Element fluxes for sinking particles in the northwest Pacific

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To assess the possible impacts for deep-sea mining, the International Seabed Autholity (ISA) requires contractors to collect environmental baseline data. We have conducted the environmental baseline surveys in Japan's exploration areas for cobalt-rich crusts in the northwest Pacific. In this study, sedimentation process was discussed based on the analyses of sinking particles collected by sediment traps. The sediment traps were moored at the crest (900 and 1000 m water depths) and the northeast base (1000 and 4720 m water depths) of Xufu Guyot (JA06 Seamount; 19°30'N, 158°00'E) from June 2016 to April 2017. Total mass fluxes were very low (2 to 15 mg m^{-2} d^{-1}) and showed seasonal variations with maximum in summer at both stations. These seasonal variations are consistent with the previous observations in Maloney Guyot (JA04 Seamount) from April 2001 to May 2002 and Lamont Guyot (JA02 Seamount) from August 2006 to July 2007. Carbonate was major component of the particles throughout the year. At the base station, organic matter fluxes were larger in the shallow trap, whereas larger opal and lithogenic fluxes were observed in the deep trap. Organic matter fluxes showed a positive correlation with lithogenic fluxes, suggesting that dust particles play an important role in vertical transport of organic aggregates. We also analyzed chemical compositions of the particles using ICP-MS/-AES. At the base station, elements related to carbonate (Ca, Mg, Sr) and nutrient (P, Zn, Cd) showed higher fluxes in the shallow trap or same as the deep trap. On the other hand, Fe and Mn fluxes were much higher in the deep trap. Other elements such as Co, Cu, Al, Ti, V, REE showed positive correlations with Fe and Mn. It suggests that these elements are scavenged onto ferromanganese oxides in the water column.