Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

MIS30-26 Room:501 Time:April 29 09:30-09:45

Pliocene and Pleistocene paleoceanography in the northwestern Pacific and the Bering Sea based on diatom analyses

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Late Pliocene-Pleistocene fossil diatom assemblages from Ocean Drilling Program (ODP) Leg 145 Hole 884B in the western Subarctic North Pacific were investigated and the paleoceanographic records were compared with those at Integrated Ocean Drilling Program (IODP) Expedition 323 Holes U1341B and U1343E in the Bering Sea for an interval of 2.5-0 Ma.

As the results, in Hole 884B, five diatom zones, from the *Neodenticula koizumii-N. kamtschatica* Zone to the *N. seminae* Zone, were identified. The cold-water indicators from Hole 884B, which represented high abundances throughout the interval, suggest the cold environmental conditions analogous to the modern sea-surface conditions in the western subarctic Pacific. The drastic decrease of the temperate-water species at ca. 2.2 Ma is related to a rapid cooling event at ˜2 Ma. Sporadic appearances of sea-ice related species from ca. 2.3 Ma and a slight increase of neritic species observed at ca. 2.0 Ma may be reflection of a series of the Northern Hemisphere Glaciation (NHG) events. Slightly higher abundances of the sea-ice related species at 1.0-0.8 and 0.4 Ma and those of the neritic species at 2.0, 1.8, 1.2, and 0.9 Ma are likely to correspond to the southward advance of the subarctic front and drop in sea-surface temperature mentioned by Sancetta and Silvestri (1986).

The age differences of the distinct decreases of temperate-water species recognized at ca. 1.9 Ma for Hole U1343E, ca. 2.1 Ma for Hole U1341B and ca. 2.2 Ma for Hole 884B indicate that the East Kamchatka Current in the Western Subarctic Gyre was strengthened and the westward advection of the Alaskan Stream was weakened at ca. 2.2 Ma. In the Bering Sea, the limited input of temperate waters via the Near Strait resulted as a decrease of warm water supply to the region around Site U1341 at ca. 2.1 Ma, while the eastern Bering slope region had been still affected by the warm water masses advected from the Amchtka and Amukta Passes. Further global cooling might have restricted the continuous warm water supply to the Bering slope region around Site U1343 at ca. 1.9 Ma.

Keywords: diatom, paleoceanography, subarctic Pacific, Bering Sea, IODP Expedition 323, ODP Leg 145