

Pore fluid chemistry at a small pockmark with liquid CO₂ venting within an active hydrothermal field in the Okinawa Trough

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Since the first discovery in 1989, liquid CO₂ venting on the seafloor has been observed in several hydrothermal fields in the Okinawa Trough. In Higashi Izena hydrothermal field, a small pockmark about 10-20 meters in diameter covered with white material was discovered during KM 18-08C dive campaign. Venting of liquid CO₂ was observed from the pockmark surface when the sediment was disturbed, which suggests liquid CO₂ accumulation just beneath the surface sediment. During the following KR18-14 dive campaign, short push sediment cores about 20-30 cm in length were collected at and near the small pockmark. The sediment cores were sliced into 3 cm pieces and pore fluid was extracted, onboard. The pore fluids were provided for chemical analysis after return to the laboratory, intended to reveal chemical signature affected by liquid CO₂ accumulation within the sediment. The pore fluid between 15 and 30 cm below the seafloor at the pockmark indicated increase of concentrations in all major ions compared with the seawater. They also showed D-depleted and ¹⁸O-depleted signature in the isotopic composition. These results strongly suggest incorporation of H₂O into the CO₂-hydrate formed within the sediment.

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