

Relationship between climate and TOC and TN fluxes in the sediment of Lake Kizaki, central Japan

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Total organic carbon (TOC) and total nitrogen (TN) have been analyzed recently as a new proxy of climate variability. But there are not enough study to clarify the process how climate control TOC and TN contents (or flux) in lake sediment. The Kizakiko Observation Group have been continued limnological observation in Lake Kizaki monthly since 1993, and accumulated various kinds of limnological data such as water temperature and chlorophyll a (chl. a) for 17 years. Meteorological data have been obtained at Omachi meteorological observation site by AMeDAS system about 5 km south to Lake Kizaki. Lake sediment was sampled as 31 cm long core by a Satake-type corer, and water, TOC and TN contents were measured in 0.5 cm interval of the sediments. The age of cored sediment is based on the identification of flood sediments in 1983 and 1995, and the comparison between this core and the former core taken in 1983.

The winter temperature (monthly average from December to next March) is positively correlative with annual amount of chl. a (coefficient 0.37). The amount of chl. a has positive relation with TOC flux in the sediment with coefficient of 0.34. The correlation between the winter temperature and TOC flux is also positive with coefficient of 0.27. Therefore, it is concluded that winter temperature well controlled biogenic productivity, resulting in high TOC and TN flux in sediment in Lake Kizaki. This means that high TOC and TN contents (fluxes) in lake sediment indicate winter warmth.