Total Dissolved and Particulate Lead in the Western Harbor Ofalexandria, a Mediterranean Basin under Stress

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The Western Harbor (WH) of Alexandria, the largest harbor of Egypt on the Mediterranean Sea, receives continuously different internal and external untreated pollutants affecting dramatically its water, sediments and biota. Surface and bottom water samples were collected bimonthly from this harbor for studying the vertical, regional and monthly distribution of total suspended matter (TSM), total dissolved lead (TDPb) and total particulate lead (TPPb). The high surface TSM values coincided with air-born dust, organic aggregates, plankton productivity and discharged wastes. The high TSM averages in winter resulted mainly from turbulence of the water column by wind action. The highest averages of TDPb in the petroleum and coal basins in the WH reflect their effects on the water column. However, the lowest averages of TDPb and TPPb were found at a location far away from pollution sources. For the water column, the maximum and minimum monthly averages of TPPb and TDPb respectively in June reflect the increase in the rate of lead uptake by phytoplankton abundant in summer, favored by temperature elevation. The annual mean concentration of TPPb was nearly double that of TDPb, indicating that lead was transported to the WH mainly in the particulate form. This reflects the high TSM content in the harbor water onto which a considerable part of lead was adsorbed.