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Air-sea interaction and the Alpine cyclogenesis

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A meteo-oceanographic event of interest for the understanding of the role of the sea on the cyclogenesis lee of the Alps is present and discussed. In particular, from the data set collected during the Medalpex, which is the marine counterpart of the Alpex, by the buoy ODAS-Italia 1 moored at about 27 miles off the Ligurian coast, we estimate heat and moisture fluxes at the air-sea interface in the occasion of the passage of intense atmospheric perturbations. Such analysis is completed on the whole Ligurian basin by processing NOAA-7 AVHRR satellite images. The Split Window Algorithm (SWA) is used both for correction of Sea Surface Temperature (SST) and to obtain the Water Vapour Content (WVC) of the air column. SST and WVC deduced by the buoy are then compared with averaged values, in an area of 20 km x 20 km around the buoy, obtained from the AVHRR images. This comparison allows a fine tuning of the SWA for both SST and WVC. Finally, by the use of the vertical temperature profile obtained by XBT probe, it is possible to implement a simple mixed layer model able to simulate the evolution of SST. Such model is then used to describe the noticeable decrease of the SST occurred during the period 22-24 May, 1982 as it results from particularly intense air-sea exchanges.

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Water mass dynamics on the Western Black Sea Shelf

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Owing to the concentration of the river runoff in the north-western part of the Black Sea, the characteristics of the water mass circulation on the western shelf are essential for the formation and evolution of the space distribution of all physico-chemical parameters.

For some areas where direct measurement series were available, regime circulations have been carried out to establish the peculiarities of the meridian flux (4). In order to investigate the current field structure over the continental shelf,the dynamic method (2) has been used for shallow water stations (1, 3).

In the present paper the same method is used for a 10 station hydrological network carried out seasonally during 1981-1983 in the outer shelf area. Due to the "levelling" of the stations (6) relative to the 50 dbar surface, only the results concerning the dynamics of the upper layer are presented.

In all the analysed situations the circulation pattern characteristics are different in the northern part as compared to those from southern part where the variability is higher. Owing to this fact,the overall current field has an intricate structure,with convergence and divergence areas.

The computed speeds are low, reaching only 0.11 m/s. For all the pairs of neighbouring stations of the network the meridian component is directed to south in 60% of the cases, while the zonal component has a westward direction in 80% of the cases.

The station in the southeastern corner of the network is the only deep water station and the vertical distribution characteristics for the specific volume anomaly have been computed (a continuous decrease of the average value from the surface to the 500 m depth and a sharp decrease of the standard deviation below 50 m depth) but these cannot be used in determining the deep water circulation.

For this problem,the data collected during 1978-1980 in a network including three stations located off the continental shelf carried out twice a year (5) have been used.The vertical density distribution characteristics in this three stations are similar to those of the previously mentionned station, but the differences between them rendered difficult the choice of a reference surface by the usual criteria (2).To overcome this difficulty,the 300 dbar surface,located below the lower boundary of the oxygen and used by other authors (7) has been chosen as the reference surface for all situations.

In three cases (February 1978, February 1980 and May 1980), the surface flow is oriented toward NNE, the meridian component reaching 0.15 m/s. In the first situation,the current has practically the same speed and direction down to 50 m depth, then the speed gradually decreases and the very weak zonal component changes sign at 100 m depth. In the other two cases, the current is constant only in the 0 to 10 m layer, but zonal component has in the last situation a value of 0.02 m/s down to 100 m depth.

In the hydrological situation existing in August 1978, the flow is directed toward SW with a speed of 0.17 m/s at the surface. The meridian component has practically the same value down to 75 m depth, while the zonal component slowly decreases,revealing an anticlockwise rotation of the deep current.

In February 1979, the very weak geostrophic currents (0.04 m/s) are directed toward SSE in the upper layer, having an irregular variation with depth.

As a conclusion, the dynamic method yields satisfactory results even for the hydrological stations located on the continental shelf as regards the current field pattern, but it is less reliable for the speed computation.

For the off shelf stations the results are significant if the reference surface is chosen below 150 m. The obtained circulation pattern often differs greatly from the general Black Sea circulation scheme, but when the western branch of the cyclonic gyre is detected, the currents are very stable down to great depths.

REFERENCES

1. DIACONU V., NAE I. - Recherches Marines, 7/1974, pp. 15 - 19.
2. FOMIN L.M. - The Dynamic Method in Oceanography, Elsevier, Amsterdam, 1964.
3. MARINESCU A. - St.Hidraulică, IX/1965.
4. SERPOIANU GH. et al. - Recherches Marines, 9/1976, pp. 19-25.
5. SERPOIANU GH. et al. - Recherches Marines, 16/1983, pp. 25-38.
6. TIMOFEEV V.T., PANOV V.V. - Kosvennye metody vydelenija i analiz vodnykh mass. Gidrometeoizdat, Leningrad, 1962.
7. TOLMAZIN D. - Progress in Oceanography, vol.15, no.4, 1985, pp. 217-316.

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