U-Pb zircon age of the metapelites and granitic gneisses from Nyalam High Himalayan Series and their significance to the early Palaeozoic tectonic evolution

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The Nyalam High Himalayan Crystalline Series lies in Southern Tibet (roughly 28°N, 86°E) along the China-Nepal highway. These series include pelitic schists and gneisses, augen granitic gneisses, calcareous schists, marbles and quartzites that have been intruded by tourmaline-bearing leucogranites. There are not the isotope ages of the metapelites and the granitic gneisses from Nyalam High Himalayan Series in the Southern Tibet. The study of the zircon cathodoluminescence images from the metamorphic sedimentary rock show that there are complex textures. The dating results indicate Pan-African thermal events record in the zircon. A Pan-African periods deposition age (ca. 0.50 Ga) is inferred from the age of the metapelites. Zircon SHRIMP U-Pb dating yielded an age of 478.2±4.4 (2σ) Ma for the granitic gneisses

U-Pb ages of detrital zircons show different peak (2.4 Ga, 1.6 Ga, 0.8 Ga and 0.50 Ga), suggesting that the detrital archive records the geological event history of its source region. The 0.5 Ga zircon grains with oscillatory zoning, uniform and concordant U-Pb systems, igneous Th-U ratios, are interpreted as primary magmatic zircons.

During the Pan-African periods, the northern part of India was affected by a Pan-African event, Numerous granitic intrusions dated at around 0.5 Ga are attributed to this event. The Pan-African event is marked by an unconformity between Ordovician continental conglometrates and the underlying Cambrian marine sediments. It is tempting to correlate the early Palaeozoic thermal event with a late extensional stage of the long-lasting Pan-African orogenic events which ended with the formation of the Gondwana supercontinent.

The protolith age of the High Himalayan metamorphic rocks is generally regarded to be Precambrian to early Paleozoic. It seems plausible that the High Himalayan metamorphic rocks represent a minimum depositional rage at ~0.5 Ga. 478 Ma granitic gneisses is assigned to an important orogenic event, the early Palaeozoic thermal event indicate that early Paleozoic tectonism has played an important role in shaping the Himalyan orogen.

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Evidences of Ghronology and Isotopic geochemistry of Bogda Rift Closure and Regional Uplift, Xinjiang

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The Bogda Mountain, with Junggar basin on the north and Turpan-Hami basin on thesouth, is a part of the East Tianshan Mountains. The Dashitou-Shepikou area belong to the northern part of the eastern section of the Bogda orogen. Rhyolite of the Dashitou group gave a Rb-Sr age of 306.7±2.3Ma, and thus is suggested to have been produced at the uplifting stage following the closure of the Bogda rift. With ε_{Nd} (t) of +5.30 ~ 6.40, $(^{87}Sr/^{86}Sr)_i$ of 0.703289 ~ 0.703496, $(^{206}Pb/^{204}Pb)_i$ of 18.037 ~ 18.425, $(^{207}Pb/^{204}Pb)_i$ of 15.524 ~ 15.567 and $(^{208}Pb/^{204}Pb)_i$ of 37.198 ~ 37.810, the rhyolite is comparable in Nd, Sr and Pb isotopes to the basalt and rhyolite of the Lower and Middle Carboniferous Qijiaojing formation that were formed during extension and subsidence of the Bogda intra-continental rift. Minor rhyolite accompanying a large amount of basalt in the Qijiaojing formation are though to have been produced by fractional crystallisation of the basaltic magma, but a large quantity of rhyolite accompanied by very minor basaltic rocks precludes their formation by fractional crystallisation of basaltic magma. These data indicate that the rhyolite is similar in Nd-Sr-Pb isotopes to the rhyolite [1,2] that was formed by fractional crystallization of the basaltic magma. The rhyolite of the Dashitou group is likely to have been derived from an underplated basaltic body by remelting of this body in response to mantle heating. Highly positiveε_{Nd} (t), and negativeε_{Sr} (t) (low $^{87}Sr/^{86}Sr$ initial ratio), and low Pb isotope ratios suggested that, like the pre-collision basalt of the Qijiaojing formation, the mantle magma underplated at the post-collision stage of the Bogda rift came from depleted mantle, and that the post-collision mantle of the Bogda rift could have inherited the depleted nature of the pre-collision mantle of the same rift.

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