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Occurrence and origin of shallow gas hydrates

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It is almost 16 years since Leg 164 of the Ocean Drilling Project conducted the first gas hydrate drilling on the Blake Ridge, West Atlantic, and revealed that the anomalous reflector BSRs do not always indicate extensive distribution of gas hydrate but perhaps existence of free gas zones below the BSR. For the last decades, our understanding of marine gas hydrates has been remarkably deepened and developed. Direct observation of the seafloor by ROV, dense coring, high-resolution acoustic surveys have identified densely accumulated gas hydrate zones in shallow sediments and even on the seafloor. We have now two distinctive types of gas hydrate. One is deep-seated, pore-filling type accumulation, and the other is shallow massive accumulation. As for the industry efforts, National gas hydrate program MH21 is planning to conduct an offshore production test on the deep-seated type accumulation in Nankai Trough in 2012 and 2013. Gas hydrate exploration efforts are rapidly growing in nearby countries and districts, in which the projects seem to target not only the deep-seated type but also shallow and massive accumulation of gas hydrate. In the present paper, I would like to discuss and clarify the geologic, geochemical, and physical constraints to form shallow gas hydrates in Japan Sea with an intention to assess the resource potential of shallow gas hydrates, on the basis of our gas hydrate expedition since 2009.

Keywords: gas hydrate, gas chimney, hydrate mound