O-VI4

MESO-SCALE HYDROGRAPHIC CHARACTERISTICS IN THE NORTHEASTERN MEDITERRANEAN - NOVEMBER 1985

E. ÖZSOY, M.A. LATIF and Ü. ÜNLÜATA

Institute of Marine Sciences, P.K. 28, Erdemli, ICEL (Turkey)

A meso-scale survey of high resolution has been carried out in the northeastern quarter (north of 34° N and east of 28° E) of the Levantine Sea by the R/V BİLİM during 1-12 November 1985. A total of 54 deep stations with spacings of (½)° latitude and longitude were visited during the survey. Hydrographic casts at the stations were obtained down to a maximum depth of 1000m with vertical resolution of 1m or better, using a Seabird Model SBE9 CTD profiler equipped with an oxygen sensor. The volume of data has been edited and processed such that original data failing consistency checks are eliminated. The remaining data have been despiked and filtered. Derived quantities such as mixed layer depth, heat and salt storage in the mixed layer and in the upper layers and salt volumes in the subsurface salinity minimum and maximum layers, Turner double-diffusive stability index and Brunt-Vaisala frequency are calculated from the data. Overall hydrographic features and a summary of important results are presented.

In general, a mixed layer of 20-50 m thickness is found at the surface. Immediately below the mixed layer, an abrupt drop in salinity marks waters of Atlantic origin. At intermediate depths, a maximum in the salinity profiles indicates the presence of Levantine Intermediate Water (LIW). These characteristics are similar to those found by Wüst (1961) and Miller et. al. (1970).

The LIW core (maximum salinity: 39.1) is found maximally to the S of Antalya and NW of Cyprus where it seems to be trapped in anticyclonic eddies. Just further to the south and also within the cyclonic eddy located near Rhodes, upwelling is indicated by the upward lifting of isohalines (isopycnals) by several hundreds of meters. In fact, below a thin surface layer, temperature and salinity are more or less uniform since the LIW core and minimum salinity waters are destroyed by upwelling. A secondary center of high density is located to the east of Cyprus. The minimum salinity water (minimum 38.3) below the mixed layer (at 40-50m depth) is found most abundantly to the SW of Cyprus and is partially advected towards the Gulf of Antalya. In the west of Cyprus, the zones of minimum salinity subsurface water and LIW are separated by a front which extends in an E-W direction. Near this front, interleaving is observed in the salinity profiles.

References:

Wüst, G. (1961) On the Vertical Circulation of the Mediterranean Sea, J. Geophys. Res., v.66, pp. 3261-3271.

Miller, A.R., Tchernia, P. and H. Charnock, (1970) Mediterranean Sea Atlas of Temperature, Salinity, Oxygen Profiles and Data from Cruises of R.V. Atlantis and R.V. Chain, WHOI Atlas Series 3, Woods Hole, Mass., WHOI.

O-VI5

MESO-SCALE CIRCULATION FEATURES IN THE NORTHEASTERN MEDITERRANEAN - NOVEMBER 1985

E. ÖZSOY, T. OĞUZ and Ü. ÜNLÜATA

Institute of Marine Sciences, METU, P.K. 28, Erdemli, Icel (Turkey)

Density profiles at 54 deep stations in the northeastern Mediterranean (north of 34° N and of 28° E) have been analysed. The original data were obtained with a Seabird Model SBE9 CTD profiler on board the R/V BİLİM. The maximum depth of the casts was 1000 m, with vertical resolution of less then 1 m, 24 Hz Sampling rate, 1 second averaging and 1 m/s raising/lowering speed. Only upcasts were used in the analyses since only upcasts were available at a majority of the stations.

The original data were edited such that data failing consistency checks were eliminated, and the valid profile data were despiked and filtered. The density profiles were then used to calculate geostrophic streamfunction at standard depths assuming a level of no motion at 900m. Objective analysis techniques (Bretherton et. al., 1976) were used to construct maps of optimally interpolated streamfunction estimates and relative estimation error.

At the surface, an intense cyclonic eddy is found SE of the Island of Rhodes in the general area that has been reported earlier by Özturgut (1975), Anati (1984) and Ovchinnikov (1984). Breakup eddies from this main circulation extend towards the Gulf of Antalya and further to the south. Another cyclonic eddy is detected at the NE tip of the Island of Cyprus. On the other hand, anticyclonic eddies are found in the Cilician channel and its exit to the Gulf of Antalya. Considerable vertical structure is displayed by the analyses made at different depths. Jet-like features at the surface coincide with frontal zones W of Cyprus and near the shelf edge at the Gulf of Iskenderun.

At the westernmost cyclonic eddy centers, upwelling is observed. Intermediate depth salinity maximum (LIW) is found at the center of the anticyclonic eddy located to the NW of Cyprus. The advection of the subsurface salinity is strongly correlated with the circulation patterns.

References:

Bretherton, F.P., Davis, R.E. and C.B. Fandry, (1976) A Technique for Objective Analysis and Design of Oceanographic Experiments Applied to MODE-73, Deep-Sea Research, v.2 , pp. 559-582.

Özturgut, E., The Sources and Spreading of the Levantine Intermediate Water in the Eastern Mediterranean, SACLANT ASW Research Center Memorandum SM-92, La Spezia, Italy, pp. 45.

Anati, D.A., (1984), A Dome of Cold Water in the Levantine Basin, Deep Sea Research, v. 31, NO: 10, pp. 1251-1257.

Ovchinnikov, I.M. (1984), The Formation of Intermediate Water in the Mediterranean, Oceanology, v. 24, No: 2, pp. 168-173.