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Horizontal and Vertical Distribution of Heavy Metals in the Sediment of the Seto Inland Sea

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Abstract

The surface bottom sediment in the Seto Inland Sea taken at 425 sites in the period 1981-1985 and 1991-1994, and the sediment core samples of some sea areas taken in 1990 were investigated to evaluate the change of heavy metal concentrations of the elements, cadmium, lead, copper, zinc, and manganese. The sea area where had higher concentrations of heavy metals in the first half of 1980's showed a decrease in some area in the first half of 1990's. The test of the difference on average values for cadmium, lead, zinc, and manganese at 425 sites indicated that it was significant at the 1% or 5% level in the entire Seto Inland Sea. The vertical distribution of heavy metal concentrations except for manganese in Osaka Bay and the Sea of Harima also showed that it increased upwardly from the lower layer. The highest concentrations of four elements were found at 20-30cm layer, then the values became lower values towards the surface layer. Sedimentation rates of two sea areas, determined by ^{210}Pb dating,

were 0.29g/cm^2/year and 0.32g/cm^2/year, respectively. The ages of layers indicating the high concentrations were determined to be before 1960 in Osaka Bay and 1960's in the Sea of Harima by the age of the ^{210}Pb. These results suggest that many environmental policies, which have been conducted, were related to the decrease of heavy metal concentrations in the bottom sediment of the entire Seto Inland Sea. In some sea areas, however, the concentrations of heavy metals in the bottom sediments were maintained at the same level, or became worse than in the first half of 1980's. This shows that it is necessary to make more of an effort to rehabilitate the condition of the bottom sediment.