



Spatial distribution of allochthonous fine-grained sediments from drilling activities in the deepwater Ulleung Basin, Korea

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The marine sediments in deepwater basins can be used as sedimentologic, stratigraphic, paleoceanographic, and paleoclimatologic tools to interpret the various scientific topics in the world. As a result, many drilling and coring activities were performed by international ocean drilling programs in deepwater basins during the last 50 years. In the deepwater Ulleung Basin, the Second Ulleung Basin Gas Hydrate Drilling Expedition (UBGH2) was conducted to perform the gas hydrate R&D in 2010. During the UBGH2, drilling and coring activities were successfully accomplished in 13 sites ranging from 898 m to 2,156 m water depth. The three major sediment facies in the Ulleung Basin are composed of light-colored bioturbated hemipelagic muds under a highly oxygenated bottom-water conditions, dark-colored crudely laminated muds under a poorly oxygenated bottom-water conditions, and laminated/massive sand with turbidites. The present seafloor sediments commonly consist of 1-2 thick light-colored bioturbated hemipelagic muds in the deepwater Ulleung Basin. We observed the UBGH2 drilling holes using by Ultra-short Baseline (USBL)-guided KIGAM Seafloor Observation System (KISOS) in 2013. The UBGH2 drilling holes were found on the seafloor with partially collapse of the margin. We also found the multi-colored sediment patches on the seafloor due to allochthonous sediment input. We analyzed the elements using a non-destructive Itrax X-ray fluorescence (XRF) core scanner for split core. The sediment patches have relatively low concentrations of Fe, Ba, Mn and Pb compared to the element concentrations of the present seafloor sediments. The concentrations of K, Ca, and Ti are higher than the present seafloor sediments. The patch sediments are observed no more than 50 m away from the UBGH2 drilling holes. The allochthonous sediments occur at depth of about 6 cm below seafloor in the observed drilling holes. The origin of allochthonous sediments on the seafloor is interpreted as drilling cuttings derived from drilling activities during the UBGH2 in 2010. However, spatial distribution of allochthonous sediments would be influenced by local bottom current and benthic organism activities.