

Millennial variability of Holocene environment in the southwestern Okhotsk Sea: A diatom evidence

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A diatom analysis was carried out to reveal the late Holocene paleoceanographic history in the southwestern Okhotsk Sea, using a diatomaceous submarine core, off Abashiri, northern Japan (GH00-1006; 44-35.54N, 144-26.11E, 1378 m water depth, 372.5 cm recovery). As a result, we recognized a distinctive variation of diatom flora for the last 2,800 years.

Of the hydrographic features in the Okhotsk Sea, seasonal dynamics of sea ice concentration and existence of the single warm current inflowing, the Soya Warm Current (SWC), have been thought to potentially contribute as the important source of the North Pacific Intermediate Water (NPIW; Kitani, 1973; Talley, 1991; Watanabe and Wakatsuchi, 1996, 1998), which widely distributes in the modern North Pacific Ocean and is believed to play a significant role as a reservoir of greenhouse gasses (Tsunogai et al., 1993, 1995). In addition, based on both natural and archeological evidences, past literatures have pointed out the possible effects by such marine environmental changes in the sea on Holocene human activities (Akamatsu, 1969 and others). To deal with the submarine material from the sea doubtlessly allows us not only a more qualified reconstruction of the past hydrographic regimes but also a better correlation with the adjacent on-shore regions from which much historical information has been integrated. Here, in this study we aim to describe a past hydrographic change in the SW Okhotsk Sea, highlighting diatom records as one of the most sensitive paleoceanographic proxies.

As a result of microscopic observation, the followings have been revealed; *Thalassionema nitzschioides*, *Neodenticula seminae* and ice-related species (including *Bacterosira fragilis*, *Fragilariopsis cylindrus* and *F. oceanica*), were far more dominant in percent abundances through the core. The ice-related species abundantly occurred particularly in thinly-laminated horizons at the middle part of the core (250-125cmbsf; 1590-760 yrs BP), accompanied with extinct, i.e., reworked species like *N. kamtschatica*. In the upper part, we observed a drastic floral change into *T. nitzschioides* and *N. seminae*-rich flora. Warm species indicating the Kuroshio Current and its branching water, mainly *F. doliolus*, on the other hand, intermittently occurred at -330 cmbsf (-2250 yrs BP) and 70-0 cmbsf (400- yrs BP) in relatively higher abundances.

Even though the abundances were found lower, the warm species including *F. doliolus* more clearly showed an occurrence implying a periodic change of the intensity of the SWC, based on another diatom examination of a Holocene core off Shiretoko Pen., northern Japan (Shimada et al., 2000). Here we claim that the millennial-scaled floral change observed in our core would be possible to correlate with that core for late Holocene. Furthermore, this Holocene paleoenvironmental variation in the SW Okhotsk Sea might be synchronous to not only the periodic change of the intensity of the Tsushima Warm Current (TWC) in the Japan Sea (Koizumi, 1989) but also the information that has been accumulated about the on-land historical events in the eastern Hokkaido Island.