

## The feature of aquatic environment and surface sediment in the Lake Ogawara, Aomori Prefecture, north Japan.

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To analyze paleoenvironment and paleoclimate, we must understand the feature of sediments as recorder and recent environment. In particular, the coastal lagoon is necessary to investigate before performing the paleoenvironmental study because of shows each characteristic lake environment. In this study, we performed a field study in the Lake Ogawara from August 31 to September 9, 2011, to clarify a characteristic of aquatic environments and surface sediments.

The Lake Ogawara, is located in east part of Aomori Prefecture, have a halocline around 20m for water depth throughout the year. The thermocline is formed around 10m for water depth in the summer season. Therefore, dissolved oxygen is not supplied in the intermediate water, and anoxic water mass thickens. In this study, we investigated in this timing. The investigation is made up of 110 detailed sampling localities in grid and 100 water quality measurement sites in a traverse line through the lake system.

In Lake Ogawara, the water temperature shows 24-25 degrees Celsius in surface water, and shows low with 9 degrees Celsius in bottom water. The thermocline was observed at 8-18m for water depth. The salinity in surface water is less than 2 psu, and is less than 1 psu around the delta of Hichinohe River. Salinity show high value with 12psu in bottom water, and halocline was observed at 8-18m for water depth. The water column of Lake Ogawara divided into 3 water masses, as an epilimnion (0-8m), a metalimnion (8-18m), and a hypolimnion (deeper than 18m).

The environments in metalimnion and hypolimnion show the anoxic to euxinic condition. The upper part of the metalimnion shows pycnocline dependent on water temperature and salinity, and the lower part shows pycnocline dependent on mainly salinity. The chlorophyll-a concentration is high in metalimnion and hypolimnion.

Surface sediments are observed well-sorted sand shallower than 6m, and black mud deeper than it depth. As a result of grain size analysis, the frequency distribution of muddy sediment have a mode at 3.5, 5.5, and 7.5 phi. It is considered that fraction of 3.5 phi was supplied from the seaside by density current flow because of the mode of 3.5 phi decreases southward. However, coarse fraction might be supplied by a tsunami because it was recognized over the lake basin.

As a result of CNS element analysis of surface sediments, the total organic carbon (TOC) contents increase toward deep, and show very high value (around 8%) in metalimnion and hypolimnion. This value is high in comparison with the other coastal lagoon as a Nakaumi Lagoon, Lake Shinji, Lake Abashiri, and Lake Mokoto. This high values were caused by high productivity, low velocity of decomposition by the anoxic to euxinic condition, and low sedimentation rate. TOC contents show high value near the delta of river. This is suggested that terrestrial higher plant add to organic matter of in lake production because of high C/N ratio.

Total sulfur (TS) content shows 1-2% of values deeper than metalimnion. In spite of euxinic condition, TOC/TS ratio is high in comparison with the normal marine. This suggests the exhaustion of metal ions such as iron or undersupply of sulfate ion.

Keywords: Coastal Lagoon, Lake Ogawara, TOC content, C/N ratio, TS content, anoxic condition