Water fluxes induced from the wind stress over the Northern Red Sea and the Gulf of Suez

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The expected controlling factor in driving the circulation of the upper surface layer in the longitudinal direction along the main axis of the Red Sea is the wind stress (GERGES & SOLIMAN, 1987). The variation of the wind stress with time over the northern region of the Red Sea is thought to be one of the main controls on that of the surface transport. Consequently, the aim of the present work is to examine the relationships of the variabilities of the surface flux with those of the wind stress over the northern Red Sea off the Egyptian coast and the Gulf of Suez.

Zonal and meridional components of the wind stress (Fig.1) over the northern Red Sea and the Gulf of Suez were calculated from each station wind observation through the bulk formulas. The data used in this study were collected during the joint Soviet-Egyptian expedition on the RV Professor Bogorov which took place during the period 1-6 March 1990.

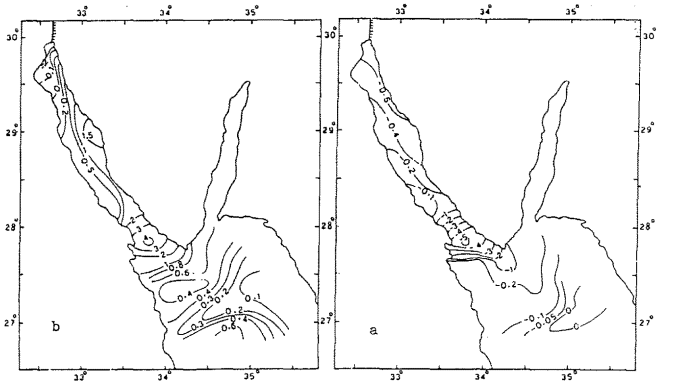

Fig.1. Zonal (a) and meridional (b) components of the wind stress in gm/cm/sec^2.

For the zonal component of the wind stress, the high energy area corresponds to the southern part of the Gulf, where the westward wind stress is dominant and decreases northward and southward. The highest energy area for the meridional stress is found around 27° 30'N and 33° 30'E which is the same position as that for the zonal stress.

Based or the wind stress components, the zonal and meridional components of the Ekman flux for the upper 50m layer (Fig.2) were computed. Zonal fluxes were in the eastward direction. The magnitude of the eastward flux was larger in the Gulf (8.84 $m^2.sec^{-1}$) than those through the northern region of the Red Sea (7.82 $m^2.sec^{-1}$). The meridional Ekman fluxes were northward, i.e. against the wind direction. This is in agreement with the Barlow's (1934) results.

Summations of the Ekman fluxes through the southern boundaries of the study area were about 13.13 $m^2.sec^{-1}$, of them 9.35 $m^2.sec^{-1}$ through the Gulf of Suez.

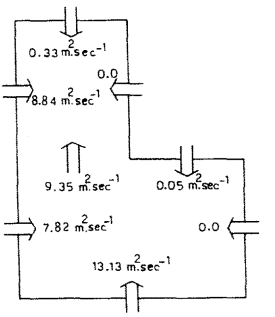

Fig. 2.- Volume fluxes due to the Ekman currents through zonal and meridional boundaries of the study area

REFERENCES

BARLOW E.W., 1934.- Currents of the Red Sea and part of the Indian Ocean north of Australia. *Mar. Obs.*, 11 : 150-154.

GERGES M.A. & SOLIMAN G.F., 1987.- Principal features of circulation in the Red Sea as obtained from a two-layer numerical model. *Bolletino di Oceanologia Teorica ed Applicata*, 5(4) : 261-276.