

Atmospheric input of particulate matter to the Eastern Mediterranean

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It is well known that the Eastern Mediterranean Sea is greatly affected by the eolian dusts originated from Sahara desert, and transported to the region by synoptic scale atmospheric features. The magnitude of which is reported by GANOR and MAMANE, 1982 and as an annual flux rate of 50-200 tones per square kilometer. The effect of such inputs is essential in understanding the chemical oceanography of the region. Mediterranean Sea provides an excellent example in providing a study area which is surrounded by industrial, semi industrial and arid countries and by world largest desert belt. The diversity of the catchment areas have further increased the importance of the impact of wind transported materials to the region.

The issue of long term monitoring of the atmospheric fluxes of trace metals to the Eastern Mediterranean Sea has not been well studied and there were no land based stations to cover this aspect. During 1990 a 18 meter high atmospheric collection tower has been constructed at the harbour jetty of the institute ($36^{\circ} 33'N$, $34^{\circ} 15'E$) and during 1990 110 samples were collected by using two terylene meshes of 300 m mesh presenting a surface area of 1 m to incoming wind. Since Aug. 1991 Andersen type Hi-Vol samplers and Andersen Wet-Dry deposition sampler utilized to collect atmospheric particulates together with mesh collection technique. During 1990 mesh collection programme dust loadings had reached to a level of 1 g per day. The classification of the dust samples according to Munsell color chart has shown that there exists two main class associated with the dust samples indicating the diversity in catchment areas. The results obtained from the elemental analysis of mesh samples of this study together with some other studies are summarized in Table 1 for comparison.

The elemental analysis of the total atmospheric material collected with Hi-Vol sampler during Aug-Sep 1991 have been completed (35 samples). The average particulate loading during Aug 1991 was $6.7 \mu\text{g}/\text{m}^3$ and for Sep 1991 it was $8.1 \mu\text{g}/\text{m}^3$. Results for Pb and Al are plotted on Composite Enrichment Factor (EF) diagrams as explained by SAYDAM, 1981 together with samples collected from other parts of the continent and Western Mediterranean region during EROS-2000 programme Fig.1.

The EF diagram of the Pb has shown that the samples collected will have tendency to fall in a region which indicates a dilution of the European background material by crustal solids. The analysis of the rain samples which are collected by wet-dry deposition sampler has resulted with an average pH of 6.8 and nitrates of $42.5 \mu\text{M}$. The preliminary results has shown that these values are in good agreement with the ones obtained at Western Mediterranean EROS 2000 which is classified as Saharan dominated atmospheric materials.

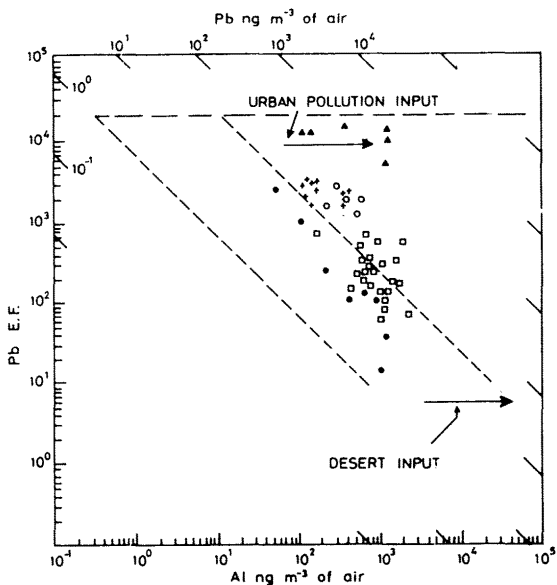


Figure 1. Composite enrichment factor diagram for Pb (after SAYDAM, 1981). Data for the following aerosol samples are plotted : Eastern Mediterranean open-ocean samples (filled circles; data from SAYDAM, 1981); polluted samples from Ghent, Belgium (filled triangles, data from DEMUNYCK *et al.*, 1976 ; U.K. non-urban sites (crosses, data from CAWSE, 1978, 1980) ; "polluted" samples from Cap Ferrat (open circles, data from CHESTER *et al.*, 1989); North Eastern Mediterranean land based station data (open squares, present work).

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