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Fault Zone Fluid Deep-penetrating Techniques for Potash Deposit Prediction in Lanping-Simao Basin, Yunnan, South China

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In China, the strategic resource potash is suffering from severe shortages, and the ancient marine solid potash locating is still a problem of long impregnability. Till now, only the Mengyejing Potash Deposit was found in the south of the Lanping-Simao Basin. The basin is a small 70,000 km² one in southern China, characterized by great development of cretaceous sedimentary evaporite, where strong late-reformation of strata occurred because of tectonic movement. Fault belts and saline springs are widely distributed, surface potassium anomaly is found in this basin, and this could be a good clue for potash deposit locating. Information of deep strata can be obtained according to surface data, such as element content (K, Ca, Mg, Sr, Li, Br, B, etc.) and their ratios (K/Cl, Na/Cl, Br/Cl, Ca/Sr, etc.), stable and noble gas isotope compositions, etc. Inspired by the previous theories “deep-penetrating geochemistry” and “geogas” (Clarke and Meier, 1990; Antropova et al., 1992; Xie and Wang, 1993; Wang et al., 1995, 1999), “fault zone fluid deep-penetrating” theory is raised: rising deep brine or circulating

deeply meteoric water can carry dissolved salts (potassium, etc.) along the anticlinal fault zone to the surface and finally form surface anomaly of potassium. Besides, corresponding techniques are suggested in order to reduce the prospecting cost and help locating the possible potash deposit, including survey lines, isotope tracer technique and potash deposit prediction model.

1) Survey lines-solid or water samples collected from surface survey lines crossing syncline (fault zone) show distribution anomaly of elements (Fig. 1).

2) Isotope tracer technique-noble gas (He, Ar, Ne, etc.) isotope compositions and stable isotope (D, O, Sr, etc)

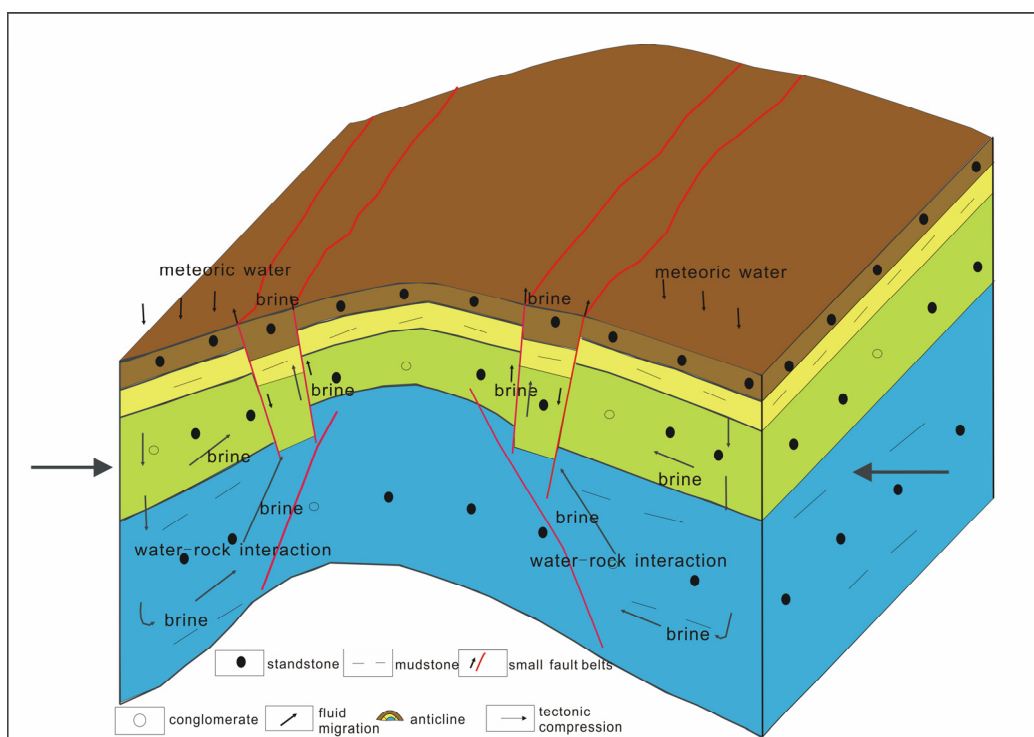


Fig. 1. Spring/brine migration through fault belts.

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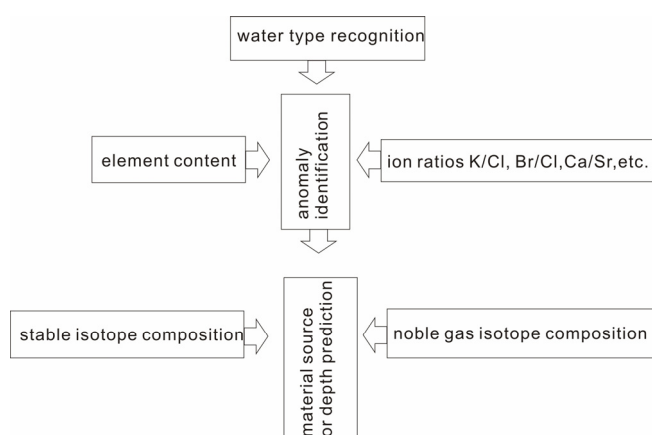


Fig. 2. Potash deposit prediction sketch map.

compositions give clues for material sources of springs/brines.

3) Potash deposit prediction model—a model have been preliminarily established for forecasting the recharge depth of brine or saline springs (Fig. 2).

Key words: fluid, deep-penetrating, noble gas, prediction, Lanping-Simao Basin

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