

Paleoceanographic reconstruction of the Japan Sea over the last 190 ka

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Precise knowledge of the paleoceanographic origin of the Japan Sea is a key for understanding the East Asian climate dynamics. For the period since the Eemian interglacial period, sediment core studies have revealed strong coupling of the seawater evolution in the Japan Sea with the glacio-eustatic sea level changes through the surface water circulation driven by baroclinic components. It has been unclear, however, whether the older paleoceanographic system was kept by the same mechanism, and how the present Japan Sea Proper Water has been formed. Here we present some geological records derived from a sediment core from the Yamato Bank, which represent paleoceanographic evolution of the Japan Sea at a resolution comparable with the previous sediment core records.

The oxygen isotope record of benthic foraminiferal tests from the KT05-9p2 core shows a changing hydrographic regime of the Japan Sea Proper Water, which is found to have been largely influenced by the influx of the Oyashio Current through the Tsugaru Strait in the interval of low sea-level stand. The sulfur isotopes of branching pyrite from glacial intervals display the onset of bacterial reduction just below the sediment-water interface, suggesting the prevalence of seawater-column stratification due to the lack of overturning circulation during sea level lowering.