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Hydrocarbon pollution in sediments from Lake Iznik (Turkey), determined by fluorescence technique

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Lake Iznik, largest in the southern Marmara region with an area of 313 square km, is situated on an active branch of the North Anatolian fault zone. Petroleum hydrocarbon pollution in the surficial sediments of Lake Iznik was investigated by synchronous fluorescence spectroscopy. Contrary to coarse coastal deposits, which are made up of mainly sand and gravel, the surface sediments of the lake below 5 m water deep are mainly composed of silt, due to its sheltered basin morphology and low-energy current conditions. The types of polycyclic aromatic hydrocarbons present in the samples are indicated by synchronous spectra and useful for characterizing the source and concentration of various polyaromatic compounds. In synchronous spectra, the compounds with different numbers of fused aromatic rings exhibit their maximum emission at particular wavelengths. Fluorescence intensity is related to the quality of aromatic compounds present in the samples. Benzenes emit most strongly in the 280-290 nm region, naphthalenes around 310-320 nm, 3 and 4 ring aromatics between 340-380 nm, and compounds with 5 or more rings above 400nm. It appears likely that the more volatile 2-ring PAHs are rapidly lost in this environment, through evaporation and photo-decomposition. Two rings (250-273 nm) PAHs have not been encountered in the some samples. It is generally accepted that pyrogenic PAHs are characterized by the dominance of high molecular mass 4-5 and more ring PAHs over the low molecular mass 2-3 ring compounds. The predominance of 5 and more ring PAHs, such as Benzopyrene which have pyrolytic origins; and perylene derivatives which have terrigenic origins are present. These peaks have also been absorbed in the spectra of sediment samples, and believed to come primarily from atmospheric dust fall. These hydrocarbons are usually thought to be generated by pyrolysis reactions during combustion of fossil fuels. In the present study there appeared to be no systematic distribution

of spectrum types between samples, suggesting that the oils in the sediments were diverse in origin.