

Evidences for continuous growth of hydrogenetic ferromanganese crusts since ca. 20 Ma over the depths of NW Pacific

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We have characterized the occurrence, distribution patterns, physical, chemical, and mineralogical properties of hydrogenetic Fe-Mn crusts at more than 40 selected seamounts in the northwestern Pacific. We review the diversity in composition and growth history in space and time, based on the analysis and observation during manned and unmanned submersibles, drills, deep-tow TV camera, as well as conventional dredge and corers.

Most of the slopes, shoulders, and much of flat tops are covered with several cm to 10 cm thick crusts, but the thickness, metal contents, and microstructural properties are not always uniform over the seamounts. The microstratigraphic description of selected in-situ samples indicated the diversity in bulk composition and abundance of the deposits are due to integration during variable geological, physical and chemical depositional conditions. We emphasize that microstratigraphic description is essential and advantageous to mineral exploring, economic estimation, and developing feasible mining system in future, if supported by well-combined geological and oceanographic data. The results indicate a basically continuous and fairly constant metal accumulation history since about 20 million years ago of the middle Miocene age to the present, and a broad areal distribution between 1km water depth to the abysses > 6km.