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TOC, TN and stable isotope study on the BIW07-5 core off Nagahama in Lake Biwa, Japan

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A piston core (BIW07-5), 13.77 m long, was collected at a 50 m-deep site off Nagahama in Lake Biwa, Japan in 2007. The sediments are mostly homogenous clay silt associated with some marker tephra beds such as K-Ah, Sakate, DHg, DSs, AT and SI. Total organic carbon (TOC) and total nitrogen (TN) contents were measured at every 2-cm interval (70 years interval), and delta 13Corg were analyzed for every 10-cm interval (350 years). TOC and TN (and also C/N ratio) fluctuate concordantly with delta 18O of North Greenland Ice Sheet Core (NGRIP) in detail. The biological productivity in Lake Biwa seems to be well controlled by the temperature around Lake Biwa which has a strong connection with the temperature in the North Atlantic region via circum-Arctic atmosphere circulation.

The record of delta 13Corg from BIW07-5 core has a similarity the NGRIP ice core, although a slight discrepancy exists. We tried to consider which factor mainly control the delta 13Corg of lake sediment in Lake Biwa. The temporal change of radius of diatom shell (Stephanodiscus pseudosuzukii) from BIW08-B core off Okishima in 2008 seems to have similar trend with the change of delta 13Corg of BIW07-5 core. This result suggests that growth rate of phytoplankton in lake water may affect delta 13Corg of lake sediments. The growth rate may have a positive relationship with air temperature in general.

Keywords: BIW07-5 core, Biwa Lake, TOC, carbon isotope ratio