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SeaDataNet, an enhanced ocean data infrastructure giving services to scientists and society

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A promotional banner for the PRIME 2020 meeting. The background is a dark blue space-themed image of Earth from space. On the left, there are three circular logos: the top one is 'ECS' in a white circle, the middle one is 'The Electrochemical Society' with a stylized 'ECS' logo, and the bottom one is 'THE KOREAN ELECTROCHEMICAL SOCIETY'. The main text in the center reads 'Joint International Meeting' in white, 'PRIME 2020' in large blue letters, and 'October 4-9, 2020' in white. Below this, a blue horizontal bar contains the text 'Attendees register at NO COST!' in white. On the right side, there is a white logo for 'PRIME' with a stylized 'P' shape above it, followed by 'PACIFIC RIM MEETING ON ELECTROCHEMICAL AND SOLID STATE SCIENCE' and '2020' in large white letters. At the bottom right, a blue bar contains the text 'REGISTER NOW' in white with a white arrow pointing right.

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SeaDataNet, an enhanced ocean data infrastructure giving services to scientists and society

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Abstract. Access to reliable and harmonised, large quantity of data has become a key topic in different fields, especially in the oceanographic sector where the cost of data sampling is very high. A huge amount of high quality marine data not only provides a basis for estimating the likelihood of occurrence of various kinds of environmental problems, but also helps to make relevant decisions about potential uses of the oceans such as renewable-energy development, aquaculture, etc. Thus, it is important to collect and make available high quality and interoperable ocean and marine observations, both at local and at global scale over several years, this is the main objective of the SeaDataNet e-infrastructure.

1. Introduction

SeaDataNet (SDN) infrastructure started in early 2000, by means of a funded European project to create a framework for data sharing and collaboration. It provides a single website access to multidisciplinary ocean and marine data as well as data products and metadata services [1,2]. SDN involves more than 110 data centres and it makes available more than 2 million datasets acquired from research cruises and other observational activities in European and global waters. Over the years, SDN has defined de-facto standards for data, metadata and vocabularies [3,4] largely used these days, collaborating with European and international experts within the framework of IOC-IODE, ICES, adapting ISO and OGC standards, and achieving INSPIRE compliance for some metadata services directory [5]. SDN serves the ocean and marine community as well as government agencies, industry, researchers and general public, allowing to preserve ocean data over a long period [6], visualise and analyse it. SDN provides access to extremely heterogeneous marine and ocean data in an effective and easy way.

2. Metadata services

The SDN metadata services give overviews of marine organisations in Europe and their engagement in marine research projects, managing large datasets, and data acquisition by research vessels and monitoring programmes for the European seas and global oceans. The cited metadata catalogues, harmonised in the use of syntax, semantics and tools, are the following:

CSR = Cruise Summary Reports

EDMED = European Directory of Marine Environmental Data

EDMERP = European Directory of Marine Environmental Research Projects

EDIOS = European Directory of Initial Ocean-observing Systems

EDMO = European Directory of Marine Organisations

3. Data products

SDN offers access to data products for the 6 European sea basins. The products are aggregated datasets, quality checked [7], coming from the measurements of temperature (T) and salinity (S) freely



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available in the infrastructure, as well as regional climatologies of sea T and S [8]. The latter are available in 2 versions, the most recent, enriched with external datasets coming from the Coriolis Ocean Database for the Reanalysis and the World Ocean Database.

4. Products Catalogue service

The available data products have been documented with metadata, are accessible by the Sextant catalogue and can be viewed and downloaded from the OceanBrowser service. The climatologies and the aggregated datasets have their own Digital Object Identifier (DOI) to cite them [9].

5. Long term preservation of marine data collection and DOI minting services.

The infrastructure is ever-evolving and innovating, thanks to the European funded SeaDataCloud (SDC) project. One of the challenges for the project is to achieve a long-term sustainability of the SDN infrastructure that requires the continuing delivery, far beyond the end of the funded period of the infrastructure services including the cloud platform and High Performance Computing (HPC) services [2]. The cloud services rely on the collaboration with EUDAT consortium, an active member of the SDC project.

A long-term strategic vision fostered the decision, in most part of partners, on organising in a legal entity; this year, the SDN AISBL, an International Non-Profit Association under Belgian law, was formed. SDN allows to overcome issues such as the lack of funds for digital preservation and the risk of data loss, assuring long-term archiving. Data itself has become increasingly important in all fields of scientific research. It is appropriate and right to acknowledge the work done to collect interoperable and quality data. SDN provides Digital Object Identifier (DOI) attribution and metadata management services by using the SEANOE (SEA scieNtific Open data Edition) system to facilitate scientists to publish their research data in the field of marine sciences as citable resources [10].

6. Virtual collaboration services

As part of the activities to innovate the infrastructure a virtual research environment is under development. The innovations, soon available, will include a software to interpolate, analyse and visualise marine observations [2,9] that will be accessible online using remote computing power and a virtual workspace for online collaboration. In the cloud the infrastructure will offer the opportunity for new discoveries in ocean science, new ways for research collaboration as well as new economic growth for private companies, regardless of resource constraints.

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