# Dispersion Models and Behaviour of Some Trace Elements in Brackish Waters of an Estuary ( Mex Bay )

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Mex Bay-west of Alexandria, is one of the Mediterranean bays. It receives effluents from three different landbased sources. Umum Drain (an agricultural drain) is considered as the greatest. Its discharge represents over 96 % of the total input. EL-RAYIS et al., (1984) and EL-GINDY et al., (1986) showed that Mex Bay is characterized by two water layers ; an upper brackish layer of salinity values ranging between 5 and 38.8 ‰ and lower saline layer. During spreading of the fresh water in the surface layer, the concentration of any element discharged with the fresh water may or may not follow the freshwater-seawater distribution, depending on wheather the elements are conservative or non-conservative (EL-RAYIS, 1990).

The present work is an attempt to study the distributions and ideal dispersion models of some trace elements and assessing their behaviours during the transportation process from Umum Drain to the proper sea via the estuary, following the procedure used by EL-RAYIS (1990). The results reveal the presence of a plume-like pattern directly off the drain outlet, in which the dissolved trace elements behave non-conservatively. Some of the elements, like Fe, Mn, Hg and P show considerable loss while others like Cu, Zn and organic carbon (OC) show slight enrichment than their counterparts found in the conservative dispersion models (Fig. 1). Both P and OC are originated mainly from the drain. In addition to the drain other sources in the region (Chlor-alkali Plant, CAP ; Western Harbour, WH ; and Dredging Activity, DA, Fig. 1) are contributed to the presence of the other elements in the bay. It is estimated that the drain alone contributes between 60 and 99.7 % of the total input of the trace elements to the bay.
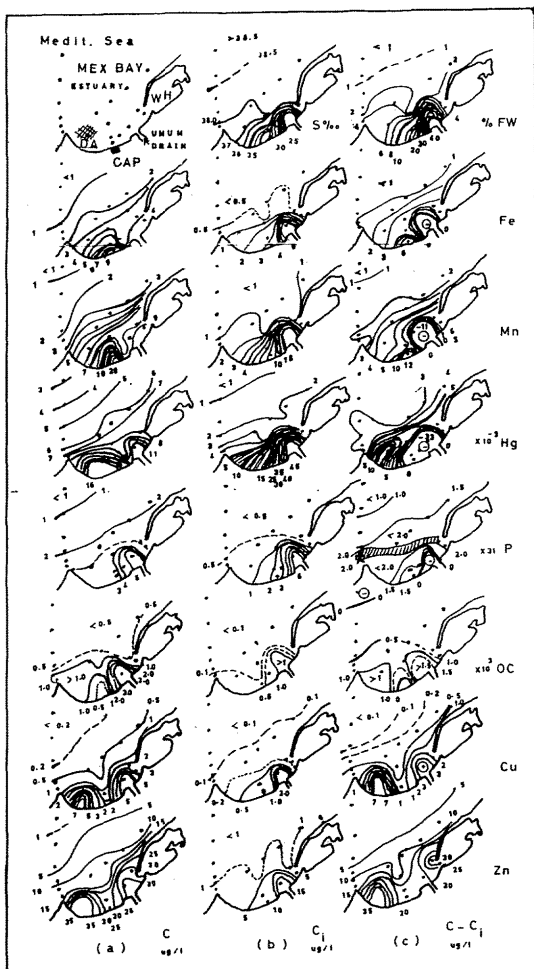


Fig. Distribution of (a) measured element C; (b) Calculated theoritical dilution line value of the element Ci; and (c) the difference between C and Ci, of the element in the surface brackish water of Mex Bay Estuary.

## REFERENCES

EL-GINDY A.A. et al., 1986.- Rapp. Comm. int. Mer. Médit., 30, 2, p.127.

EL-RAYIS O.A. and KAU J., 1990.- Mar. Sci., 1: pp. 27-38.

EL-RAYIS O.A. et al., 1984.- VIIes Journées Etud., Pollutions, Lucerne, CIESM, pp. 357-365.