Detritus in ferromanganese crusts and aeolian input to the Northwest pacific

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Hydrogenetic ferromanganese (Fe-Mn) crusts are composed mainly of iron and manganese oxides and partly of detrital particles of various origins, and have continuously precipitated on seamounts for the last several million years at extremely slow growth rates of 1 to 10 mm/m.y. The crusts are thus considered as condensed stratigraphic sections available for paleoceanographic reconstruction. We focus here the detrital particles of various origins in the crusts. Microstratigraphy on the detrital particles of the crusts should be another powerful tool for paleoceanographic reconstruction. In our study, we focus on quartz grains in the crusts and assess the variation of aeolian input to the Northwest Pacific.

Bulk XRD analysis was conducted on 15 crusts from different areas and water depth in order to reveal the secular variation patterns of quartz content with longitudinal position and water deapth. The quartz grains were then separated from the crusts by using acid-leaching method for microscopic observations, comparing with reported aeolian quartz in the nearby pelagic sediments.

The quartz content of 14 out of 15 samples shows a rapid increase since 5 Ma in common. This trend is similar to the trend of the aeolian quartz in nearby oceanic DSDP cores (Leinen, 1985). In contrast, the variation patterns of quartz content before 5 Ma show no correlations among the samples from different seamounts, and show correlations among the samples from the same seamounts. This trend before 5 Ma can be thought to reflect some local geologic events such as volcanic activites. The chemical separation revealed that that the grain size of quartz are from 1 to over 100 μm which is much larger than the general aeolian quartz accumulated in pelagic environment (Kawahata et al., 2000).

Our work suggests that the quartz in Fe-Mn crusts might have recorded aeolian flux in NW Pacific. However, every quartz grain in the crusts is not necessarily aeolian, might have another origins such as volcanogenic (Kawahata et al., 2000). Therefore, it is important to classify the quartz grains based on grain size and/or shape of grains, which may reflect their origins, for more specific correlations between the crusts growth and aeolian flux.

