AVHRR/2
Imagery of the Levantine Basin

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Advanced Very High Resolution Radiometer (AVHRR/2) data from the satellite NOAA-9, archived at the University of Dundee has been chosen in order to study physical process in the Levantine Basin.

For the atmospheric and geometrical corrections as well as for the geophysical and radiometrical calibrations mathimatical algorithms have been applied to the "raw" data. Accurate line-by-line numerical models have also been used to simulate the "split-window" Sea Surface Temperature (SST) measurements (at ~ 10 to 12.5μm) of AVHRR/2.

Dynamical features, such as convection, mesoscale eddies, the formation of the Levantine Intermediate Water (LIW) and the location(s) of this process, as well as their seasonal variation and their correlations will be examined. The chosen data cover 1985 seasonally - five series of four consecutive days, enabling conclusions to be drawn about the seasonal (in)dependence of the physical processes mentioned above. For comparison one data set for each series has been chosen from 1986 and 1987.

Qualitatively, all the images are free from clouds and many dynamical features are recognisable.

Aspects of hydrology and circulation of the Northeast Ionian Sea

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Introduction

The Ionian Sea lies to the east of the Straits of Sicily, surrounded by Italy, Greece, Libya and Tunisia. It is the largest in volume sea ($10.8 \times 10^3 km^3$), of the Eastern Mediterranean, and has the greatest depth (5121m) southwest of Peloponnesus. To the north it joins the Adriatic at the Otranto Strait (75 km wide, sill depth 780 m). To the east it communicates with the Aegean through the three western passages of the Cretan Arc; whilst it merges with the Levantine via the Cretan Rise.

Data and Methods

CTD data were collected by R.V. "AEGAION" at 22 stations in the north-eastern Ionian Sea (Fig.1), during POEM-01-1986 Cruise (15-24 April 1986). The data were subjected to conventional methods of analysis, whilst an appropriate version of the so-called "neutral surface analysis" (1) was also employed.

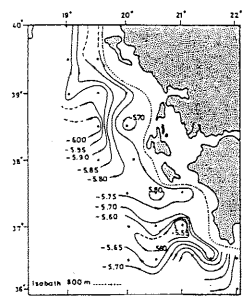

Fig. 1. Dynamic topography of the surface relative to 800 dbar (dashed extensions and closures of the isolines are conjectural).

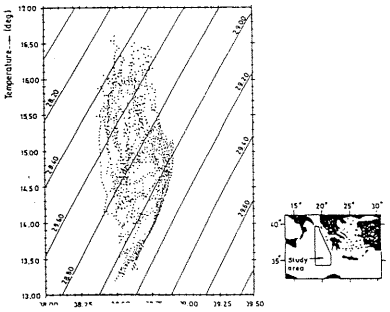

Fig. 2. Composite T-S diagram based on all T-S data of POEM-01-86 Cruise in the study area.

Results and Discussion

Analysis of the data proved the presence of modified types of Levantine Intermediate Water (LIW), North Atlantic Water (NAW), and Adriatic Water (2); and showed frontal but isopycnic encounter with interpenetrations between these water masses (Fig.2). This frontal zone assumes a northeast-southwest meander-like orientation, a pattern consistently manifested from the surface downwards.
At the northernmost part of the front, vigorous mixing processses occur, indicated by an impressive small-scale thermohaline variability and interleaving. At this location the front is nearly vertical, whilst water with characteristics ($T=13.224°C, S=38.642, \sigma_\theta=29.172$) pertinent to Eastern Mediterranean Deep Water occurs near the bottom.
The front remains inclined along its remaining length, separating heavier water in the centre of the study area from lighter water at its eastern part. Eddies both cyclonic and anticyclonic are probably related to this front. However, a meandering mesoscale anticyclonic eddy-like feature stands out at the southeasternmost part of the study area.
The patterns of geopotential topography of the surface relative to the 800 dbar level (Fig.1), as well as the topographies of the appropriate neutral surfaces (1), broadly reflect the bottom bathymetry, and taken in conjunction with the distribution of salinity on the neutral surfaces (3), indicate in addition to the aforementioned features, a meandering northward "flow", and also the extent of the influence of the NAW and LIW, as well as the nature of their interaction within the northeastern Ionian Sea, at the time of observations.

Conclusions

During late winter-early spring the hydrography of the northeastern Ionian Sea was found to be dominated by a meandering frontal zone created by the encounter of NAW, LIW, and Adriatic water; mesoscale eddy activity is probably associated with this frontal zone.
The circulation follows broadly the bottom bathymetry in the contra solem direction.

References

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