

## Biogeochemistry of the seawater-seafloor of Oki trough

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Recently, Shallow methane hydrates near the seafloor has been found in the Japan Sea including Oki Trough area, there are also found characteristic submarine topography such as mound/pockmark topography and chimney structure indicate shallow methane hydrates existence. Some of these features often accompany active methane seepage (methane plume), they cause the local changes of biogeochemical environments near the seafloor. Understanding impact shallow methane hydrates work seafloor environment and water column play important role in understanding ocean environment including shallow methane hydrate areas. We have collected seawater and sedimentary pore water samples in order to characterize the biogeochemical processes associated with the high methane delivery and accumulation. The sampling sites are focused in an area where mound-gas chimney structures are well developed at water depths of 760 m, situated in the Oki Trough of the Japan Sea, ~120 km offshore Tottori.

Concentrations of methane dissolved in water columns collected from fixed point observation of offshore Tottori show little variations near the seafloor, but some variations near depth from 200 meters below the sea-level (mbsl) to 400 mbsl. The concentration of methane dissolved in the seawater is high between 200 and 400 mbsl, which may reflect the formation of shell-like methane hydrates on the surface of the methane bubbles near the seafloor and its dissociation around the upper limit of the hydrate stability around 400 mbsl, and subsequent methane release into the seawater.

Concentrations of methane and ethane dissolved in the sedimentary pore waters collected from the same location are relatively high, comparable to the sites in Offshore Joetsu, and the concentration of sulfate rapidly decrease downward to the sulfate-methane interface at <1.5 meters below the seafloor, methane flux is as high as those in the Offshore Joetsu sites. The chemical compositions of these gases are similar to the sites where bacterial mats and carbonates with frequently high concentrations of methane are widely observed in other areas of Oki Trough.

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