Geochemistry of hot-spring waters in the Shimokita peninsula

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Water and gas samples from 9 hot springs in the Shimokita Peninsula, northeast Japan, were collected for chemical and isotopic analyses. Anion composition suggests that the hot spring waters of the area are classified into 5 types (Cl, Cl-SO_4, Cl-HCO_3, SO_4, HCO_3 types). The 3He/4He ratios near the volcanic front and associated with the back-arc side of subduction zones are about four times higher than the atmospheric ratio, whereas those in the fore-arc region are significantly lower than the relative to atmospheric value. The distinctive Br/Cl and I/Cl ratios suggest that the hot spring waters collected in the fore-arc region result from the mixing of sea water and diagenetic dehydrated fluid.