

Source of pore water and distribution of shallow gas hydrates inferred from dissolved Li isotopes

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Pore waters collected from the Umitaka Spur area in the Japan Sea, off Joetsu (MD179 cruise, MH21 Research Consortium), where active gas seepage accompanying massive gas hydrate formation near the seafloor have been observed particularly on the summit. Rapid decreases of sulfate concentration with alkalinity increases result from anaerobic methane oxidation in the shallow sediments both on the spur and basin sites, indicating methane flux is high over the research area. Contrary, pore water freshening and Li input due to clay mineral dehydration are dominant on the spur. Li isotopic analyses result that the dissolved Li in pore waters were released from clay minerals at >1100 mbsf over the area. Shallow biogeochemical processes significantly change pore water geochemistry, however, the focused delivery of deep-sourced materials like Li and thermogenic methane is a key to deposit massive gas hydrates near the seafloor.

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