

WANG Licheng, LIU Chenglin, GAO Xiang and ZHANG Hua, 2014. Provenance and Paleogeography of the Late Cretaceous Mengyejing Formation, Simao Basin, southeastern Tibetan Plateau. *Acta Geologica Sinica* (English Edition), 88(supp. 1): 255–256.

Provenance and Paleogeography of the Late Cretaceous Mengyejing Formation, Simao Basin, Southeastern Tibetan Plateau

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The Mengyejing potash salt deposit (MPSD) is the only pre-Quaternary potash salt deposit in China. The MPSD is located in the southern Simao Basin, southeastern Tibetan Plateau. The MPSD, along with rock salts and clastic rocks, is part of the Mengyejing Formation. The Late Cretaceous Mengyejing Formation is thought to be genetically related to the Maha Sarakham Formation in the Khorat Basin. The genetic relationship between these basins and their sedimentary provenance and paleogeography has been of great interest (e.g., BGMRY, 1986; Racey et al., 1996; Qu, 1997; Qu et al., 1998; Racey, 2009; Han et al., 2011; Morley, 2012). However, there is little diagnostic evidence for the paleogeographic link between them. A combined analysis of whole rock geochemistry, zircon U-Pb chronology, and Hf isotopic compositions was performed

to characterize the provenance of the Mengyejing Formation. This formation's sandstones are characterized by moderate chemical index of alteration (CIA) values. These values, together with plots of the Th/U-Th ratios, suggest that certain samples have undergone moderate weathering and sedimentary recycling. The major and trace elements (La/Th-Hf , Th/Sc-Zr/Sc , $\text{Eu/Eu}^*-\text{Th/Sc}$, $\text{TiO}_2-\text{Fe}_2\text{O}_3^{\text{T}}+\text{MgO}$, $\text{Al}_2\text{O}_3/\text{SiO}_2-\text{Fe}_2\text{O}_3^{\text{T}}+\text{MgO}$, $\text{K}_2\text{O}/\text{Na}_2\text{O}-\text{SiO}_2$) indicate that the sedimentary sources were felsic rocks from an active continental margin or continental arc with a minor amount of recycled sediment from a passive continental margin. The Mengyejing Formation contains detrital zircons primarily with U-Pb ages of 2.45–2.57 Ga, 1.8–1.9 Ga, 740–880 Ma, 410–470 Ma, and 215–300 Ma. The results reveal that the pre-Devonian zircons are derived from the recycled sediments of the Yangtze block originating in the Qinling Orogenic Belt, and they share this provenance with the coeval sediments in the Khorat Basin. The magmatic rocks of the Ailaoshan and Lincang areas are responsible for supplying the Devonian to Triassic detrital zircons. These provenance data combined with published paleocurrent results suggest that the Simao Basin was situated on the western margin of the Khorat Basin during the Late Cretaceous (Figure.1). The basins were connected when marine incursion occurred. We propose that pre-Devonian materials from the southwestern Sichuan Basin first supplied detritus to the Simao Basin and subsequently to the Khorat Basin.

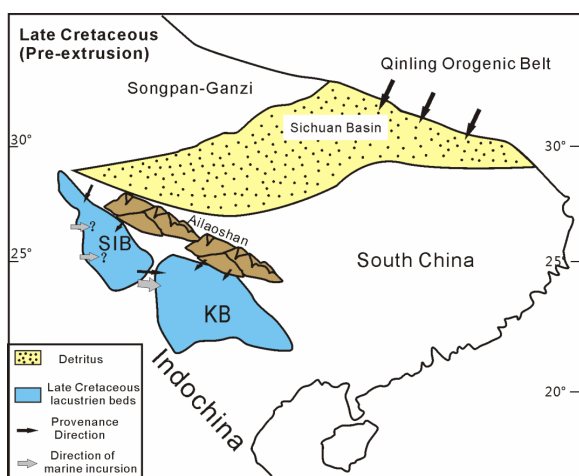


Fig. 1. The Late Cretaceous paleogeography of the Simao and Khorat Basins (Modified from Carter and Bristow, 2003). SIB, Simao Basin; KB, Khorat Basin.

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