# Comparative analysis of microbial communities on hydrogenetic ferromanganese crusts in the northwest Pacific

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Ferromanganese crusts are commonly found on outcrops of slopes of seamounts in the Pacific, and contain economically valuable elements, such as Co, Ni, Cu, Pt and REE, therefore the crusts are great interest of deep-sea mining. Microorganisms are thought to contribute to formation of the crusts and play a significant role in accumulation of the elements. Actually, the presence of abundant and diverse microorganisms on a ferromanganese crust collected at 3000 m water depth in the Takuyo-Daigo Seamount has been reported (Nitaraha et al., 2011). However, our knowledge of commonality and difference in the abundance, diversity and distribution of microorganisms of the ferromanganese crusts is still limited. To assess the commonality and difference, in the present study, we collected ferromanganese crusts from three regions (Takuyo-Daigo Seamount, Ryusei Seamount, and Daito Ridge) at several water depths (1200 m to 2200 m) during the cruises NT09-02, KY11-02 and NT12-25, and analyzed microbial communities of the crusts. In addition, we collected and analyzed surrounding sediments and bottom seawater as references to assess the uniqueness of the crust communities. Cell densities estimated by quantitative PCR were significantly higher in the crusts than the seawater, but comparable to or lower than the sediments. Both of bacterial and archaeal 16S rRNA genes were detected in all samples. Phylogenetic diversities were higher in the crusts than the seawater, but comparable to or slightly lower than the sediments. Comparative analyses of the community compositions showed 1) the presence of unique microorganisms to the crusts, which were not detected in the sediments and seawater, and 2) the presence of common microorganisms among the crusts at every region and almost every depth, which are likely key members for ecosystem functioning on the crusts. Based on the results, microbial contribution to the formation of the crusts will be discussed.

Keywords: Co-rich ferromanganese crust, Microbial community, Northwest Pacific

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