

SURFACE LAYER CURRENTS AND MESOSCALE THERMAL PATTERNS IN THE BLACK SEA DURING APRIL 1993

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CTD and ADCP measurements carried out in April 1993 are used to describe the circulation in the western Black Sea. Figure 1a shows horizontal current vector distributions at 10 m level. Maximum velocities measured at stations did not exceed 45-50 cm/s, while measurements reached 70 cm/s during ship was under way. Large-scale structures coinciding to the Rim Current west of the Crimean peninsula and along the Turkish coast are well identified. Weaker flows are observed on the North-West shelf (10-15 cm/s), and in central regions of the sea (maximum ≈ 20 cm/s).

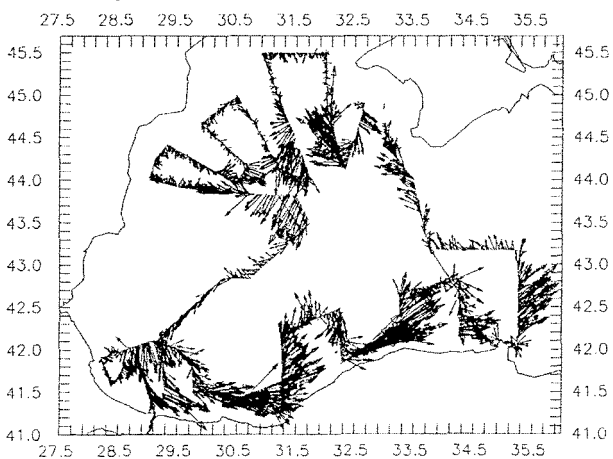
The nearest cloud free AVHRR scene to the cruise obtained in April 19, 1994 (Figure 1b) clearly shows the meandering band of warm water corresponding to the Rim Current west of Sevastopol. To the South, along 44.2°N the cold water area is formed possibly by flow divergence and separates into two branches. Amplitude of cold anomaly is -1.2 °C at the foot of northern current branch of cyclonic meander west of the Crimea. To the west of this meander, the anticyclonic Sevastopol eddy has a diameter of 55 km (centered at 44.5°N, 32.1°E). Further to the West there is another cyclonic meander separating the Sevastopol eddy from the next anticyclonic eddy centered at 43.3°N, 30.5°E.

The North-West shelf is colder (1.5 - 2.0 °C) than the Rim Current water along the continental slope. Near the western shore, the Danube waters are well differentiated, since they are warmer than shelf water by about 1.5 °C. The Danube waters enter the sea from three clearly distinguished three river mouths (Kilija, Sulina and St.George) and spread in a narrow band along the coast towards the South, forming the off-shore anticyclonic eddy south of Cape St.George. The cold shelf water zone connected with north-eastern shelf is seen in between the near-shore jet and Rim Current flowing along the shelf edge.

Along the southern coast, the Rim Current is distinguished by maximum temperature. An anticyclonic eddy north of this jet (centered at 42.5°N, 31.7°E) a diameter of ≈ 40 km and temperature difference of ≈ 6 °C between its center and periphery. The cold eddy was possibly generated by the instability of the Rim Current. Numerous frontal boundaries separating bands of water advected eastwards are observed in the region.

Very good correspondence exists between the currents and thermal structures. The velocity maxima coincide with the frontal regions. The combined use of ADCP and satellite data provides a better description of the mesoscale circulation as compared to the individual sets of data.

Figure 1. (a) ADCP current measurements at 10 m depth, ...



...and (b) infrared AVHRR images in April 1993.

