

Heavy metal concentrations and the variations of foraminifers in the Silivri-Kumbagi area (NW Marmara Sea, Turkey)

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ABSTRACT

In the area between Silivri (İstanbul) and Kumbagi (Tekirdag), NW of Marmara Sea, there is a considerable extent in marine pollution from industrial and settlements wastes, sea transports, and agricultural activities. The most important one of these pollutions is the spread of heavy metals. Our research investigated sediments in order to determine whether heavy minerals affected biota such as recent foraminifers, or not. Our investigation area starts from Marmara Ereglisi, in the east, continues to Tekirdag and Kumbagi, in the west. 10 sea-water samples, 10 sediment-core samples and one 10 m core-drilling sample, taken 250 m off-shore from coast line. As a result of this sampling geochemical analysis of the bottom-mud and water samples were done and the ratio of heavy metals and other contaminants determined. For heavy metal analyses, concentration analysis of 12 heavy metals (Cd, Fe, Cu, Pb, Zn, Al, Co, Cr, Mn, Ni, As, and Hg) has been conducted, as ppm, in sediment samples taken from the levels in which foraminifers are collected. Perpendicular (spatial) heavy metal concentration changes have been determined with off-shore drilling samples and horizontal changes (geochronological) have been determined with the help of core samples. Especially, it has been understood that heavy metal concentrations in recent sediments are higher compared to the past.

In this research the samples have been taken from each 10 cm. of core and drilling samples to collect the benthic foraminifers. In this context, 15 grams of dry sediment sample taken from each level, have been washed in 125 μ m sieves in order to determine its benthic foraminifer content. Benthic foraminifera from these samples have been identified taxonomically and their morphological differentiation has been determined after taking SEM photos. As a result of this study, the foraminifera types of “*Adelosinacliarensis*, *Adelosinamediteranensis*, *Adelosinapulchella*, *Ammonia compacta*, *Ammonia parkinsonia*, *Ammonia tepida*, *Criboelphidium poeyonum*, *Cycloforina contorta*, *Elphidium maculeatum*, *Elphidium complanatum*, *Elphidium crispum*, *Elphidium galvestonense*, *Lobatula lobatula*, *Massilina secans*, *Miliolinella subrotunda*, *Pseudotriloculina oblonga*, *Quinqueloculina seminula*, *Quinqueloculina polygona*, *Spiroloculina angulosa*, *Spiroloculina excavata*, *Triloculina marioni*” have been determined. Especially in the *Elphidium crispum* and *Ammonia compacta*, collected from the core samples taken from Marmara Ereglisi (Tekirdag) and Silivri (Istanbul) offshore, some morphological variations, colour changes, abnormality and multiple-individuals, were observed. Increasing of the heavy metal concentration in the levels of these morphological variations is noticeable.