



Sediment provenance changes in the western slope of the Ulleung Basin, East Sea during the last 220 ka

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Provenance changes recorded in the core sediment from the Site UBGH2-1_1, which was drilled during the Second Ulleung Basin Gas Hydrate Expedition (UBGH2), were examined using grain-size variations of detrital fractions and REE tracers such as Eu anomaly, LREEN/HREEN, and MREEN/HREEN. The core sediments are predominated by hemipelagic mud down to the target depth of 220 mbsf. Well logging results from the site show in-phase cyclic fluctuations in natural gamma, density, and resistivity logs. They are primarily ascribed to variations in biogenic opal contents which were modulated by orbital scale climate changes on the basis of grain-size and XRD mineral compositions of the sediments. This study focuses on the upper 30 m where the AMS 14C dates and the cyclic variations of logs suggest the age back to about 220 ka, MIS 7. Located in the western slope of the Ulleung Basin with water depth of 1540 m, main sources of detrital sediments to the Site UBGH2-1_1 are inputs from Nakdong River and Chinese rivers and aeolian input of the Chinese Loess which were successfully discriminated using the REE tracers. The REE variations indicate increased flux of the Chinese Loess during the glacial periods of the MIS 2 and MIS 6. The increased Chinese Loess input was accompanied by coarsening trends in grain-size distribution of detrital fractions. The REE and grain-size variations suggest that during the glacial maximums of the MIS 2 and MIS 6, the riverine inputs were significantly diminished due to the lowered sea level and consequent diverting of transport path and aeolian input with higher fractions of coarse silt was predominant.