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SEA SURFACE EXPRESSION OF MESO-SCALE EDDIES IN THE NORTHEASTERN MEDITERRANEAN - NOVEMBER 1985

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The northeastern corner of the Mediterranean (north of 34°N and east of 28°E) was surveyed by the R.V/BILIM during 1-12 Nov. 1985. Hydrographic casts were made at 54 deep stations using a Seabird model SBE9 CTD profiler. Along the ship course between these stations, the CTD instrument was immersed in an on-board overflow tank through which sea water was pumped at constant rate. The surface temperature, salinity and density were sampled continuously in real-time with an averaging period of 1 minute for each recording. In addition, water samples were collected for the analysis of nutrients. The samples were then analyzed with an on board Technician II autoanalyzer with single channel colorimeter for the determination of phosphate concentration. The ship position was also monitored continuously using mainly satellite navigation, or dead reckoning when fixes were not available.

In processing the large volume of sea surface data, the original time series were first transposed to ship position coordinates making use of the available fixes. Positioning data with obvious error were either corrected or eliminated based on checks for maximum calculated ship speed and total distance travelled. Ship positions between consecutive fixes were interpolated. Then the surface data along the ship course were projected onto straight paths connecting stations and filtered to eliminate noise or originating from ship roll and wake, interference of microscales and other sampling errors. Contours of temperature, salinity, density and phosphate concentration were then passed manually through intercepts determined from

the processed data.

In the surface temperature distribution, a series of eddies are identified with cold centers to the SE of Rhodes Island (19°C.) in Antalya Bay (21°C) and at the NE tip of the Island of Cyprus (21°C) and warm centers (23°C) to the NW of Cyprus. The SE Rhodes eddy is the most intense among these, with two associated breakup eddies located S of the Gulf of Anatalya. Similar eddies were also found by Ozturgut (1976), Anati (1984) and Ovchinnikov (1984) at different times. Frontal crossings with gradients occasionally exceeding 1°C/10 km and displaying meanders are identified at the edges of some of these eddies. Part of the frontal zone extends parallel to the coast and separates coastal and open sea water masses. The observed surface features are closely correlated with the deeper circulation. In the westernmost eddy center considerable upwelling occurs as manifested by the deep station profiles, increased surface turbidity and visual sightings of seabirds, squids and dolphins. Light penetration measurements indicate higher extinction coefficients (0.2-0.5 m^{-1}) the upwelling zone SE of Rhodes as compared to other regions such as the warm core eddy located NW of Cyprus (0.05-0.1-1).

Features that are typical of oceanic fronts (Bowman and Esaias, 1978) are also identified as follows: Along the frontal zones, salinity is reduced through frontal mixing with the underlying minimum salinity waters. A significant increase in phosphate concentration occurs near the fronts, although it is uniformly distributed elsewhere and only increases with depth. Strong interleaving is observed in the T-S diagrams near the fronts.

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