A web interface for griding arbitrarily distributed in situ data based on Data-Interpolating Variational Analysis (Diva)

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Spatial interpolation of observations on a regular grid is a common task in many oceanographic disciplines (and geosciences in general). It is often used to create climatological maps for physical, biological or chemical parameters representing e.g. monthly or seasonally averaged fields. Since instantaneous observations can not be directly related to a field representing an average, simple spatial interpolation of observations is in general not acceptable. Diva (Data-Interpolating Variational Analysis) is an analysis tool which takes the error in the observations and the typical spatial scale of the underlying field into account. Barriers due to the coastline and the topography in general and also currents estimates (if available) are used to propagate the information of a given observation spatially.

Diva is a command-line driven application written in Fortran and Shell Scripts. The observations and parameters are specified by the user using text files. The analyzed field and the expected error variance are returned as NetCDF files. This form of interaction with Diva is very similar to other high-performance codes and is a familiar approach for ocean modelers. However it represents a steep learning curve for oceanographers from other disciplines not familiar with command-line applications and programming.

To make Diva easier to use, a web interface has been developed (http://gher-diva.phys.ulg.ac.be). Installation and compilation of Diva is therefore not required. The user can directly upload his/her data in ASCII format and enter several parameters for the analysis. The analyzed field, location of the observations, and the error mask are presented as different layers using the Web Map Service protocol. They are visualized in the browser using the Javascript library OpenLayers allowing the user to interact with layers (for example zooming and panning). Finally, the results can be downloaded as a NetCDF file, Matlab file (also readable in Octave, an open source program similar to Matlab) and Keyhole Markup Language (KML) file for visualisation in applications such as Google Earth.