Modern to glacial-interglacial time scale subarctic environmental variation of the Northern hemisphere recorded in sediment organic compound

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Geological time scale surface environmental variation in high latitude had been blank for long period because of lack appearance of carbonate fossils which had been utilized as robust proxy of paleo environment. Thanks to alkenone specifically produced by haptophyte, *Emiliania huxleyi* (*E. huxleyi*) that live in broad from equator to 60˚N and 60˚S was developed as a paleo-thermometer in 1980’, paleo studies in subarctic area remarkably progressed. In this presentation, I will show changes in alkenone sea surface temperature (SST) from the subarctic North Pacific sediment cores including its marginal seas of the Okhotsk and Bering with dynamic time range from modern to geological timescale. During the Holocene, variations of alkenone-SSTs at sites near Kamchatka in the Northwest Pacific, in the western and eastern regions of the Bering Sea, and in the eastern North Pacific track the changes of Holocene summer insolation at 50˚N, but at other sites in the western North Pacific, in the southern Okhotsk Sea, and the eastern Bering Sea they do not. In addition to insolation, other atmosphere and ocean climate drivers, such as sea ice distribution and changes in the position and activity of the Aleutian Low, may have systematically influenced the timing and magnitude of warming and cooling during the Holocene within the subarctic North Pacific. On the other hand, during the modern period, ocean color satellite images have revealed large-scale blooms of the coccolithophorid *E. huxleyi* in the eastern Bering Sea since 1997. The reason why the coccolithophorid bloom occurred oftenly in the Bering Sea had been open question, because the Bering Sea was considered as diatom ocean. I examined continental shelf sediment profiles of alkenone covering the past ~70 years. The alkenone records suggest that large *E. huxleyi* blooms are a novel feature in the Bering Sea as they have occurred only since the late 1970s and recent changes in alkenone content were closely related to the 1976–77 climatic regime shift in the North Pacific. It implies that natural and anthropogenic warming and freshening of Bering Sea waters promoted *E. huxleyi* blooms.

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