

## Stable isotopic compositions of CO in hydrothermal fluid: signature of sub-vent biosphere?

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For the aim of searching geochemical evidences of sub-vent biosphere in seafloor hydrothermal fluids, we determined concentrations and stable carbon isotopic compositions of CO<sub>2</sub>, CH<sub>4</sub>, and CO dissolved in hydrothermal fluids for individual vents of Suiyo seamount, located on the southern part of the Izu-Bonin (Ogasawara) arc. If there would be some microbial chemosynthetic activities within a fluid conduit, concentrations and stable carbon isotopic compositions of such components must be altered through the activities, which could result in heterogeneous compositions of such components between vents. From this point of view, 20 fluid samples have been gathered from 19 vents (40 - 315 C) in the site by using gas-tight water sampler (WHATS) attached to the Japanese manned submersible Shinkai 2000. While carbon isotopic composition of CO<sub>2</sub> and CH<sub>4</sub> show homogeneous value with less than 0.5 per mil variation in the site, those of CO show average carbon isotopic composition of -31 per mil with 1 sigma variation of more than 2.0 per mil. While the average value almost corresponds to equilibrium fractionation temperature of 300 C with CO<sub>2</sub>, compatible with observed maximum temperature in the site, the 1 sigma variation is significantly larger than that expected from sampling and analytical errors. Besides, the carbon isotopic composition seems to depend on the sampling location of each fluid within the site. The large variation in carbon isotopic composition of CO might reflect activities of sub-vent biosphere.