Occurrence of marine silicate weathering (MSiW) in the mound structure of the Chukchi Sea

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During the 2016 and 2018 Expeditions in the Chukchi Sea, we collected pore fluid samples from six mound sites (MSs) and one reference site (RS). We observed the gas hysdrates and methane-dervied authigenic carbonate (MDAC) in the MSs during both expedtions, indicating that upwarding methane flux is high at the MSs. Indeed, the depth of sulfate-methane transition (SMT) is less than 3.5 meters below seafloor at the MSs, while it is not reached at the RS. Downcore profile of alkalinity and sulfur at the MSs also indicated non-steaday state condition. Downcore profile of $H_4Si(OH_4)$ displayed a increasing trend and K concentration had a higher value (> 11 mM) than that of modern seawater (~10. 5mM) in the MSs, implying the occurrence of marine silicate weathering (MSiW). However, downcore profile of Li and B in the MSs displayed a decreasing trend, which is the reverse trend when MSiW is influenced on the pore fluid chemistry and indicated fluid-rock interaction consuming both elements has been taken place within the sediment. We performed the leaching experiment of MDAC at the two MSs using 5% (vol/vol) acetic acid to identify the infleunce of MDAC in the MSiW. Even though B concetration was not determined, Li in the leaching soultion was detected, ranging from 0.14 mM to 0.58 mM. This result suggested that Li and B can be adsorbed during the MDACs formation. However, we need further researches to generalize our observation.