CONTRIBUTION OF NESTOS RIVER TO THE WATER CIRCULATION OF KAVALA BAY IN NORTH AEGEAN

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In the present study the influx of warmer and lower salinity water into the Kavala bay in North Aegean is examined. The study of temperature and salinity time series, as they were recorded at three locations with moored current meters, combined with the observed current field results that, warmer and lower salinity water enters into the area through Thassos island channel. It is believed that, the origin of the structure of this water mass is Nestos' river water which outflows 13 km east of the bay (Fig.1).

The study of surface bottom sediments of Kavala bay (Lykousis,1984) showed that fine-grained materials predominate all over the bay.This conclusion combined with: (a) The small values of water transparency measured with a secchi disc at the eastern and southern part of the bay, (b) The existence of illite mineral in great quantities in the bay's sediments and (c) the movement of suspended materials from Nestos river, as it is derived from aerial photographs drives to the general conclusion that, Nestos river is the main sourse of supply for the fine-grained sediments of Kavala bay.

The study of bay's current field (Kardaras,1984) using data recorded with current meters showed that: (a) The water circulation is mainly wind-driven and (b) When E or SE winds blow over the area warmer and lower salinity water enters into the area from east.

Data used were collected at three locations with AANDERAA current meters for a three weeks period, May 17, 1983-June 7,1983 (Kardaras,1984). At each location A, B and C (Fig.1) one sub-surface mooring deployed carried two current meters. These were located at depths below MSL of 9m and 5m above the bottom recording the horizontal velocity components, the temperature, the conductivity and the hydrostatic pressure of the water mass. During the observation period hourly values of wind field parameters (direction, speed, barometric pressure) and heights of sea level with a tide gage were recorded at coastal stations (Fig.1).

In the time series of temperature and salinity, two events are observed both associated by a movement of warmer and lower salinity water mass, directed from east to west. Figures 2, 3 and 4 show the time series of temperature, salinity, velocity and direction of current recorded at the top current meter at location A.

The first of the events coincides with an atmospheric disturbance between May 23, and May 24, 1983 when a cold front passed over the area. The passage of the front was characterized by a decrease of barometric pressure and a corresponding increase of mean sea level. Also, easterly winds were recorded with a speed up to 7.7 m/sec.

During the second event observed between May 28 and May 31, 1983, the variations of the temperature and salinity were accompanied by a strong anti cyclonic flow of the water mass at the bay. The recorded current speed had a magnitude up to 45 cm/sec. In contrast, the mean current speed during the rest of the period was 10 cm/sec. The parameters' change appeared first at location C and subsequently at locations B and A. It should be added that, during the above period very ligth winds were recorded and a deep low passed south of Thassos island

The geological information and the current field during the observation period, suggests that, the water of Nestos river is the responsible factor for the generation of the warmer and lower salinity water which enters into Kavala bay from east.

The water mass circulation during the period between May 23 and May 24, 1983 can be attributed to the moderate esterly winds. Although the parameters' variation was stronger at the top current meters than at the bottom ones, it is believed that, more intense easterly winds, than they prevailed, would influence the circulation of the entire water column and not only the top surface layer. A data set of current measurements recorded during March 1982 showed a similar picture of the water circulation in the inner part of the bay (Kardaras,1984).

The change of temperature and salinity as well as the strong burst of current velocity during the period between May 28 and May 31,1983, seems not to have any direct relation to the prevailing wind field over the area. The variation of water's parameters was more intense in the second event than during the previous recorded.

The influx of the water mass into the bay throughout Thassos island channel, is a characteristic barotropic motion, which could be attributed to the pressure gradient extented over the area due to the passed barometric low. This partly confirmed by the difference observed among the sea level's recorded values of the tide gage and the pressure sensors of current meters.

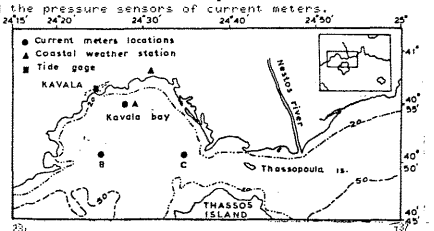

Fig.1 The area of Kavala bay and Nestos river in North Aegean

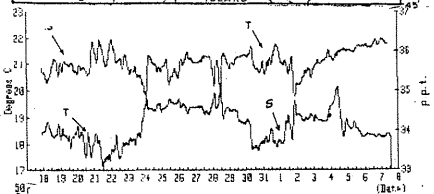

Fig.2 Temperature (T) and salinity (S) time series at top current meter of location A

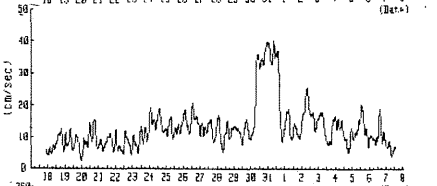

Fig.3 Velocity time serie at the top current meter of location A

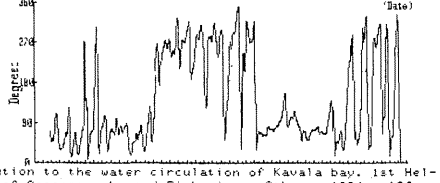

Fig.4 Direction of current at the top current meter of location A

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