Chemical composition of river sediments around Lake Biwa area, southwestern Japan

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Lake Biwa is the largest lake in Japan and it supplies daily life water to Kinki area, southwestern Japan. About 118 first-class rivers flow into Lake Biwa, and the lake water only flow out from the Seta River, which locates southern part of the lake. The geology of the watershed area of rivers flowing into Lake Biwa is roughly divided into four areas: 1) granite area, 2) Ko-biwako Group area, 3) slate, chert and sandstone area, and 4) limestone and basic volcanic rock area[1)]. In this study, 14 samples of river sediments were collected from the western part of the lake, where river sediments have not been widely surveyed. 6 samples are collected from the granite area, 3 samples are from the Ko-biwako Group area, and 5 samples are from slate, chert and sandstone area. River sediment samples with a particle size of less than 180 μm were studied. Major and other minor elements were determined by wavelength dispersive X-ray fluorescence spectrometer (XRF). River sediment chemical composition data from geochemical map of sea and land of Japan by AIST[2)] are also compiled in this study. The concentration of P_2O_5 is particularly high in the Koto region, eastern part from the lake. Rice paddy fields are widely distributed in this region. The higher phosphorus value is considered to be affected by the fertilizer eluted from the soil. Mn and Cu concentration distributions are higher at western part from the lake. Manganese mines in this area may affect these elemental distributions[3)]. The alumina saturation index (=(K_2O+CaO+Na_2O)/Al_2O_3) of most collecting river sediments show higher values in the granite area and lower values in the sedimentary rocks area. It is concordant with surrounding geology. River sediment sample reflects chemical characteristics of surrounding geology. Chemical composition of sediments and concentration correlation matrix analysis reveal that the correlation between sediments of inflowing river and lake bottom sediment is low. It may be caused by redistribution of chemical elements such as weathering and ion exchange. The correlation between the sediment of Seta River and lake bottom sediment is also law. Sediments in the Seta river may be more affected by the sediments of surrounding branch inflowing rivers than the lake bottom sediments[4)-8)].

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