

An environmental magnetic analysis on the Osaka Bay sediment: Relationship with the sea water condition

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We analyzed the sea water composition and the rock magnetic properties of the surface sediments from the Osaka Bay in order to understand the control of the sea water environment over dissolution of iron oxide and formation of iron sulfide.

In the inner part of the bay, the low salinity water reflecting the freshwater inflow from the Yodo and Yamato Rivers covered the sea surface. The sea bottom water has a low content of dissolved oxygen because water ventilation was prevented by density stratification. On the contrary, in the center of the bay vertical change in salinity was not significant and dissolved oxygen at the bottom was relatively high.

Existence of magnetite, greigite and hematite was identified by stepwise acquisition of IRM and thermal demagnetization of IRM. The formation of framboidal pyrite was also identified even in the samples from the center of the bay, as well as in those from the inner part of the bay. In spite of the variety in dissolved oxygen at the sea bottom, a large supply of organic matter into the bay may result the anoxic condition within the sediment, resulting the authigenic formation of pyrite and greigite.

Clear relationship with the sea bottom dissolved oxygen was recognized in the concentration ratio of hematite. In the center of the bay the concentration of hematite was relatively high. It suggests that selective dissolution of magnetic minerals controls the variation of magnetic properties in the Osaka Bay. S-ratio, the ratio of magnetization carried by hematite to total magnetization, is a possible proxy for the water environment in the Osaka Bay.