Neogloboquadrina pachyderma in the modern Arctic Ocean: a potential for its morophological variation for paleoceanographic reconstruction

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In the Arctic Ocean, predominance of polar planktic foraminifera Neogloboquadrina pachyderma sinistral prevents utilities using their thanocoenosis in order to understand paleoenvironmental conditions in the Arctic Ocean. Although potential availability of N. pachyderma's morphological variation for paleoceanographic reconstruction has been presented by recent studies, its application is still limited within N. Atlantic side of the Arctic Ocean. Additional data from the Pacific side of the Arctic Ocean is strongly anticipated to extend their paleoceanographic utility over the entire Arctic Ocean.

Here, we will present the modern distribution of morphological variations of N. pachyderma, using 82 surface sediment samples collected in the western Arctic Ocean. Within investigated surface sediment samples, we have encountered total of seven morphological variations of N. pachyderma, compromising their description of previous study (Eynaund et al., 2010). Distinct geographic dominance of "Large-sized (>250 μm)" N. pachyderma along the offshore of Northern Alaskan margin suggests its preferences in the relatively warm and low-salinity condition. Using the distribution pattern of morphological variations of N. pachyderma, we have succeeded to establish transfer functions (PF-based TFs) for salinity, temperature and summer ice concentration. Applications of established PF-based TFs to four downcores taken from east-west transects crossing over the Chukchi Sea showed distinct opposite trend at eastern/western side of the Transpolar Drift (TPD): Clear warming, freshening and summer sea-ice concentration reduction were reconstruded at the western side of TPD, whilst rather cooling, increasing in both salinity and summer sea-ice concentration were witnessed in the eastern part during last 6,000 years. Such regional heterogenic response in the Chukchi Sea is presumably linked to relocation of TPD via long term shift in the atmospheric forcing during the Holocene.