1 Introduction

Dogai Coring is a name of lake lied in the northern Tibet. There are a series of modern salt springs and theies travertines. All of salt springs have an anomaly of potassium, implying that springs water may dissolve evaporites from deep bed formation, which includes halite and/or sylvine (Niu et al., 2013). These evaporites have important economic implications. Therefore, research on travertines precipitated from salt springs will probe further tectonic activity and processing of deep geological fluid, providing help for evaporites exploration.

2 Geological Setting and Sample Analysis

Research area is located in the south of Dogai coring of Qiangtang basin (Fig. 1). The main stratum consists of Xiali Formation, Suowa Formation, Bailongbinghe Formation and Paleogene from bottom to top. A set of NW-SE faults trend in research area and travertines distribute along these faults. Generally, travertines developed in Suowa Formation and formed a dome shaped body. The basal diameter of travertines domes are from 0.5 meter to tens of meters and height of travertines domes are from 0.5 meter to above 15 meters. Most of travertines are still in growth and a few of travertines domes have stopped growing. In order to acquire genetic mechanism of travertines, samples were obtained from field. Also, rock samples of Xiali Formation, Suowa Formation, Bailongbinghe Formation were obtained for analysis in laboratory. The travertines samples sites are situated in northwest Wanan lake, Yuanquan river and south of Dogai Coring lake.

REEs, $\delta^{13}$C, $\delta^{18}$O and $\text{Sr}^{87}/\text{Sr}^{86}$ of travertines were determined in laboratory. For comparison conveniently, REEs of Xiali Formation, Suowa Formation, Bailongbinghe Formation were also determined.

3 Discussion and Conclusion

REE distribution patterns show apparently higher light REE concentration and slightly negative Eu anomaly. Travertines of northwest Wan’an lake, Yuanquan river and south of Dogai Coring lake have relatively consistent REE distribution patterns (Fig. 2). In view of both springs and travertines having consistent REE distribution patterns (Lavrushin et al., 2006), we confirm that springs water of northwest Wanan lake, Yuanquan river and south of Dogai Coring lake either originated from same strata or witnessed similar geological process.

REE distribution patterns of Xiali Formation, Suowa Formation, Bailongbinghe Formation are consistent each other with negative Eu anomaly, similar to the characteristics of travertines (Fig. 3). These evidence indicated that travertines are genetically related with Xiali Formation, Suowa Formation, Bailongbinghe Formation, and mineral elements of travertine may come from sedimentary formation.

The $\delta^{13}$C and $\delta^{18}$O values in travertine of three sample sites vary from 2 to 9.5‰ (average 6.78‰, n=6) and from –13.2‰ to –7.8‰ (average –10.3‰, n=6) respectively. This is consistent with thermogene travertine (Pentecost, 2005). Thus, CO$_2$ from deep crust may be added in process of travertine forming.

The $\text{Sr}^{87}/\text{Sr}^{86}$ will not greatly change When travertines precipitated from springs (Leeman et al., 1977). Thus, $\text{Sr}^{87}/\text{Sr}^{86}$ from travertine is a good tracer for springs. The $\text{Sr}^{87}/\text{Sr}^{86}$ values in travertine vary 0.708817 to 0.70952, which fell in the interval of 2nd Member of Xiali Formation and 1st Member of Suowa Formation (Liu et al., 2007). Consequently, the mineral elements of springs water which formed travertine may be from these two stratum.

Key words: Travertine, springs, isotope, REE, Tibet
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References