

Multiproxies applied on sediment core for revealing the environmental changes and natural disaster events in Lake Kitaura, central Japan

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Lake Kitaura is located in the northeast area of Tokyo, facing the Pacific Ocean. We pay more attention to the natural disaster records of this lagoon. Previous studies indicate that the Lake Kitaura recorded twice volcano eruption events, one is A.D. 1707 (Fuji-Hoei), and the other is A.D. 1783 (Asama-a). We drilled two sediment cores here in A.D. 2017 to use multiproxies for interpreting the environmental changes and natural disaster events. First, according to the magnetic susceptibility scan by MSCL, we defined volcanic eruption events in the position of peaking magnetic susceptibility. Our results reveal 6 layers of the volcanic eruption in the lake based on historical records. Those are eruptions from Mt. Fuji in A.D. 1707 and Mt. Asama in A.D. 1783, 1973, 1983, 2004, 2009. The composition of volcanic glass was determined by EDS and LA-ICP-MS for analyzing the SiO₂ content and ratio of Rb/Y and Rb/Sr.

We found that the grain size of sediments was influenced by the volcanic eruption, typhoon, and tsunami events. Br/Ti and S/Ti ratio from Itrax core scanner gives us the information of environmental changes between marine and freshwater, and also indicate that the lagoon formed after about A.D. 1200. After the Mt. Fuji eruption in A.D. 1707, the river brought a lot of sediment accumulation at that time to cause the Br/Ti and S/Ti signals decreasing and forming a more closed brackish environment. We also can judge the duration of salt damage before the Hitachi River locks in A.D. 1975. The sediment cores may record the tsunami event of A.D. 1707, and frequent storm tides between A.D.1275-1340 closed to the time of Kamikaze typhoon in historical records.

Keywords: Lake Kitaura, sediment core, volcanic, disaster, Itrax