

Activity 3.6 - Training current RIs staff and user communities

WP5

Course title: Marine data management and data quality control

Brief description of the course: This course aims to provide a comprehensive introduction to marine data management and validation, including the guiding principles of open science and the European data infrastructures that support it. This course has been developed by and for marine data managers and researchers responsible for the collection and good management of marine data. It covers various general aspects related to marine data management and data life cycle, including metadata, quality control, data policy, data sharing and publication, data management plans. By the end of this course, participants will be able to undertake the core tasks required to process and curate marine data and advise researchers on the importance of metadata and responsible data sharing.

Training objectives: The course aims to provide participants with a solid understanding of the fundamental concepts, best practices and principles of data management and quality control. Insights from previous experiences and case studies will allow participants to deepen the knowledge on the national and EU landscape of marine data infrastructures. Practical exercises will enable RI staff to acquire the basic skills to be applied effectively in their specific context.

Location: Venice.

Address: CNR-ISMAR headquarters, Arsenale Tesa 104, Castello 2737/F.

Period: 9-12 December 2024.

Duration: 4 days.

Course delivery method (online course/in-person/mixed): hybrid.

Number of the speakers: 7.

Name of the speakers: Mauro Caccavale (CNR), Alessandra Giorgetti (OGS), Mario Locati (INGV), Antonio Novellino (ETT), Elena Partescano (OGS), Reiner Schlitzer (AWI), Simona Simoncelli (INGV)

Training modules: 7.

Syllabus:

1. **Data life cycle, data value chain, BDI, FAIRness** (2 hour).
2. **Open Science, European and Italian landscape for data management, marine data infrastructures and ITINERIS federated approach** (2 hour).

3. **Research data management, Identifiers and metadata** (3 hours).

4. **Metadata standards and interoperability: examples and tools** (4 hours).

- Metadata in SeaDataNet/EMODnet directories.
- Common Data Inedx (CDI): SeaDataNet metadata content standard.
- Metadata format for reporting on cruises (Cruise Summary Report- CSR), dataset (European Directory of Marine Environmental Data sets EDMED), projects (EDMERP) and organisations (EDMO).
- SeaDataNet NVS controlled vocabularies (for metadata and data).
- Data submission in the EMODnet Ingestion Workflow (phases for data submitters, metadata, and NODC processing).

Software for ocean data and metadata management.

SeaDataNet Metadata formatting tools:

- MIKADO: for editing and generating XML metadata entries for the for the SeaDataNet directories EDMED, CSR, EDMERP and CDI.

SeaDataNet Data formatting tools:

- NEMO: for conversion of any ASCII format to all SeaDataNet data formats (ODV ASCII, NetCDF (CF) and MedAtlas).
- OCTOPUS: a multi-format splitter and converter tool to to convert files in a given SeaDataNet format to another SeaDataNet format (e.g. ODV to NetCDF, MedAtlas to NetCDF, MedAtlas to ODV).

5. **Data processing, Quality control, Data analysis and visualisation. Hands-on session on Ocean Data View** (5 hours).

6. **Operational services and EU data platforms. Hands-on session on ERDDAP** (4 hours).

7. **The ITINERIS marine hub and IT-IOOS: how it works and how to contribute** (2 hours).

- The philosophy and the technical aspects behind the marine data portal.
- The distributed hardware infrastructure and topology.
- The individual data managements server.
- The end points federation.
- The marine portal back-end organization: metadata and data harmonization, monitoring, statistics, etc.
- The marine portal front-end: graphics interface, layers, datasets, etc.

Final test (0,5 hour).

Short introduction of the speakers

Simona Simoncelli holds a Ph.D. in Environmental Science (“Protection and Management of Natural Resources”) with main focus on statistical data analysis, in situ data quality control, mapping techniques, numerical modelling, model validation and ocean monitoring indicators. She has experience in coastal modelling, regional reanalysis and climatologies. She participated in EU-Projects such as [SeaDataNet](#), [MyOcean](#). She was task leader in MyOcean2 and MyOcean-Follow-On projects coordinating the production of regional reanalyses of EU sea basins. She produced the Mediterranean reanalysis distributed through [CMEMS](#) (phase I) and was responsible for the Mediterranean Sea multi-year products’ cross cutting activities, contributing to the Ocean State Report (issue 1 and 2). WP leader of SeaDataNet II and SeaDataCloud projects, coordinating quality control activities, the production/release of aggregated datasets and climatologies for all EU marginal seas. Scientific manager of the [EMODnet MedSea Checkpoint](#) project devoted to the assessment of the adequacy of the observing and monitoring system at basin scale. She is currently involved in important EU projects dedicated to the developments of the European Open Science Cloud (EOSC) services in the marine domain, such as [FAIR-EASE](#) and [Blue Cloud 2026](#). She promotes open science practices within the [EMODnet Data Ingestion](#) project and as Topical Editor (Ocean) for the [Earth System Science Data \(ESSD\) Journal](#). She recently joined the [IQuOD](#) steering group.

Alessandra Giorgetti is a Lead Technologist at the National Institute of Oceanography and Applied Geophysics - OGS, Italy, Deputy Director of the Oceanography Department. Since 2006 Head of the National Oceanographic Data Centre, a reference infrastructure working at national and international level to support the world of research and European policies, e.g. MSFD and MSP, by promoting best practises in data management, open access to data and the development of innovative products. National delegate for Italy in the UNESCO/IOC International Oceanographic Data and Information Exchange System, she actively contributed to the development of the oceanographic databases within the European projects MTPII/MATER and MEDAR and the European directories within the European project SEA-SEARCH and the European project EDIOS. Responsible for the Italian node in SeaDataNet (2006-2011), SeaDataNet2 (2011-15) and SeaDataCloud (2016-20) and scientific leader for OGS in the EU project ODIP (2012-15) and ODIP2 (2015-18) with the aim of initiating and operate the Ocean Data Interoperability Platform including all major organisations dealing with ocean data management in the EU, US and Australia, to name but a few of the leading EU projects.

She has been the coordinator of the European EMODnet Chemistry network since 2009. She is a qualified project manager with extensive experience in managing international relations and data management activities.

As a leading expert in marine data management, she advocates for open science and promotes the development of methods and tools that enable free and easy access to validated data and innovative products.

Mauro Locati is technologist at the Istituto Nazionale di Geofisica e Vulcanologia (INGV). He has managed publicly accessible databases since 2004 and since 2018 coordinates the INGV Data Management Office that implements the Institutional Data Policy. He obtained a Master’s in

Management of Research, Innovation and Technology from the Politecnico di Milano in 2017. He participates in research projects funded by the Italian Ministry of University and Research, the Italian Civil Protection Department and the European Commission. He is currently the INGV coordinator in the Horizon Europe Skills4EOSC project and since 2019 he has represented INGV within Italian Computing and Data Infrastructure (ICDI). Since 2022 he has coordinated the group in the PNRR MEET project that will build the overall data platform, and since 2022 he coordinated the Open Science group of CoPER, the Council of Presidents of Public Research Institutions.

Elena Partescano is a Technologist in the Oceanography Section at the OGS, where her main activities are related to the management of oceanographic data and metadata management using common vocabularies, adopting the ISO 19115/19139 metadata standard for all metadata directories.

Management and processing of oceanographic data in relational databases for the management of real-time and delayed oceanographic monitoring systems using SQL (Structured Query Language) on the Unix/Linux operating system; validation and analysis of oceanographic data; management of metadata using XML files (through the use of Mikado software), use of XSLT (eXtensible Stylesheet Language Transformations); management of oceanographic data using the GIS platform; creation and management of the interface for data input; use of XML DB (XML database), Xquery, RESTful Web Service and software for managing HTTP URLs (Mikado), for inserting, updating and extracting XML files directly into the Oracle database, for managing metadata catalogs. Data management with OGC standards (Sensor Observation Service, Sensor Web Enablement, SensoML and O&M).

Dr. Partescano has been involved in a number of national, European and other international projects, such as: SeaDataCloud, EMODnet Chemistry, Jerico+, EMODnet Ingestion, Eurofleets+, Harmonia, PortodiMare, SeaDataNet, SeaDataNet 2, JERICO, ODIP I, ODIP II, FixO3, Eurofleets, EMODnet Hydrography - Seabed Mapping and Geo-Seas.

Prof. Dr. Reiner Schlitzer. Education: University of Heidelberg, Diplom in Semiconductor Physics, February 1980. PhD in Oceanography, October 1984. Habilitation in Environmental Physics, University Bremen, December 1993.

Positions held:

- Postdoctoral Visiting Scientist, M.I.T., Boston. 1985-1987
- Assistant Professor and Lecturer, University of Bremen, 1987-1993
- Senior Scientist, Alfred Wegener Institute, Bremerhaven, 1993-present.
- Professor of Environmental Physics, University of Bremen, 2004-present
- Fields of Research: Inverse modelling of ocean circulation and biogeochemical cycles, radioisotopes as paleo- circulation and productivity proxies, development of data analysis and visualization software.

Antonio Novellino: Engineer, PhD in Bioengineering and Bioelectronics, Data Scientist, serves as the Head of Research and SmartCities at ETT, a digital and creative company with a strong focus on information systems and decision support for the environment, sea, climate, and infrastructure.

He actively participates in various international committees responsible for managing standards and tools that facilitate the exchange of environmental and marine data. In addition to coordinating EMODnet Physics, a project under the European EMODnet Program for the sharing of in-situ marine data, he also leads data management activities in several European projects within the Mission Restore Our Waters and Oceans program (Aquabiosens, EFFECTIVE, OLAMUR, OBSSEA4CLIM, BLUECLOUD2026, OCEAN:ICE, SO-CHIC, LandSeaLot, SoundSignature, OceanBestPractices, Copernicus Marine Service Marine Data Store).

Mauro Caccavale is a research scientist at CNR-ISMAR with a degree in Physics at the University "Federico II" of Naples. As researcher he is strongly involved on the hazard topic (PSHA, Early warning, GMPE...) and seismic monitoring. In 2013 he joined CNR, working in many national and international projects to develop mitigation strategy data analysis protocols and software. He was strongly involved in research and computational activity related with the hazard analysis for strategic sites in the Netherlands, South Korea and for the volcanic area of Campi Flegrei in the Campania region (on- and off-shore). During the last years, He is involved into developing of a new probabilistic hazard methodology related with the earthquake-induced landslide and to develop a new tomography algorithm for geothermal areas. In the framework of the scientific activity, he is collaborating with different national laboratory to test an innovative optic fibers sensor and to develop new software tool for the geothermal survey.

His interests spread over several topics, mainly regarding the seismic hazard mitigation, seismic technology, seismic data analysis and software development. He's the IT responsible for ISMAR-NA site and has strong experience as software developer and scientific data management, both production, analysis and dissemination in integrated and interoperable frameworks. Presently, He is leading the implementation of ITINERIS Marine hub: IT-IOOS.