

Preliminary results of climatological computations of the hydrological characteristics of the Mediterranean Sea using the Variational Inverse Method

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New gridded fields of temperature and salinity in the Mediterranean Sea are computed from aggregated datasets for the period 1864-2007. The sources of the datasets are: a) the MEDAR/MEDATLAS II database, b) national data of the Hellenic Oceanographic Data Centre, c) the Coriolis data of the French Operational Oceanography Data Centre and d) the World Ocean Database 2005 (WOD05). The duplicates between different data sources were identified by comparing the position and the date (and time) of the profiles and eliminated from the merged dataset. Then, the observed level data were interpolated vertically at 25 standard depths using the Reiniger & Ross interpolation, the same technique that was used for the MEDAR/MEDATLAS II climatology. The method is based on a weighted mean of two parabolic interpolations with 3 exterior and 3 interior data points. Only "good" data were used for the interpolation namely data with quality control flags equal to 1 or 2 according the MEDATLAS flag scale.

The gridded fields (monthly, seasonal and climatological) at each standard level are computed by the Variational Inverse Method and a finite element technique with the use of the geostatistical analysis tool DIVA of the University of Liege. The same method was used for the computation of the MEDAR/MEDATLAS II climatology. The present updated version of DIVA software incorporates additional capabilities that optimize the analysis. The ETOPO5 topography was used for the generation of the contour files. The contours are checked against the length scale of the analysis and used for the mesh generation. The correlation length and the signal to noise ratio are calibrated at each standard level using the Generalized Cross Validation method. In addition, quality control is performed by a DIVA module by comparing the misfit between the data and the analysis with a theoretically derived distribution of these misfits. Elimination of the detected outliers sometimes smoothes but not always eliminates suspicious features on the visual representation of the analyzed fields. Coastal data produce low error fields and will be thus eliminated from the future error analysis.

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