous and include the user interface aspects, web portal, …
o) ESONET Vi will take into account the whole group of software specialists to support the EMSO ERIC activity.
p) Seadatanet is the reference project. Seadatanet 2 is now under negotiation.
q) A call for an Integrated Infrastructure Initiative is foreseen in 2011. This will be a major topic.
r) At least one meeting a year is mandatory for an update of the specifications of a data portal.
s) Through international standards and international cooperation, supported in many cases by EU funds.
t) The collaboration with coastal monitoring projects such as I3 JERICO is foreseen on some topics
u) This very active community is already convening workshops, it is advised that at least one of them is organized in Europe in order to promote a larger impact, especially to the industry. This will continue the work performed during the Best Practices workshops of ESONET.
v) Support by MBARI and Neptune Canada
w) The ESONET Yellow Pages are needing a permanent (although limited budget). A support by coastal I3 project Jerico is certain, the new I3 envisaged for a call in 2011 could also support this initiative for the deep-sea part.
y) The PESOS group future was not addressed as such as none of the members were attending the session.
z) The ESONET WP5 group already transferred its activity to EMSO PP at the end of 2009.
(aa) ESONET Vi will take into account the will to continue exchanges and visits. It will prepare the recruitment phase of EMSO.
(bb) Marie Curie project in science and technology

7.6 Status of sustained ESONET regional groups

For each ESONET site, a group of PIs and stakeholders was established during the first years. They presented invited speeches during the All Regions Workshop #2 in Paris (October 2009) and posters for the General Assembly.
An update was done site by site through a questionnaire sent to the participants a few days before the General Assembly.
The delay was too short to get a complete overview as some key partners had other commitments. This was raised by several attendants to the session.

The following sites were discussed:

- The **Hellenic site** reply to the questionnaire shows a limited but well defined seafloor monitoring. HCMR operates the POSEIDON-Pylos stand-alone observatory in the SE Ionian Sea as part of the Hellenic node. The Pylos site is included in the Poseidon project. The involvement of more scientists outside Greece is welcome.

- On the **Iberian Margin site**, the following up of the NEAREST project deployments was ensured by a GEOSTAR-type observatory, re-deployed within the LIDO-DM in November 2009 together with the surface communication buoy ensuring the underwater acoustic link to the observatory and the satellite link to the shore station. The observatory will be recovered spring 2011 using R/V Sarmiento de Gamboa and data acquired during the two years of mission will be made available to the scientific community. Research was made concerning the use of the pressure and seismic data in the framework of the NEAMTWS system. Spanish and Portuguese authorities must be convinced of the permanent funding of this observatory infrastructure. The group of PIs and stakeholders should involve Moroccan in addition to that established since long-time among Italian, Portuguese, Spanish, French and German institutions.

- In Western Ionian Sea (East Sicily) site, a well-established collaboration with the KM3Net community is continuing. In particular INGV and INFN perform common activities inside a MoU signed since 2001. The interest of other scientists is testified by the involvement of German, Spanish, Portuguese, Greek and French institutions. Within the LIDO-DM and thank also to Italian funds the cabled infrastructure acquires real-time data, continuing these activities started in 2005. The system has been updated and reconfigured adding many new sensors with main aims to geophysics (mainly geo-hazards), physical oceanography and bio-acoustics.

- The Azores **MoMAR site** is well supported by Portuguese and French teams with PIs from several countries. The continuity of the deployment performed during the ESONET MoMAR Demonstration Mission is ensured for the next two years. The group is looking for long-term budget through French ANR or Portuguese government funds.

- In **Marmara,** the continuation of the MARMESONET Demonstration Mission through permanent cabled monitoring is planned through Turkish government

MARDEP proposal to the Turkish government (3 cabled sites) and MARQUAKE proposal to EC (1 cabled site). Cruises will continue in 2011 for improved site survey. The official service ADAP of the Turkish Prime Minister support the project.

- The **Black Sea** community is more and more active. It was not possible to achieve a formal group inside ESONET NoE duration. It is suggested that EMSO and ESONET-Vi keep associating the PIs of the Black Sea to the future work. The area is object of an European project HYPOX (coordinated by MPI) concentrated on the problem of hypoxia.

- PLOCAN in the **Canaries** is a new site, promoted by Spanish government. They will receive the questionnaire too.

- **Porcupine Abyssal Plain** site is supported by UK and several countries (Germany, Netherlands, Ireland,…). NERC already operates an observatory at PAP. NOC will lead a bid to redevelop infrastructure at PAP, probably in synchrony with the submission of the EMSO-ERIC and potential I3 proposal.

- **Ligurian sea sites** are now well defined as presented in the previous session. The group of scientists and stakeholders held a meeting in June 2010 and wrote a contribution to the funding request of EQUIPEX. The relation with astrophysical observatories projects Antares and MEUST is important. Involvement of German, Italian and Spanish scientists is increasing.

- In the **Arctic**, future expansions of Svalbard observatory at greater depths and to the mid-Atlantic Ridge will be planned as part of European infrastructure. The cable and the first node on the shelf west of Svalbard will link and contribute to both SIOS and EMSO. The proposal COSMOS (Cabled Observatories for monitoring of the Ocean System) has been submitted by the NOON consortium to the Norwegian Research Council in October 2010. It will give the opportunity to install cabled observatories offshore Vesterålen, in the Barents Sea and in Svalbard.

- NOON is having a complete plan for the **Norwegian margin** cabled observatories.

In the future, for ESONET-Vi and EMSO, the descriptions and filled in questionnaires should be circulated among the scientist list of ESONET in order to promote the participation of more scientists.

As a general comment, comparing to 2009 All Regions workshop presentations, the ESONET sites projects are supported by an increasing community. But, due to the financial crisis, one can expect slower implementation and downsized ambitions.