

Influence of chemical weathering and vegetation on the formation of alluvial soil in Kofu basin

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Alluvial soils collected at two areas around the Kofu basin, Yamanashi Prefecture, Japan, were analyzed to understand the process of the soil formation. The samples (rock and soil) were analyzed for mineralogy by X-ray powder diffraction (XRD), for major elements by X-ray fluorescence (XRF), and for minor elements by Inductively Coupled Plasma Mass Spectrometry (ICP-MS). Besides that, soil water was separated from the samples and it was analyzed by ion chromatography.

As the results of XRD and XRF analyses, parent rocks of the two areas (Kyodo river, Midai river) are considered to be granodiorite and basalt, andesite and shale, respectively. Compared to rock samples, soil samples are poor in Na₂O, CaO and so on. It indicates that chemical weathering plays an important role in the formation of soil. It was found that the contents of essential nutrient major elements (P, K, Ca, Mg, Fe, Mn) in soil are related to the vegetation.

The samples contain a high concentration of Cu and Zn, which are important nutrient minor elements for plants. Also the chemical variation of Cu and Mo is wide a range, and there is a clear enrichment in the soil. The behavior of Cu and Mo is very dependent on each characteristic and the enrichment effect of vegetation.

The analysis of soil water indicates that it contains a high level concentration of anion such as NO₃⁻ and so on. The ion balance between anions and cations are not attained. This is probably caused by the fertilization. The chemical fertilizer promotes acidification of soil, although pH of soil water is 6-7.