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A high-resolution multi-proxy record of geo-environmental change during the last deglaciation in the East Sea

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The East Sea (the Sea of Japan) is a marginal deep basin, almost enclosed by the landmass of Korea and Japan. It is connected with the North Pacific Ocean only by four small shallow straits, Korea and Tsushima Strait (140 m deep), Tsugaru Strait (130 m deep), Soya Strait (55 m deep) and Tartar Strait (12 m deep). For the glacial periods such as the last glaciation, the sea has experienced a large magnitude of sea level fall reinforcing isolation of the sea from the open ocean. The sea level falls can be recognized by presence of dark sediment layers whereas values of oxygen isotope on foraminfera tests are not well accordant with those recorded in open oceans.
A 20 m-long sediment core was raised from a deep borehole located on the southern slope of the East Sea where sedimentation rates exceed 0.3 mm/yr for the last deglaciation period. The core was analyzed at a dense interval (ca. 5 cm) to reveal vertical variation of opal content, del values of oxygen and carbon, TOC and CaCO3 content and C/N ratio. Among them, the opal content somewhat mimics the trend of del value of oxygen isotopes in open oceans: low during the last glacial period, increase during the deglaciation and high in Holocene. A sharp negative depression also occurs during the Younger Dryas event. Hence the opal content could be a good proxy record for the environmental change during late Pleistocene to Holocene. A large-scale negative depression of the opal content is also shown during Holocene. The depression is not well matched with the trend of oxygen isotope records in open oceans, suggestive of a particular event in this local area.