

A long term and quantitative reconstruction of flood history using the sediment of Lake Suigetsu and its methodology

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Observation of hazards is necessary for understanding the mechanism of their occurrence and forecasting their frequency and magnitude in the future. However, observation can only get the record back to the last 100 years at most. Because huge hazards occur with low frequency, observational and historical records could fail to obtain enough data of huge hazards. In this study, we tried to reconstruct the long term flood record based on the analysis of sedimentary record as a potential medium of hazards in the past exceeding the limit of observation. When a hazard such as flood or earthquake occurs, large amount of materials which are different from ordinary sediments are deposited in a sedimentary basin and preserved as an “event deposit (event layer)”. Thickness and accumulation rate of event layers could be used as a proxy for the magnitude of hazards. In this study, we used the sediment of Lake Suigetsu in Fukui prefecture and established a semi-quantitative method for reconstructing of heavy rainfall and flood events in central Japan based on correlation of observational record and sedimentary record. Correlation of sedimentary record and observational record is conducted based on high resolution age model constructed using the near surface sediment with annual lamination. In addition, flux of detrital material from the drainage area of Lake Suigetsu is reconstructed in the last 7000 years based on statistical analysis of major elemental composition. As a result, it is revealed that deposition and thickness of event layer represents the occurrence of flood event in this region and total amount of precipitation in each flood event. It is also revealed that flux of fine-grained detrital material from drainage area increases with the increase of frequency of heavy precipitation (>50mm/day). This methodology can be applied to other sedimentary basins to obtain the spatio-temporal variation of semi-quantitative record of flood events in geologic time scale.

Related to this presentation, identification of flood and earthquake in this study and correlation with local environmental change would be presented in M-IS 23 session, and correlation of the result of flood event in the late Holocene with regional climate change would be discussed in M-IS 06 session.

Keywords: Lake Suigetsu, varved sediment, flood, earthquake, Holocene