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Stable Isotope and Element Geochemistry of Saline Springs in Evaporite-bearing Mengla Basin, South Yunnan, China

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1 Introduction

Mengla Basin is a sub-basin in southern evaporite-bearing Lanping-Simao Basin. There are many salt springs in the basin. In 2012, 11 spring samples were collected for analyses of chemistry and boron, hydrogen and oxygen isotopes. At same time, the previously analyzed data of salt springs in study area has been obtained yet.

The results, combining previous works, showed that the origin of solutes in saline waters is derived from the solution of halite by meteoric water. Except for the solution of salt mineral, there is no significant rock-water interaction during evolution of salt springs. Namely, neither the albitization of plagioclase nor the illitisation of smectites or dissolution of K-feldspar is weak during diagenesis.

It is noted that although some boron isotope values are close to the marine value, this don't means that these salt waters have a relationship with seawater.

Key words: Mengla Basin, stable isotope and element geochemistry, water-rock reactions, saline springs.

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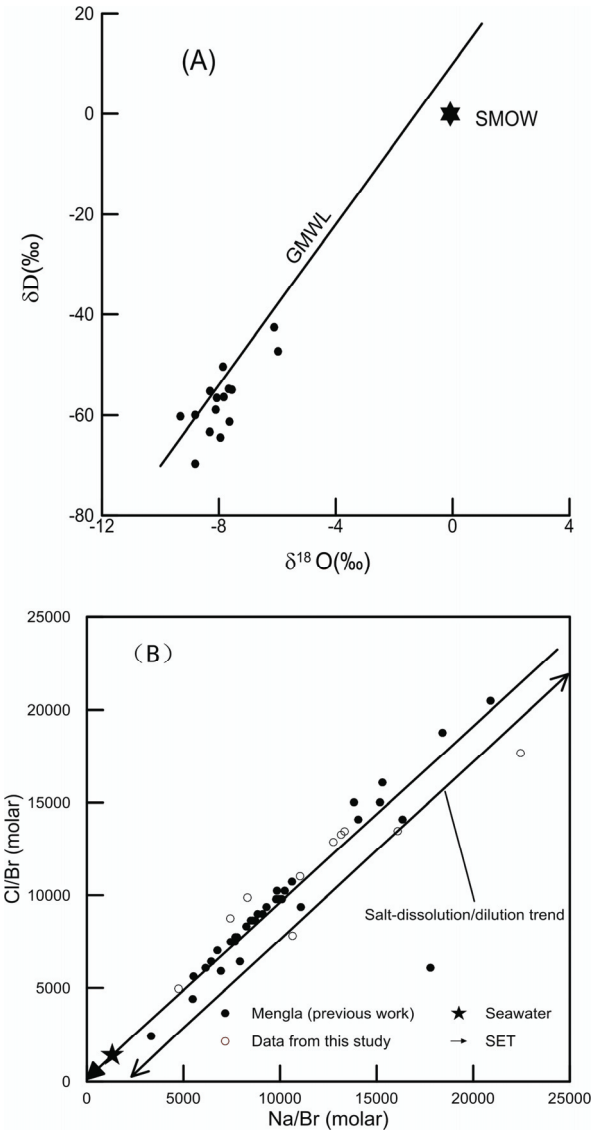

Figure 1 Hydrogen and oxygen isotope composition (A) and Br-Cl-Na systematics of saline waters (B).
In Fig. 1(A), all points lie on or along the Global Meteoric Water Line (GMWL). It is clear that these saline waters are meteoric geneses. In Fig. 1(B), the distributing trend along the salt-dissolution/dilution of all data implies that the solutes should be derived from the dissolution of halite.

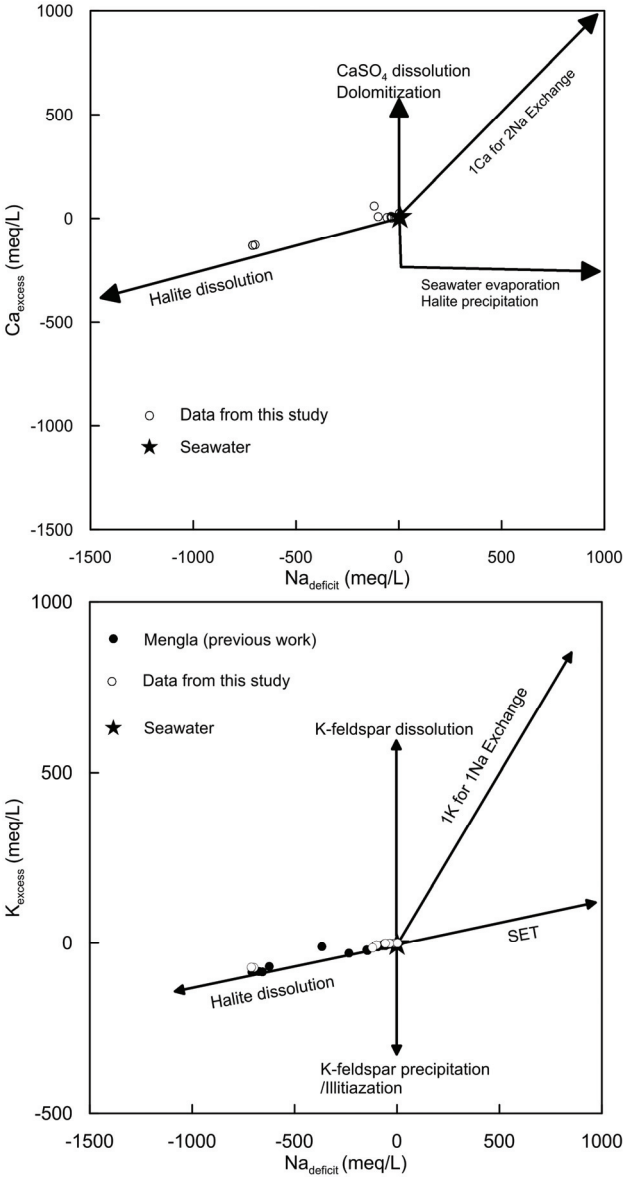

Figure 2 Excess-deficit plots showing model predictions for different processes during diagenesis.

In Fig. 2, all points lie on the line of halite dissolution trend. Two plots indicate that there is no obvious albitization of plagioclase or illitisation of smectites or dissolution of K-feldspar during diagenesis.

Table 1 B, H and O stable isotope data of saline waters.

Sample Number	$\delta^{11}B$(‰)	δD(‰)	$\delta^{18}O$(‰)	Location
SM-01	1.1	-69.5	-8.8	Yanjingzhai, Mengla
SM-02	5.9	-56.5	-8.1	Yanjingqing, Mengla
SM-03	4.3	-54.9	-7.6	Nanben, Mengla
SM-04	5.7	-59.9	-8.8	Nanben, Mengla
SM-05	-	-58.9	-8.1	Nanben, Mengla
SM-06	-4.6	-47.3	-6.0	Molong, Mengla
SM-07	40.3	-63.3	-8.3	Mozheng, Mengla
SM-08	39.6	-64.4	-8.0	Mozheng, Mengla
SM-09	39.9	-61.3	-7.6	Mozheng, Mengla
SM-10	7.4	-54.8	-7.7	Nanpo, Mengla
SM-11	17.5	-60.2	-9.3	Nanpo, Mengla
SM-12	18.0	-55.2	-8.3	Nanpo, Mengla
Lao-01	8.1	-56.4	-7.8	Muang Say
Lao-02	6.8	-50.3	-7.9	Muang Say
Lao-03	17.1	-42.5	-6.1	Thakhek

Note: Twelve samples (from SM-01 to SM-12) are from the Mengla Basin, Yunnan Province, China. Three samples of Lao-01, Lao-02 and Lao-03 are collected from Laos.

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