

CONTRIBUTION OF NATURAL AND ANTHROPOGENIC SOURCES TO FINE AND COARSE PARTICLE FRACTIONS IN THE EAST MEDITERRANEAN

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ABSTRACT

This study deals with the characterization of fine ($<2.5\mu\text{m}$) and coarse (2.5 to $10\mu\text{m}$) particles along the east coast of the Mediterranean Sea. The following tools were applied:

- (1) Analyses of continuous PM10 monitors to provide general trends.
- (2) Sampling of fine and coarse particles with dichotomous samplers in several sites in Israel. Filters were analyzed for gravimetric and elemental analysis by XRF.
- (3) Scanning electron microscopy (SEM) of selected samples.
- (4) Back trajectories of air masses during sampling events.

Continuous data showed that PM-10 levels were highest in fall and spring due to intrusion of dust storms in the region. In the summer sulfates and elemental carbon dominated the fine fraction ($<2.5\mu\text{m}$). Minerals were found at fairly low concentrations. Sulfates were probably transported from Eastern Europe. Sea salt (Na, Cl) was found at both size fractions. Electron microscopy showed association of chlorides with mineral particles. The co-occurrence of high concentrations of sea salt and mineral particles has to do with the stormy meteorological conditions associated with Saharan Dust transported along the North African continent. V and Ni are highly correlated, indicating the heavy use of crude oil in Europe and East Mediterranean.

Those findings may indicate the possible coating of minerals with soluble sulfates and chlorides, in line with earlier results that minerals are efficient in removing these constituents from either anthropogenic or natural sources. The coating of particles may have a significant impact on the radiative properties of minerals.

Key Words: PM10, Fine and coarse particles, mixed particles, dichotomous sampler, XRF, Electron microscopy, minerals, sulfates, sea salt, east Mediterranean