

Environmental geochemistry of river mouth sediments of Nanakita, Miyagi, Japan

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Abstract

Heavy metals tend to deposit near the river mouth, where sea and river water are mixed. The purpose of this study is to investigate how the heavy metals accumulate near the river mouth. Samples for chemical analyses were taken from the river mouth of Nanakita in Miyagi prefecture. First, PH and salinity were analyzed from water sample. Second, sediment samples were dealt by a sequential extraction method to find out the species of deposited heavy metals and the mechanism of its accumulation. In this scheme, heavy metals are extracted from samples, step by step, by using different reagents as weakly-bound (exchangeable) phase, carbonatic phase, easily reducible phase, oxidisable phase and strongly-bound phase. Third, the variation of constituent minerals by the sequential extraction was examined. The value of PH and salinity at the river mouth was higher than that of the upper stream. Heavy metal accumulation was also found near the river mouth. They were mainly weakly-bound (exchangeable) phase, carbonatic phase and oxidisable phase. Heavy metals were found in many kinds of weakly-bound (exchangeable) phase. On the other hand, those of carbonatic and oxidisable phase contain a few limited kinds of metals. Heavy metal concentration was changed by the depth of sediments. The variation of constituent minerals by the sequential extraction was not clearly recognized. The constituent minerals at the river mouth were quartz, plagioclase and clay minerals. At the river mouth, wedge-shaped zone of sea and river water seemed to be developed. And heavy metal accumulation there was caused by clay minerals and organic complexes (mainly humic acid). And the concentration of heavy metals also depended on living things. Heavy metals fixed by clay minerals were not in rich at the surface of sediments, but at lower of them.