## A Water budget study of the Southeastern Mediterranean off the Egyptian Coast

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Water budget is one of the most important problems with which meteorology and oceanography is concerned. It can be assumed with a very considerable degree of probability that the cycle through which the water passes is closed. For a quantitative assessment of the water budget on the Egyptian Mediterranean coast it is necessary to make estimate of the amount of water circulating through it.

The experimental area (Fig.1) has a surface area of about 154840 km$^2$ and its water volume of 224801.55 km$^3$. Striking features of this area are the presence of different water masses which converge and mix. According to the outline of circulation in the Eastern Mediterranean, the incoming flux after passing through the Strait of Sicily follows a cyclonic gyre along the coasts of the Eastern basin. An example of the Egyptian Mediterranean waters circulation pattern was given by GERGES (1981). He used all available surface current measurements collected throughout a period of 50 years, up to the early Seventies, and indicated that the surface currents in the Southeastern Mediterranean are mostly eastward and southward.

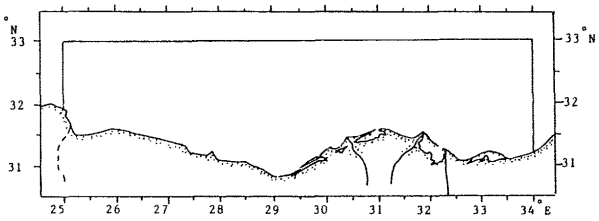
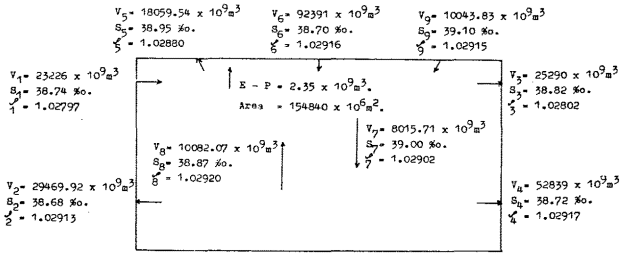



Fig.1. Egyptian Mediterranean Coast.

In the western sector of the experimental area the mean calculated salinity 38.74 ‰ occupies the upper 0-150 m layer. In the eastern sector of the area, according to the results obtained by BETHOUX (1980), the mean surface flux $V_3$ is about 25290 x 10$^9$m$^3$ and salinity 38.82 ‰.




Below this level, there exists an intermediate layer of maximum of salinity. The isopycnal analysis of the study area indicated that, the inflowing intermediate water from the Levantine basin ($V_9$) and the water formed on the Egyptian Mediterranean shelf ($V_7$) flow away from the continental shelf to the northwest in a high-salinity tongue ($V_5$) and reaches the open sea with values as low as 38. 95 ‰ . If we suppose as BETHOUX (1980) that the intermediate water conserves its original salinity of 39.10 ‰ up to the Egyptian waters, 39.00 ‰ on the Egyptian shelf and 38.95‰ up to the open sea (SAID and KARAM, 1990).

The horizontal and vertical fluxes, salinities and densities are summed up in diagram 1. Fluxes $V_2$, $V_4$, $V_6$, $V_7$, $V_8$ and $V_9$ and salinities $S_2$, $S_4$ and $S_8$ are initial unknowns and their values are the proposed solutions resulting from the water and salt budgets equations. The deep Eastern Mediterranean waters ($V_6$) are characterized by 13.60 °C and 38.70 ‰. From the quantitative analysis of the Southeastern Mediterranean waters off the Egyptian coast the mean calculated values of $S_2$, $S_4$ and $S_8$ are 38.68 ‰, 38.72 ‰ and 38.87 ‰ respectively. The mean annual water deficit (evaporation, E-"precipitation + runoff", P) is equal to 2.35 x 10$^9$m$^3$. The schematic presentation in diagram resumes the annual mean calculated values of the fluxes in the Egyptian Mediterranean coast together with the resulting water deficit.

### REFERENCES

BETHOUX J.P., 1980.- Mean water fluxes across sections in the Mediterranean Sea, evaluated on the basis of water and salt budgets and of observed salinities. *Oceanol. Acta*, 3(1) : 79-88.