A Review: Recent Studies of Neogene Strata-bound Manganese Oxide Deposits From the Northeastern Japan Arc

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In 1950s and 1960s, Neogene strata-bound manganese oxide deposits distributed in the Northeastern Japan Arc had studied vigorously in the viewpoint of the mineral exploration (e.g. Yoshimura. 1952, 1967). Based on the mineralogy, the major elements chemistry and the geological setting, it has been concluded that these deposits formed by submarine hydrothermal activities. Miura et al. (1992) carried out the geochemical studies including trace elements and rare earth elements (REE) compositions for the Neogene strata-bound manganese oxide deposits from southwestern Hokkaido and also concluded them to having hydrothermal origin. On the other hand, they also pointed out that these deposits showed the positive Ce anomalies, which are different characters from the hydrothermal manganese deposits occurred around the modern spreading centers. Recently, Sakai et al. (in prep.) showed radiolarian stratigraphy in the Fukaura district, one of the main occurrences of the Neogene strata-bound manganese oxide deposit in the Northeastern Japan Arc, and found the long term (ca. 6 to 7 m.y.) hiatus just above the manganese deposit horizon. The long-term exposure of the manganese oxide deposit to oxic seawater may be the cause of the REE pattern showing the positive Ce anomaly.

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