SEASONAL TEMPERATURE AND SALINITY FIELDS IN THE MEDITERRANEAN SEA : CLIMATOLOGICAL ANALYSES OF AN HISTORICAL DATA SET

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Observations of temperature and salinity have been collected in the Mediterranean Sea for a long time, within the frame of national and international research projects. An effort to merge several existing data sets into a common file system has been undertaken in the perspective of climatological studies. Up to now, over 25000 CTD and STD profiles have been integrated in the so-called MED2 historical data base, covering the period 1900-1983. These profiles originate essentially from the French BNDO (Bureau National des Données Océaniques, Brest) and the U.S. NODC (National Oceanographic Data Centre). The spatial distribution of the MED2 stations is shown on figure 1. This preliminary effort is now pursued within the frame of the CEC MAST/MODB initiative for data and information management. In the near future, the data bank will be upgraded with more recent data collected, for instance, by the POEM Group or by regional institutions.

Seasonal and monthly objective analyses of the original data are performed using a variational inverse method (BRASSEUR and HAUS, 1991) as an alternate to the standard statistical procedure. The solutions are derived from a variational principle, taking into account the statistics of the observations to minimize the expected error on the fields. Error fields are estimated from the variance of the finite element solution. In addition, a kinematic constraint can be imposed to represent anisotropic correlations between the data, as a result of the advection of the scalar properties by the geostrophic circulation.

The numerical parameters of the scheme are adjusted according to the statistics contained in the MED2 data. The results, materialized as gridded data sets (horizontal resolution at 1/4 of degree), show some trends of the seasonal variability affecting the properties of the water masses. As expected, the upper layer is the seat of a well-marked seasonal variability affecting both the temperature and the salinity fields. The surface salinity reconstructed for the winter period is illustrated on figure 2. The Rhode gyre in the Eastern basin and the Gulf of Lions gyre in the Western basin represent the most robust features of the winter circulation. An inventory of the seasonal analyses performed at all depths is reported in BRASSEUR *et al.* (1994).

The MODB products have been prepared for general distribution among the scientific community. In addition, they are conceived as a basic support to more advanced studies, including : diagnostic calculations, initialization of dynamical models, assimilation of hydrological data into primitive equation models, planning of experimental surveys, ... A first attempt to assimilate these climatological analyses into a 3D primitive equation model is reported in BECKERS *et al.* (1994). New versions of the climatological fields will be released as additional data are validated and made available to feed the MED2 historical data set.

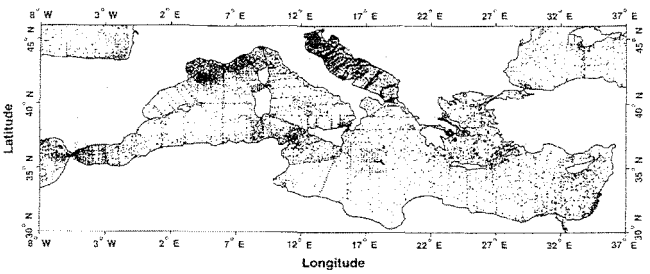

Fig. 1: Spatial distribution of the MED2 historical data during winter.

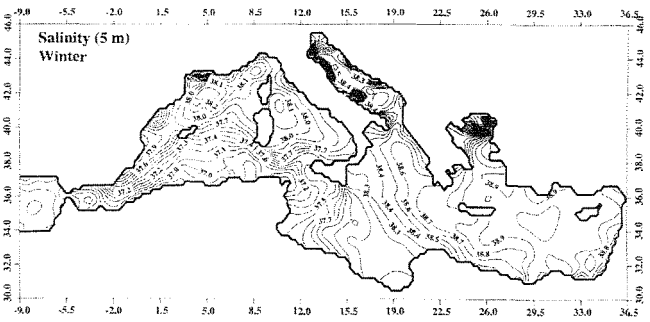

Fig. 2: Surface salinity representative of the winter season as reconstructed by the variational inverse method.

REFERENCES

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