Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

APE33-P21 Room:Convention Hall Time:May 24 17:15-18:30

Environmental history and flood events during the last 80 years in Lake Marunuma, Gunma Prefecture, Japan

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Lake sediments are, in general, regarded as to preserve environmental history of lakes and their surroundings. Recent studies clarified the existence of lake level change, climate change, floods, tsunamis and earthquake records in sediments. This study restores the existence of flood record, which occurred during the last 80 years, at lake Marunuma of Gunma prefecture.

Older Marunuma was a small lake formed after damming up by lava flows of Nikko-Shirane volcano and its initial diameter was ca. 600m. After the construction of artificial dam in 1930, lake level rose 28m higher.

In addition to the bottom surface sediments taken at all lake area, two short cores were taken at older lake bottom. Samples were described based on naked eye observation, soft-X ray photographs were taken, water content was measured at every 1cm in thickness and grain-size was measured using Mastersizer 2000 of Malvern Instruments Co. also at 1cm interval.

We distinguished flood sediments as to having coarser grain size, lower water content and lower transparency of soft-X ray photos. Statistically significant difference in grain size existed between normal sediment and flood sediments. Sedimentation rate was calculated as 0.2cm per year assuming that the sediment depth which shows minima of grain size and water content to be AD1930, when artificial dam was constructed. Time resolution of the record is ca.5 years based on sampling interval.

Comparison of meteorological events and ages of event sediment shows that five events of large flood can be correlated during the last 80 years. This means that sedimentary record of Lake Marunuma well correlates to those historical flood events at lower Tone River.

Keywords: Lake Marunuma, Event sediment, Flood events