



## **The European common data and metadata model for real-time High Frequency Radar surface current data**

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High Frequency Radars (HFR) have become invaluable tools in the field of operational oceanography for monitoring surface currents, waves and winds, with direct applications in different sectors, such as Search and Rescue, renewable energy (wind farms, ocean current turbines), fishery management and monitoring of pollutants and biological quantities. They are increasingly used to support decision-making by coastal ocean users and managers. Moreover, in the next years it is expected that HFR surface current data will be systematically ingested in data assimilation processes necessary for predictive model adjustment. It is then crucial to promote and distribute high quality HFR data for scientific, operational and societal applications.

An appropriate data description (i.e. "comprehensive metadata") complying with an accepted standard, is crucial for enforcing discovery and access. The comprehensive metadata description is a prerequisite for the full implementation of EuroGOOS, providing an inventory of the continuously available data for operational models. It is also necessary for creating and giving an overview of marine monitoring programmes relevant for the Marine Strategy Framework Directive (MSFD) implementation.

Active international initiatives and ongoing projects exist, that aim at fostering and promoting the use of HFR technology in Europe. As part of these efforts, a model for data and metadata was defined and implemented aimed at becoming the official European standard for producing near real-time HFR surface current data and at ensuring efficient and automated HFR data discovery and interoperability.

The model has been implemented according to the standards of Open Geospatial Consortium (OGC) for access and delivery of geospatial data, and compliant with the Climate and Forecast Metadata Convention CF-1.6, to the Unidata NetCDF Attribute Convention for Data Discovery (ACDD), to the OceanSITES convention and to the INSPIRE directive. Furthermore, it has been defined following the guidelines of the DATAMEQ working group and it fulfils the recommendations given by the Radiowave Operators Working Group (ROWG). To enforce semantics and interoperability, controlled vocabularies are used in the model for variable short names and standard names.

The model specifies the file format (i.e. netCDF-4 classic model), the global attribute scheme, the dimensions, the coordinate, data and Quality Control (QC) variables and their syntax, the QC procedures and the flagging policy for both radial and total data.

A battery of mandatory QC tests has also been defined, in order to ensure the delivery of high quality data, to describe in a quantitative way the accuracy of the physical information and to detect suspicious or unreliable data.