

Modern changes of sedimentary environments in the brackish Lake Shinji, the east part of Shimane prefecture, Japan

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Lake Shinji is oligohaline brackish lake in the east part of Shimane prefecture. Area of Lake Shinji is 79.1km², water depth shows less than 6m. The water column of Lake Shinji is divided into oligohaline surface water, mesohaline pycnocline, and mesohaline bottom water.

In recent years, Lake Shinji is observed environmental events such as Cyanobacterial water bloom, anomaly overgrowth of aquatic plants, decrease in the catch of Corbicula and so on. The purpose of this study is to reveal the changes in the sedimentary environment by using the comparison with the spatial investigation of surface sediments in 2006 and 2013 and the result of monitoring since 2010 in Lake Shinji.

The surface sediments in Lake Shinji in 2006 are sandy deposits shallower than 3.5m in water depth, but are muddy deposits deeper than its depth. Mean grain size of surface sediments deeper than 3.5m tend to be fine-grained with water depth, and shows 7.5 phi in deepest site. In shallower than 3.5m, many surface sediments shows fine to medium sand around 2 phi. Total organic carbon (TOC) contents of surface sediments was less than 4%. TOC contents shows high positive correlation coefficient 0.85 with mean grain size. This is suggested that the spatial distribution of TOC contents depend on grain size. Total Sulfur (TS) contents of surface sediments were less than 1 %, and tend to be decreased with water depth. However, TS contents were less than 0.2 % shallower than 4.5m. In deeper than its depth, TS contents decreases dramatically.

The surface sediments in Lake Shinji in 2013 are sandy deposits shallower than 3.5m in water depth, but are muddy deposits deeper than its depth. Mean grain size in 2013 was similar to the 2006. TOC contents of surface sediments were 6 to 8 %. TS contents were less than 2 %. TS contents were less than 0.2 % shallower than 3.0m. This depth is shallow clearly than in 2006.

TOC contents in monitoring site from 2010 to 2013 fluctuated greatly in the range of 4% to 10%. TOC contents shows low values in summer season, and high values in winter season. It is considered that the fluctuation of TOC contents is caused by the dilution effect of inorganic sediment due to rainfall in the summer. In addition, TOC contents tend to increase from 2010 to 2013. TS contents fluctuated greatly in the range of 0.5 % to 2.0 %. TOC contents shows high values in summer season, and low values in winter season, and tend to increase from 2010 to 2013 as with the TOC contents. This is suggested that the increase of TS contents is caused by the inflow of mesohaline water and the decrease of dissolved oxygen in bottom water.

From the results of these, surface sediments and bottom water environments in Lake Shinji are a distinct change during term from 2006 to 2013. We are thinking that some of this cause.

Keywords: Lake Shinji, Surface sediments, Total organic carbon contents, Total Sulfur contents, Grain size analysis