

Paleoceanographic reconstructions of surface ocean conditions in the East China Sea since the last glacial maximum based on diatoms

*Keiko Shirota¹, Yusuke Okazaki², Susumu Konno², Yoshimi Kubota³, Yusuke Yokoyama⁴, Hirokuni Oda⁵

1.Department of Earth and Planetary Sciences, Graduated School of Science, Kyushu University, 2.Department of Earth and Planetary Sciences, Faculty of Science, Kyushu University, 3.National Museum of Nature and Science, 4.Atmosphere and Ocean Research Institute, University of Tokyo, 5.Institute of Geology and Geoinformation, Geological Survey of Japan, AIST

The East China Sea (ECS) has four surface water-masses. The first one is the Chinese coastal water in the north characterized by low salinity, low temperature and high nutrient. The other three water masses are flowed into the ECS from the south: the Kuroshio surface water; the Kuroshio subsurface water; and the Taiwan warm water. The Kuroshio surface water and the Taiwan warm water are characterized by high salinity, high temperature and low nutrient. The Kuroshio subsurface water with high salinity, low temperature and high nutrient penetrates into continental shelf region. During the last glacial period, sea level dropped to -120 m. Therefore, most of the continental shelves of the ECS were aerially exposed and the Yangtze River mouth must have advanced eastward. Diatom assemblages are highly sensitive to environmental changes such as salinity, temperature, nutrient availability. Thus, diatoms have a great potential to reconstruct past environmental changes in surface water of the ECS. However, paleoceanographic studies employing diatom assemblages have been very limited in the ECS. Only Tanimura et al. (2002) suggested that *Paralia sulcata*, a representative near shore species, dominated during the last deglacial termination.

14.1 m-long sediment core was obtained from the Danjo Basin, northern part of ECS (KY0704-PC01, 31°38.35'N, 128°56.64'E, 758 m water depth). Sediment samples for diatom analyses were sub-sampled at every 5 cm and added 30% hydrogen peroxide to degrade organic matter. For light microscope observation, suspended samples were dropped onto coverslip and mounted with Pleurax (Mount Media). For scanning electron microscope (SEM) observation, suspended samples were filtered with membrane filters with a nominal pore size of 0.45 µm and coated by Osmium tetroxide. Diatom taxa were identified under field emission scanning electron microscope (FE-SEM, JEOL JEM-7001F) and light microscope (LM, Olympus BX50 and BX53). 200 diatom valves were counted under LM for each slide.

A total of 45 diatom species were encountered. We classified them into three environmental groups, i.e., near shore, near shore to open ocean, and open ocean. Near shore, near shore to open ocean, and open ocean groups were characterized by *Paralia sulcata*, *Thalassionema nitzschioides*, and *Nitzschia bicapitata*, respectively. Since last glacial period, *Paralia sulcata* and *Thalassionema nitzschioides* have accounted for 25% to 80% in total diatom assemblage. In particular, *Paralia sulcata* was dominated during the last glacial-deglacial periods with low sea-level, suggesting enhanced coastal water input. At 8 ka, *Nitzschia bicapitata* accounted for >20% in total diatom assemblage suggesting warm water flowed into the northern ECS from the subtropical Pacific and the South China Sea flowed into the northern ECS. Based on detailed microscopic observation, we identified that both *Paralia sulcata* and *Thalassionema nitzschioides* in our samples were not a single species but multiple species. These species suggested that repeated intrusion of Chinese coastal water into the Danjo Basin during Holocene.

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