

Gas plume and anomaly atmospheric CH₄ concentration

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Geological sources of greenhouse gases (e.g., methane (CH₄) and carbon dioxide (CO₂)) in the onshore area emit directly into the atmosphere. On the other hand, CH₄ release from the offshore area is certified as 'gas plume' in the water column. The gas plume is vertical acoustic anomalies in the water column and composed of the gas bubbles. The gas plume observed in the Japan Sea is CH₄ gas supplied through gas chimney. Massive nodular hydrates (shallow gas hydrate) are locally concentrated with high CH₄ flux via gas chimney. Exploration of gas plume is one method of investigating the accumulation zone of shallow gas hydrate. If the gas forming gas plumes reaches the atmosphere, the atmospheric CH₄ increase. We investigated the relationship between gas plume locations and anomalies of atmospheric CH₄ concentration.

We observed the higher CH₄ concentrations nearby a gas plume point (<5 km) in some gas plume site. Since the anomaly of atmospheric CH₄ concentration may be attributed to anthropogenic origins from land, satellite data (ASCAT and WindSat) observing the wind direction were used to screen wind directions. The water temperature profile differed depending on the sea area, and it seemed to be related to anomaly atmospheric concentration.

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