

## Indication of stable chlorine and bromine isotopes in two different geothermal systems, China

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Indication of chlorine and bromine isotopes for geothermal water evolution were assessed, including fissure water (Group A and Group B) in convective geothermal system of southwestern Guangdong Province and pore water (Group C and Group D) in conductive geothermal system of North China Plain.

Cl<sup>-</sup> VS. Br<sup>-</sup> showed that geothermal water in four groups originated from freshwater, while Group B, C and D had experienced mixing with seawater. Two stage relationships between  $\delta^{37}\text{Cl}$  and Cl<sup>-</sup> suggested that water-rock interaction played an important role in evolution of Group A and Group B, and Group C and Group D might experience evaporation process. Meanwhile, two end-members were recognised, recharge freshwater enriched in <sup>37</sup>Cl and bedrock depleted in <sup>37</sup>Cl. While homogeneous negative relation between  $\delta^{81}\text{Br}$  and Br<sup>-</sup> implied that stable bromine isotope might behave more conservatively.

The comparison of  $\delta^{37}\text{Cl}$  and  $\delta^{81}\text{Br}$  (Fig. 1) provided information on evolution processes of geothermal water in two systems, and a conjecture that recharge freshwater was enriched in <sup>81</sup>Br.

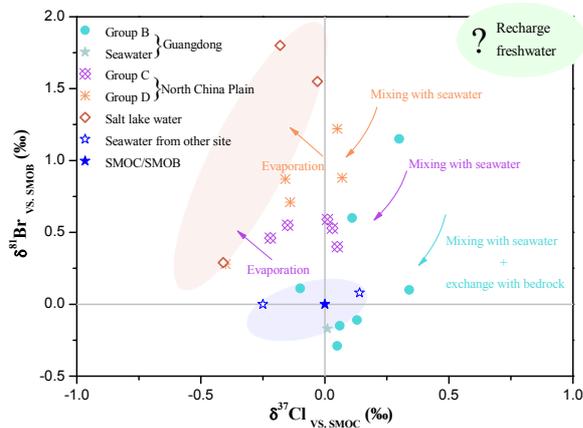


Fig. 1 Variations of  $\delta^{37}\text{Cl}$  and  $\delta^{81}\text{Br}$  in groundwater from two different geothermal systems