Climate and environmental changes during the past 1000 years reconstructed from fluxes of detrital materials of different sources to the Lake Suigetsu sediment

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Fluxes of detrital material in the sediment reflect various climatic factors such as rainfall through river discharge and wind system through transport of eolian dust. Because flux of detrital material is controlled by relatively simple physical process, it has high potential to become a quantitative paleoclimate proxy. If we want to utilize detrital flux as a paleoclimate proxy, we have to separate detrital fluxes from different sources and correlate their records with observational and historical records to specify the physical processes that control the detrital inputs.

In this study, we used Lake Suigetsu sediment core (SG12) drilled in 2012 for chemical and mineralogical analyses to specify different sources of detrital material and estimate their mixing ratio. Because Lake Suigetsu sediment is known to have high-precision and high-resolution age depth model, we can correlate sedimentary record with historical record precisely.

We conducted XRF analysis for major elements' composition and XRD analysis with Rietveld data analysis method to quantify mineralogical composition. Using these data, we conducted factor analysis to extract end members' compositions of the sediment. XRF and XRD measurement is also conducted for detrital materials collected in Hasu River, the major watershed of Lake Suigetsu, and its tributaries to compare with end-members extracted by factor analysis to estimate their sources. In this presentation, we will introduce the chemical + mineralogical data analysis method to reconstruct temporal changes in detrital fluxes from different sources during the past 1000 years.

Keywords: Lake Suigetsu, Factor analysis, Rietveld method

