Interpolate with DIVA and view the products in OceanBrowser : what's up ?

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The Data-Interpolating Variational Analysis (DIVA) software is a statistical tool designed to reconstruct a continuous field from discrete measurements. This method is based on the numerical implementation of the Variational Inverse Model (VIM), which consists of a minimization of a cost function, allowing the choice of the analyzed field fitting at best the data sets without presenting unrealistic strong variations. The problem is solved efficiently using a finite-element method. This method, equivalent to the Optimal Interpolation, is particularly suited to deal with irregularly-spaced observations and produces outputs on a regular grid (2D, 3D or 4D). The results are stored in NetCDF files, the most widespread format in the earth sciences community.

OceanBrowser is a web-service that allows one to visualize gridded fields on-line. Within the SeaDataNet and EMODNET (Chemical lot) projects, several national ocean data centers have created gridded climatologies of different ocean properties using the data analysis software DIVA. In order to give a common viewing service to those interpolated products, the GHER has developed OceanBrowser which is based on open standards from the Open Geospatial Consortium (OGC), in particular Web Map Service (WMS) and Web Feature Service (WFS). These standards define a protocol for describing, requesting and querying two-dimensional maps at a given depth and time.
DIVA and OceanBrowser are both softwares tools which are continuously upgraded and distributed for free through frequent version releases. The development is funded by the EMODnet and SeaDataNet projects and include many discussions and feedback from the users community. Here, we present two recent major upgrades.

First, we have implemented a "customization" of DIVA analyses following the sea bottom, using the bottom depth gradient as a new source of information. The weaker the slope of the bottom ocean, the higher the correlation length. This correlation length being associated with the propagation of the information, it is therefore harder to interpolate through bottom topographic "barriers" such as the continental slope and easier to do it in the perpendicular direction. Although realistic for most applications, this behaviour can always be disabled by the user.

Second, we have added some combined products in OceanBrowser, covering all European seas at once. Based on the analyses performed by the other EMODnet partners using DIVA on five zones (Atlantic, North Sea, Baltic Sea, Black Sea, Mediterranean Sea), we have computed a single European product for five variables : ammonium, chlorophyll-a, dissolved oxygen concentration, phosphate and silicate. At boundaries, a smooth filter was used to remove possible discrepancies between regional analyses. Our European combined product is available for all seasons and several depths. This is the first step towards the use of a common reference field for all European seas when running DIVA.