Paleoceanographic interpretation of middle Eocene Arctic Ocean based on silicoflagellate and ebridian microfossils

Jonaotaro Onodera[1]; KOZO TAKAHASHI[2]

[1] CMCR, Kochi Univ.; [2] Earth and Planetary Sci., Kyushu Univ

IODP Exp. 302 (Arctic Coring Expedition - ACEX) revealed that the paleo-geography of the Arctic Ocean in the early middle Eocene was a semi-closed basin similar to the modern Black and the Baltic Seas, based on many paleoceanographic proxies. Here we show several paleoceanographic results based on siliceous microfossils: silicoflagellates and ebridians. (1) The primary composition of the microfossil assemblages of the middle Eocene ACEX cores included silicoflagellates and ebridians in addition to abundant diatoms. Because that the silicoflagellates and ebridians are abundantly observed in coastal waters, which sometime includes the eutrophic suboxic waters in the euphotic layer, the analysis of these siliceous microfossils on their abundances and assemblage changes appears to indicate the extent of surface water connections between the Arctic and the Atlantic Oceans. The silicoflagellate and ebridian assemblages in the studied ACEX cores were usually unique, suggesting the limited surface water mixing between the neighboring oceans probably due to the salinity front. However, the assemblage similarities were not always consistent between the Arctic and the Atlantic Oceans. (2) The studied sediments were deposited in the anoxic deep waters without bioturbation, and thus a high resolution study has been hereby accomplished in order to decipher the Milankovich Cycle. While our previous publications on the silicoflagellate and ebridian assemblages were based on the chronological resolution of approximately every 40 kyrs, here we present our temporally significantly improved results based on the sample sets of approximately every 10 kyr resolution. (3) In the studied cores, the first occurrence of seasonal sea ice in the Cenozoic Arctic Ocean was suggested by IRD after 46.25Ma. Based on the biogeographic relationship between modern silicoflagellate and sea surface temperature, the relative abundances and the ratio of silicoflagellate genera *Dictyocha* and *Distephanus* suggested the cooling trend of euphotic layer. The silicoflagellate-inferred temperature also corresponded to the increase of IRD with isolated pebbles.