Contribution of bacterial methane to some deep-sea hydrothermal fluids as inferred from carbon isotope ratio of methane

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Concentrations and stable carbon isotopic compositions (13C/12C) of CH4 in hydrothermal fluids were determined for three hydrothermal sites: Suiyo-seamount and Kaikata-seamount in the Izu-Ogasawara Arc, and TOTO caldera in the southern Mariana Arc, together with that of CO2. At Suiyo-seamount, the carbon isotopic compositions of CH4 show highly 13C-enriched value (-5 ~ -4 permil PDB). We conclude that CH4 in hydrothermal fluids of Suiyo-seamount is derived from magma. On the other hand, at Kaikata-seamount and TOTO caldera, carbon isotopic compositions of CH4 is lighter than that of Suiyo-seamount (-38 ~ -37 permil PDB). Possible contribution of CH4 from microorganisms within the fluid circulation systems might be responsible for the discrepancy.

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