



Experimental hydrothermal alteration of andesite at 325 °C, 300 bar: Comparison with the hydrothermal fluids in the Hatoma Knoll, southern Okinawa Trough

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Formation processes and types of hydrothermal sulfide deposits are closely related to chemical compositions of seafloor hydrothermal fluids. Seafloor hydrothermal alteration of intermediate to felsic rocks is a major process that controls the fluid compositions in the arc/back-arc hydrothermal systems, although the chemical reaction process during water-rock interaction has not been examined in detail. We experimentally reacted a NaCl solution under high-pressure and -temperature conditions with fresh andesite collected from the Hatoma Knoll, southern Okinawa Trough. The concentrations of selected elements (e.g., K, Ca, and Si) in the fluid obtained by the experiment are inconsistent with those of the hydrothermal fluids in the Hatoma Knoll. The present results suggest that the inputs of magmatic volatiles derived from andesitic magma to the hydrothermal fluids may not be significant whereas hydrothermal reactions with felsic rocks (e.g., dacite and rhyolite) and/or sediments may contribute substantially to the fluid compositions in the Hatoma Knoll.