

Tectonic Implication of Detrital Muscovite from Carboniferous Sedimentary Rocks in the Northern Dabie Mountains, China: Evidence from Single Grain Rb-Sr Dating

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The Dabie ultrahigh-pressure orogenic belt represents the eastern part of the Qinling-Dabie orogenic belt in China, which was formed by collision of the North and South China Blocks during Early Mesozoic. Time of this collision has been constrained at ca. 230-220 Ma by numerous radiometric studies [1-2]. The Dabie belt is geologically made up of four tectonically juxtaposed zones, from south to north, the Susong HP zone, South Dabie UHP zone, North Dabie gneiss zone, and Beihuaiyang low-grade zone. UHP metamorphic mineral inclusions are found in garnet and zircon, indicating subduction of continental crust during the collision.

Low-grade metamorphic Paleozoic sedimentary rocks are exposed along northern margin of the Qinling-Dabie orogenic belt. Provenance and tectonic setting of these low-grade rocks are debated. Late Proterozoic and late Archean detrital zircon were found in the sedimentary rocks that indicate mixing sources of South and North China affinities [3]. This study presents results of detrital biotite and muscovite minerals of Carboniferous sedimentary rocks exposed in the northern margin of the Dabie Mountains. About 15% of detrital muscovite grains are phengitic in composition indicated in high Si/Al ratios of >3.3. Single grain Rb-Sr isotopic analyses show that either phengite or muscovite give about 400 Ma isochron age, while detrital biotite grains are scattered in two groups of Rb-Sr isotopic composition, likely suggesting different sedimentary sources of old crustal and juvenile material probably of magmatic rocks related to Paleozoic convergence along southern margin of the North China block. Whole-rock Nd isotopic composition of the sedimentary rocks also demonstrates a mixture of sedimentary sources of different ages, similar to the conclusions proposed previously [3]. Paleozoic detrital phengite can be originated from the North Qinling terrain where Paleozoic subduction and subsequent collision have been proposed [4].

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References:

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