

Sea-surface temperature changes in the Japan Sea off Wakasa since the Last Glacial Maximum based on silicoflagellate assemblages

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The Japan Sea is a marginal sea, connecting to the East China Sea, the North Pacific and the Okhotsk Sea through the Tsushima, Tsugaru, Soya, and Mamiya straits. During the Last Glacial Maximum, the connections between Japan Sea and the circumjacent seas were highly limited due to sea-level drop down to ~130 m. Because of significant decrease in the Tsushima Warm Current (TWC) inflow into the Japan Sea, sea-surface temperature (SST) of the glacial Japan Sea must have been chilled. However, no previous study was unable to constrain glacial sea-surface temperature of the Japan Sea caused by low salinity surface water and semi-closed environments. For instance, oxygen isotopes of planktic foraminiferal shells showed significantly light values highly influenced by the glacial low salinity. Alkenone paleo-thermometry did not work well due to low salinity, indicating unusually high SST during LGM. Silicoflagellate is a marine phytoplankton with biogenic opal skeletons. Most of the modern silicoflagellates are belonging to two genera: *Dictyocha* mainly distributing tropical to temperate regions and *Stephanocha* mainly distributing polar to subpolar regions. In addition, silicoflagellates can survive in brackish water. Therefore, silicoflagellates has a great potential to reconstruct glacial SST in the Japan Sea. Here we present SST reconstruction in glacial Japan Sea based on silicoflagellate assemblage in Japan Sea sediment. The sediment core KR15-10 WB6 was collected off Wakasa at water depth 845 m. Age model of the piston core has been established based on radiocarbon datings on planktic foraminiferal shells. Based on modern analog technique of the silicoflagellate assemblages, quantitative SST reconstruction of SST was performed for the past 28.5 kyrs. Reconstructed SST of the glacial Japan Sea indicated 5 degree C or colder. Gradual SST increase was observed since 14 ka and reached 14 degree C (modern SST) at 11 ka. These suggest that resuming of TWC inflow into the Japan Sea occurred at ~14 ka. Since 11 ka, TWC strength would have been comparable to the present one.

Keywords: Japan Sea, Last Glacial Maximum, Sea-surface temperature, Silicoflagellate assemblage