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Environmental changes after dredging revealed by diatom assemblage changes in Lake Yunoko, Japan

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Lake Yunoko is located in the northwest Tochigi Prefecture, lies 1478m above sea level. There is the Nikko Yumoto Hot Springs at the lake side. This lake became a eutrophic lake because water pollutions are caused by inflows of living drainages. Therefore, advanced wastewater treatment equipments were increased in the Yumoto sewage plants in 1979, in addition, the water purification project, first time in Japan, that remove sludge of the lake bottom was carried out by government subsidy since 1989. This project was completed in 1996 after the sludges of 192000 cubic-meters had been dredged.
In this study, in order to examine the influence on diatoms which main primary producer and a proxy of water quality caused by the dredging in the lake, diatom assemblages before artificial water pollution and before and after the dredging were compared.
In the samples just under Nikko-Shirane tephra (A.D. 1646) and the surface sediment samples obtained immediately before dredging in 1988, the dominant species is Aulacoseira longispina. In the surface sediments samples obtained after dredging in 2009, the appearance frequency of Aulacoseira longispina decreases greatly and dominant species become Fragilaria crotonensis and Asterionella formosa. The number of diatom valves decreases compared with the sample before dredging. This fact indicates that maximum change of diatom assemblage in the last 350 years have been caused by the dredging in Lake Yunoko. In addition, the change of diatom assemblages may mean a reduction of nutrient salts elution from bottom sediments have been caused by the dredging.

Keywords: Lake Yunoko, Dredging, Diatom