

## Panel F- *DATA HARMONIZATION*

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### Conclusions and recommendations

The Panel discussions concentrated on the current issues and possibilities to archive data harmonization for Mediterranean and Black Seas across disciplines, so as to further research and applications. The main data types addressed in the seven panel presentations were oceanographic data and biological data. The presentations made clear that a long record of oceanographic data exists with a wealth of excellent systems, tools and technologies in place in both East and West. The main systems discussed were ESIMO and SeaDataNet. Recent advances in molecular biology and especially sequencing technologies have now paved the way to add “the biological factor” to global oceanographic and climate models.

Definition of “Data Harmonisation” and its related entities, such as data integration and interoperability of systems:

- *Data Harmonisation* is a possibility to combine data from heterogeneous sources into integrated and consistent data
- *Data Integration* is combining data of different sources and providing users with a unified view of these data
- *Interoperability* is the ability of two and more systems or components to exchange information and to use information that has been exchanged

The Panel defined the following key elements for data harmonisation from three different points of view:

1. Semantic
  - a. *Quality of data*; application of best practices for data management on institutional level to prepare data sets for sharing data
  - b. *Standards*; use of internationally adopted standards
  - c. *Vocabularies and Ontologies*; use of common codes and dictionaries
2. Technical
  - a. *Metadata structures*; use of common metadata structures for data/services description and data discoverability based on ISO, OGC and INSPIRE standards
  - b. *Data formats*; use of common formats for data exchange taking into account NetCDF, XML and geo-services (e.g. WMS, WFS, WCS) for data accessibility

- c. *Data publication* e.g. by using agreed DOIs to increase discoverability of data
  - d. *Machine to machine communication* following common interaction standards and providing data exchange between servers of interacted data systems
  - e. *Easy to use interfaces*; the “one stop shop” for end user access
3. Organisational and policy
- a. Free and open access to data
  - b. Minimum cycle time from data production to availability

The Panel concluded:

- Data harmonisation is a complex process
- Data harmonisation is a living process
- Data harmonisation across disciplines e.g. by including biological data is a challenge

Benefits of data harmonisation:

- One-stop shop for data and web services
- Increased visibility for one’s research data
- Increased visibility of research and researchers

## **Recommendations**

To best proceed Panel F proposes to initiate a joint proposal on data harmonisation for Mediterranean and Black Seas based on an East-West cooperation. Panel F proposes to create an ad-hoc working group for the preparation of the project. This working group should include the co-chairs of panel F and appropriate representatives of CIESM member States as well as SeaDataNet, ESIMO, IODE Ocean Data Portal. The working group would prepare and outline of the proposal for a first submission to CIESM. Key points of the proposal are: 1) Data harmonisation across disciplines, 2) Open Access to data.

Financial support should be sought by matching funds from the Russian Ministry of Science and Education and the European Commission as part of a specific call within the H2020 programme.