Geophysical Research Abstracts, Vol. 9, 04016, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-04016

Chemical fingerprinting techniques following the Haydarpasa Port pollution; Sea of Marmara, Turkey

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All crude oils and petroleum products, to some extent, have chemical compositions that differ from each other. This variability in chemical compositions results in unique chemical fingerprints for each oil and provides a basis for identifying the source(s) of the spilled oil. Flexible, tiered analytical approaches, which facilitate the detailed compositional analyses based primarily upon GC/MS have been developed in response to the oil spill identification. An important discovery is that the diagnostic indices in a vessel's bilge contents and its discharges could also constitute fingerprints for the ships. In so that, by comparing the fingerprints of different spilled oils with the material from the bilges of ships, it would be possible to determine the source of spill oil. The coasts of Sea of Marmara are continually affected by heavy crude oil and heavy fuel oil pollution. In addition to the coastal pollution, some point sources such as ports and oil terminals have serious effects. The Haydarpasa Port is the most important port situated on the Anatolian side of the Strait of Istanbul (Bosphorus). It has two breakwaters about 1700 and 600 m long. The pollution of the maritime, coastal and harbour environments continues to be an issue around the globe. In the Haydarpasa Port, fuel oil spillage from ships and vehicles and conventional shipping activities such as tank cleaning and de-ballasting operations and bilge waste waters are the main sources of PAHs in the vicinity. SUVF and GC/MS analyses were used to characterize the chemical composition of the unknown oil spilled from a ship anchored at the Haydarpasa Port. Advanced fingerprinting techniques and diagnostic ratios were used in correlating the samples collected from the ships with the spill sample. Characterization of spilled oils and subsequent monitoring of the affected ecosystems have been found to be an important tool for environmental damage assessment. In addition, successful forensic investigation and analysis of oil and refined product hydrocarbons in contam-

inated sites and receptors yield a wealth of chemical fingerprinting data.