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Transport of sediment with phosphorus

Mayumi Jige^{1*}, Shin-ichi Onodera², Yuta Shimizu²

¹Chiba Institute of Science, ²Hiroshima University

Eutrophication is caused under the rich nutrient condition. Nutrient transport by terrestrial water to marine has been reported by so many researchers. Not only artificial water pollution but also the leaching from natural rocks and/or soils affects the eutrophication in the coastal area in various time scales, respectively. However, the source and transport of phosphorus (P) in various watersheds has not been clarified enough. Transporting sediment with high P concentrations has been identified as a major hydrological pathway for sediment associated P delivery to surface waters, and is considered a major threat to water quality. Especially, some researches have not been considered the mineralogical sources and carriers of phosphorus, and hydrological dynamics of phosphorus transport, respectively. So, it is important to determine kinds of minerals including P, and concentrations of P in each mineral. By the study about the characterization of P in the granite distributed area, it is known that P is included in mica minerals and/or iron hydroxide minerals.

This study is aimed at clarifying the relations of P contents and minerals weathering of rocks and sediments from drilling core at four points around Asahi River, Okayama Prefecture. Collected samples were examined the identification of mineral in sediment by the X-rays diffractometry and chemical composition of sediments by the X-ray fluorescence analysis. Furthermore, carbon and nitrogen contents in each collected samples were analyzed.

The constituted particle of the drilling core is comparatively big in particle size rather an upper basin than the lower basin. Quartz, feldspars, hornblende and clay minerals were recognized in all points. Mica minerals, kaolin minerals, chlorite, vermiculite and smectite were confirmed as clay minerals. XRD analyses show a decrease in mica minerals contents and a increase in vermiculite formed in altered sediment. Vermiculite has been formed as altered mineral from mica minerals such as biotite. The phosphorus concentration has negative relation to the potassium content. On the other hand, it was shown that it had equilateral relation to iron and magnesium content. The phosphorus content tends to increase in a part with much vermiculite. It is thought that phosphorus is adsorbed in vermiculite; however we must consider adsorption of phosphorus of the amorphous iron hydroxide. Sediment transport with a high phosphorus concentration has been identified as a major role to total phosphorus supply to the marine. Therefore, it is necessary to determine kinds of minerals including P, and concentrations of P in each mineral in stream sediments.

Keywords: phosphorus, mica mineral, vermiculite