

**Circulation and water masses :  
their implications on shore processes  
and pollutant transport in Abuquir Bay (Egypt)**

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**Abstract :** Abuquir Bay is a shallow area ( mean depth less than 10 meters ) and affected by active coastal processes and significant sources of pollution. In this paper the water masses in the bay, the dissolved oxygen, total suspended matter and the circulation are discussed. In addition, the major characteristics of echosounder profiles in the area are presented, using a recent Summer ( September, 1984 ) hydrographic survey, with about 40 stations.

The Summer results for Oxygen, salinity and currents show a strong outflow from Maadia outlet, which connect the bay and Idku lake, with a longshore current to the east extending up to mid - way between Rosetta head land and Maadia. Consequently, it is expected that pesticides and other pollutants from the lake Idku will disperse in the bay in the current direction. The density current plays the main role in the circulation of the bay. The high concentration of suspended matter may contribute to the residence of pollutants by adsorption on the particles surfaces.

The currents are strong enough to initiate the sediment movement on the bottom and to intensify the erosional processes. This sediment in motion could also transport the adsorped pollutants to the offshore area.

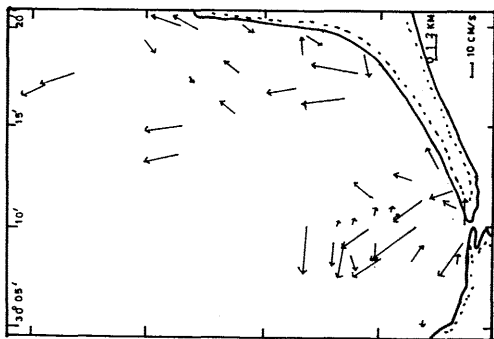


Fig. 1. Circulation pattern in Abuquir Bay at 5 meters immersion, Summer, 1984.

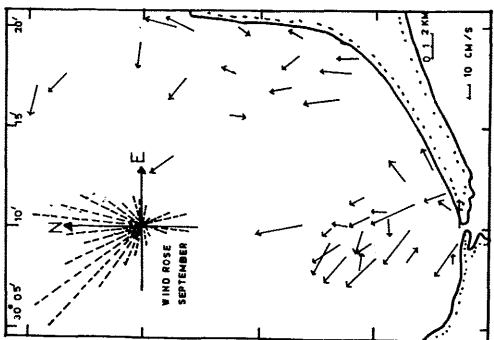


Fig. 2. Circulation pattern in Abuquir Bay near bottom, Summer, 1984.

**On the dynamic features and the possible mechanisms  
of the vertical mixing in Abuquir Bay  
(Alexandria, Egypt)**

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The hydrographic and current data collected in the shallow coastal zone of Abuquir and Rosetta (Egypt) with 27 stations in Autumn and 49 stations in Summer, are used to study the dynamic conditions and their relation to the vertical mixing mechanisms. The dynamics parameters estimation is based on semi-empirical equations and the values of vertical current gradient, stability and wind stress.

The results indicate that the vertical stability decreases in the offshore-ward with  $N^2$  mean value between  $0.8365 \times 10^{-3}$  at 5 meters contour and  $0.141 \times 10^{-3}$  at 15 meters contour in Autumn and  $1.2138 \times 10^{-3}$  and  $0.304 \times 10^{-3}$  at the above mentioned contours respectively in Summer.

The effective vertical mixing coefficient was affected by the stability to have the mean values between 0.54 at 5 meters contour and 3.73 at 15 meters contour.

Richardson number and flux Richardson numbers indicated the dominance of turbulence in 50 % of the cases in Autumn and 10 % of cases in Summer. In the other cases both of turbulence and internal waves were important. The internal waves were dominating only in one case in Autumn and 5 cases during Summer.

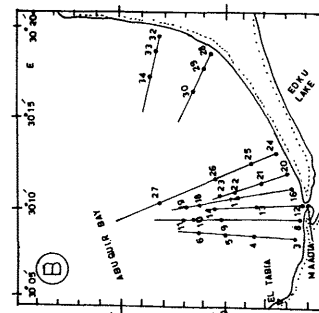


Fig. 1. The map of the study area and the positions of hydrographic stations in Autumn 1983 (A), and Summer 1984 (B and C).

