Geophysical Research Abstracts
Vol. 18, EGU2016-12804, 2016
EGU General Assembly 2016

CMEMS (Copernicus Marine Environment Monitoring Service) In Situ Thematic Assembly Centre: A service for operational Oceanography

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Copernicus, previously known as GMES (Global Monitoring for Environment and Security), is the European Programme for the establishment of a European capacity for Earth Observation and Monitoring. Copernicus aims to provide a sustainable service for Ocean Monitoring and Forecasting validated and commissioned by users. From May 2015, the Copernicus Marine Environment Monitoring Service (CMEMS) is working on an operational mode through a contract with services engagement (result is regular data provision).

Within CMEMS, the In Situ Thematic Assembly Centre (INSTAC) distributed service integrates in situ data from different sources for operational oceanography needs. CMEMS INSTAC is collecting and carrying out quality control in a homogeneous manner on data from providers outside Copernicus (national and international networks), to fit the needs of internal and external users.

CMEMS INSTAC has been organized in 7 regional Dissemination Units (DUs) to rely on the EuroGOOS ROOSes. Each DU aggregates data and metadata provided by a series of Production Units (PUs) acting as an interface for providers.

Homogeneity and standardization are key features to ensure coherent and efficient service. All DUs provide data in the OceanSITES NetCDF format 1.2 (based on NetCDF 3.6), which is CF compliant, relies on SeaDataNet vocabularies and is able to handle profile and time-series measurements. All the products, both near real-time (NRT) and multi-year (REP), are available online for every CMEMS registered user through an FTP service.

On top of the FTP service, INSTAC products are available through Oceanotron, an open-source data server dedicated to marine observations dissemination. It provides services such as aggregation on spatio-temporal coordinates and observed parameters, and subsetting on observed parameters and metadata.

The accuracy of the data is checked on various levels. Quality control procedures are applied for the validity of the data and correctness tests for the metadata of each NetCDF file. The quality control procedures for the data include different routines for NRT and REP products.

Key Performance Indicators (KPI) for monitoring purposes are also used in Copernicus. They allow a periodic monitoring of the availability, quantity and quality of the INSTAC data integrated in the NRT products.

Statistical reports are generated on quarterly and yearly basis to provide more visibility on the coverage in space and time of the INSTAC NRT and REP products, as well as information on their quality. These reports are generated using Java and Python procedures developed within the INSTAC group.

One of the most critical tasks for the DUs is to generate NetCDF files compliant with the agreed format. Many tools and programming libraries have been developed for that purpose, for instance Unidata Java Library. These tools provide NetCDF data management capabilities including creation, reading and modification.

Some DUs have also developed regional data portals which offer useful information for the users including data charts, platforms availability through interactive maps, KPI and statistical figures and direct access to the FTP service.

The proposed presentation will detail Copernicus in situ data service and the monitoring tools that have been developed by the INSTAC group.