

Dating evaporite by using contemporaneous authigenic illite

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Evaporites, including potash deposits, are lack of fossils, which is adverse for the studying of stratigraphy chronology compared with other sedimentary rocks. Thus it is very difficult to obtain the accurate formation age of evaporites with absence of intercalated volcanic beds. The roughly formation age is usually constrained from overlying and underlying sedimentary rocks. Clay minerals study from saline environments indicate that some authigenic illite could have been formed during the formation of evaporite. For instance, synthesis experiments showed that authigenic illite could be formed under certain conditions, namely in solutions with a high-salt content like seawater (Harder et al., 1974). In two East African lakes, saline paleo-lake water with unusually high K/Na ratio could engender the diagenetic transformation of smectite to illite. (Singer and Stoffers, 1980). Salt-bearing bentonites of the East Slovak Basin documented the enhancing effect of a salty environment on the smectite to illite alteration. The chemistry of the of brine waters is likely a controlling factor for this diagenetic transformation (Honty, 2004). A syndepositional authigenic illitic mixed-layer clays occurring in the central diagenetic minerals zone in deposits of Lake T'oo'dichi'. And, the occurrence of rectorite (1:1 layer of illite-smectite) in the Mengyejing potash deposit in Yunnan Province, China is evidently authigenic origin (unpublished data). Above researches demonstrate that high temperature and pressure is not an absolute prerequisite for the formation of authigenic illite. High concentrated saline waters could facilitate the formation of authigenic illite synchronous to the formation of evaporites. This process could make the use of authigenic illite to date the formation age of evaporites possible.