The influence of the N.W Aegean Sea waters on the Physical characteristics of the Pagassitikos Gulf

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Abstract

Recent hydrological investigations in the Aegean and Ionian Sea reveal that the waters of the NW Aegean Sea, are strongly affected by the inflow through the Dardanelles of Black Sea - Marmara Sea waters (THEOCHARIS *et al.*, 1992). This is more evident in the NE Aegean Sea (surface salinity values: 33.5-34.4), but the Western North Aegean Sea is also influenced (Surface salinities: (33.5-37.7). Consequently, the lower surface salinities covering all over the Pagassitikos Gulf. lead to the conclusion that the source water of the Gulf must be the NW Aegean Sea waters and not the fresh water outflow from the surrounding area of the Bay of Volos (Fig.1). Figure 2, summarizes the three years (1986-1989) seasonal salinity surface (0-20m) layer variations as compared to the integrated mean salinity values of the entire water column. It demonstrates that salinity minima are achieved in late summer to early autumn.These salinity variations dislay similar trends with the equivalent salinity variations in the NW Aegean Sea, providing further evidence that the renewal of the Pagassitikos Gulf surface waters is mainly affected by the inflow into the Gulf of the NW Aegean Sea waters. Furthermore, the analysis of the current meter data reveals that the renual of the water in the Gulf, in the near - bed layer, is made by the intrusion of the Aegean Sea water along the eastern coastline of the Gulf entrance, and outflow of the water along the western section. In the upper layer, the water circulation is in the opposite direction (BALOPOULOS *et al.*, 1987).

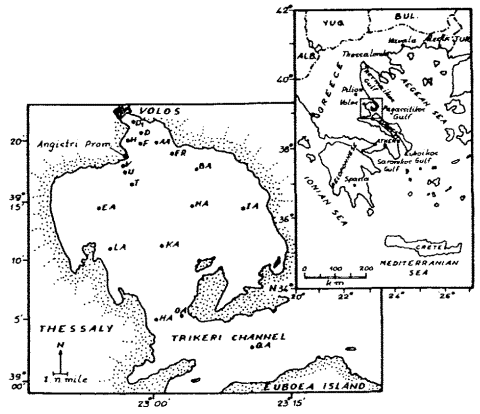

Fig.1: Sampling locations in the Gulf of Pagassitikos.

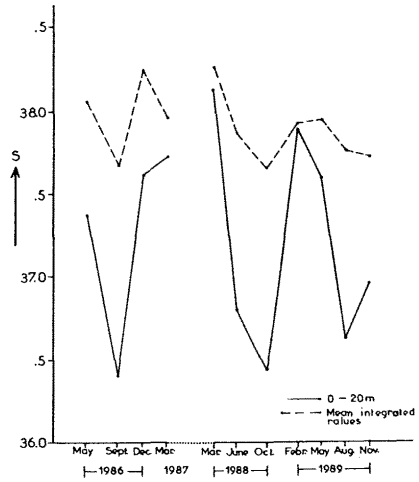

Fig. 2.- Salinity variations in station IA of the surface layer and corresponding integrated mean values (1986-1989)

REFERENCES

BALOPOULOS E., PAPAGEORGIOU E., CHARALABAKIS A. & PAPADOPOULOS B., 1987.- Current Measurements in the West Aegean Sea: Pagassitikos Gulf, Minutes of the 2nd Hellenic Conference on Oceanography and Fishing, Athens, 282-293.

THEOCHARIS A., GEORGOPOULOS D. & SALUSTI E., 1992.- Dence Water Formation over the Samothraki and Limnos Plateax in the North Aegean Sea(Eastern Mediter ranean). *Continental Shelf Research*, (accepted).

The Simulation of the Month to Month Variability of the Western Mediterranean Circulation

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Using the GHER 3D non linear primitive equation model (e.g. BECKERS, 1991), the month to month variability of the general circulation in the Western Mediterranean Sea is established. It will be shown that the main physical features are well represented (the deep water formation is shown as an example on figure 1), but that the choice of initial conditions is crucial as well as the boundary conditions.

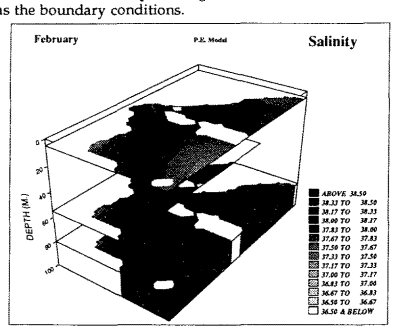

Fig. 1.- 3D view of the deep water formation in the Gulf of Lions. Salinity field in February.

In a first simulation, Levitus climatological data set was forced by the monthly mean May atmospheric data. The results showed herafter were obtained after 3 years of simulation. With these initial conditions and forcings, only a weak month to month variability was detected.

For a second simulation, the BNDO data interpolated by the inverse method are used as initial conditions. Thus a variational inverse model (e.g. BRASSEUR 1991) is developed to create appropriate initial conditions using the BNDO data set. The interpolated fields (e.g. on figure 2) - exploited as initial conditions - lead to a better simulation of the general circulation, and a crude data assimilation scheme is implemented to improve the general pattern. This data assimilation scheme simply uses the surface values computed by the inverse model to calculate an additional surface flux with a tendancy to restore the surface values computed by the direct model to those computed by the inverse model. It will be shows that now the Algerian current is improved, the Liguro-Provencal current well established. In the Balearic Island region, the simulations do not create a coherent current system indicating either bad grid-resolution, initial conditions or a high mesoscale variablity. Indeed, the variational inverse method gave significantly better results by using seasonal averages than monthly averages in this region, suggesting thus an important seasonal signal and high mesoscale variablity.

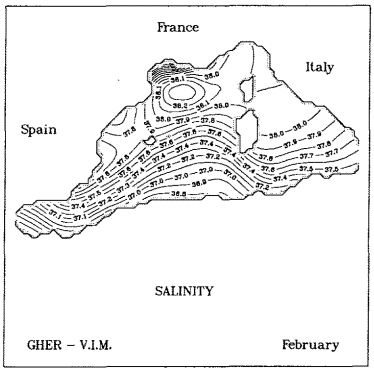

Fig. 2: Surface salinity field in February reconstructed by the variational inverse model from the BNDO data set.

In the near future, more sophisticated data assimilation schemes will be tested, in order to use a high resolution model with accurate data.

REFERENCES

BECKERS J.M., 1991. - Application of a 3D model to the Western Mediterranean. *Journal of Marine Systems*, 1, 315-332.

BRASSEUR P. & HAUS J., 1991. - Application of a 3D variational inverse model to the analysis of ecohydrodynamic data in the Northern Bering and Southern Chukchi Seas. *Journal of Marine Systems*, 1, 383-401.