

## Methane anomalies in the water columns above pockmarks, offshore Sado Island

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A number of seafloor pockmarks have been discovered at southwest offshore area of Sado Island. Since seafloor pockmarks have been presumed to be produced through rapid gas release from seafloor due to such as huge methane hydrate dissociation, it must be important to clarify the present status of gas emission from the pockmarks.

In this study, vertical distribution of both concentration and stable carbon isotopic compositions ( $\delta^{13}\text{C}$ ) of methane have been determined for stations above and around the pockmarks (within 10km).

The methane enrichments, up to 8 times more than those of control samples, were detected in bottom water of 4 stations. The pockmarks must be still active as vents of methane-rich fluid and/or methane gas bubbles to ocean. Within all the methane enrichment in bottom water, methane maximum have been observed at the depths from 500 m to 300 m in those 4 stations. In contrast, no clear anomalies have been observed from 850 m to 700 m depth. Gas bubbles emitted from the pockmarks seems to be stable during ascending the water column from seafloor to the depths around 500 m. On the other hand, methane bubbles seem to be unstable above 500 m depth so that methane in the bubbles quickly dissolve in ambient sea water at the depth.

Within the carbon isotopic compositions of the samples that exhibit methane enrichment at 500 m depth, we found carbon-13 enrichment (up to 9.2 per mill) in proportion to depletion in methane concentration. We conclude that microbial methane oxidation must be active in the depth.