Marine climate change and environmental indicators from the Marine Core Service

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Abstract

In the framework of the Mediterranean Operational Oceanography Network (MOON, http://www.moon-oceanforecasting.eu) The Mediterranean Forecasting System (Pinardi et al., 2003) has started the design and development of services that include the routine production of environmental and climate indicators. A process of identifying user requirements has been started in collaboration with European Environment Agency and the indicators definition and implementation aim to take user requirements into account. The indicators are extensively used by EEA (EEA web page on indicators: http://themes.eea.europa.eu/indicators/). INGV has carried out an analysis on the possible improvements of existing indicators in use by EEA and on the development of new indicators based on Marine Core Services (MCS) products. The list of indicators includes: Temperature, Chlorophyll-a (from ocean colour), Ocean Currents and Transport, Salinity, Transparency, Sea Level, Sea Ice and Density. A critical analysis has been carried out to identify the relevance of the above-mentioned indicators for EU policies, their spatial and temporal coverage, their accuracy and their availability (Coppini et al., 2008). INGV in collaboration with CNR-ISAC are directly involved on the development of the indicators in the Mediterranean region and European Seas region the Temperature and Chlorophyll-a (Chl-a) products are the most suitable for an indicator development test phase. In particular the OO Chl-a product, deduced from satellite data, is able to contribute to the further development of the EEA Chl-a indicator on eutrohpication that is based on in-situ measurements (CSI023). For this indicator a development phase has been undertaken in 2008 and 2009 within the European Topic Center for Water (ETC-W) for EEA. The temperature indicators, developed with the support of MyOcean and Operational Oceanography community, consist of long time series (1870-Today) of SST anomaly able to describe ocean temperature increase due to climate change in the European Seas and on SST trends map of the last 25 years for the European Seas. These last two indicators have been included in the last 2008 EEA report on Impacts of Climate change in the European Seas (http://www.eea.europa.eu/publications/eea_report_2008_4). Moreover MFS re-analysis have been produced for the Mediterranean Sea and it consists of daily output of MFS-OPA hydrodinamic model (1/16 of degree horizontal resolution) that assimilates all available in situ and satellite observation for 1985 to 2007. This reanalysis product is used to detect temperature anomalies over the last 20 years in the coastal zone that could be related with environmental stresses. In addition to that we have also identified a Density indicator that appears relevant for the ecosystem health assessment in the coastal waters.