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Anthropogenic PAHs as markers for the history of industrial pollution in the anoxic Mariager Fjord, Denmark

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The polycyclic aromatic hydrocarbons (PAH) of molecular weigth below 276 g/mol have been investigated from an 80 cm sediment core from the bottom of Mariager Fjord. The PAHs include phenanthrene, fluoranthene, benzopyrenes and perylene. Mariager Fjord is a silled fjord with stratified and anoxic bottomwater shown by the presence of 17(E)-13α(H)-malabarica-14(27),17,21-triene, fern-7-ene and perylene. Organic production in the fjord is high and ^{210}Pb-dates suggest a depositional rate of 5 mm/year.

Selected anthropogenic PAHs have been quantified using GC-MS. The dominance of larger PAHs (3 or more rings), the minor amount of methylated PAHs and the precence of 4,5-methylphenantheren indikates a pyrolytic origin of the anthropogenic PAHs, with the exception of perylene. The relative concentration of perylene compared to 3,4-benzo-pyrene suggest that the source of perylene changes from both pyrolytic and biogenic to increasingly biogenic in the oldest samples.

It is shown that the amount of PAHs and the level of the backgound noise increased parallely from low pre-industrial levels through a high level during the period of concrete production (1873-1984) to a lower level in modern times. This development is also reflected through the change in distribution of the PAHs. Thus the history of production from the nearby (5 km) concrete industry is reflected in the sedimentary succession.

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Tracing natural and anthropogenic contributions to modern dust storms: Sr, Pb isotopes and trace elememts in Jerusalem suspended dust

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Atmospheric dust and aerosols bear important effects on the energy balance of the Earth, production of rain clouds and the transport of chemical particles. Distinguishing between natural and anthropogenic sources of aerosols and atmospheric dust and understanding their mutual interaction are major environmental tasks. Israel, located between the North Africa - Arabian deserts and the Mediterranean climate zone receives large quantities of dust particles from the deserts, while most of the anthropogenic airborne material is carried by European-Mediterranean rain fronts. We analysed the Sr, Pb isotopes and major and trace elements (e.g. Th, U, REE) of suspended dust particles (< 10 μm) collected by a Time-Resolution Aerosol Collector (TRAS) device that was mounted at the Hebrew University, Jerusalem. Sampling was designed to trace dust storms that are associated with the different synoptic conditions in the region (e.g. Red Sea Trough, "sharav" cyclone and cold depressions). Dust samples were collected along the storms path, allowing the characterization of the isotope and chemical composition of the dust during the varying synoptic conditions. It appears that ^{87}Sr/^{86}Sr and trace element ratios can be used as robust monitors of the dust sources, while Pb isotopes are sensitive anthropogenic tracers. Red Sea Trough and cold depressions are distinguished by diverse chemical ratios (e.g La/Th, U/Th, Nd/Na, Nd/Rb, Rb/Na), permitting differentiation between dust transported towards Israel from the east and from the south-west.