# Petrological and zircon evidence for the Early Cretaceous granulite-facies metamorphism in the Dabie orogen, China

GAO X.Y., ZHENG, Y.F., ZHANG, Q.Q.,

[1] CAS Key Laboratory of Crust-Mantle Materials and Environments, School of Earth and Space Sciences, University of Science and Technology of China

An integrated study of petrology, mineralogy, geochemistry, and geochronology was carried out for contemporaneous mafic granulite and diorite from the Dabie orogen. The results provide evidence for granulite-facies reworking of the ultrahigh-pressure (UHP) metamorphic rock in the collisional orogen. Most zircons from the granulite are new growth, and their U-Pb ages are clearly categorized into two groups at 122-127 Ma and 188±2 Ma. Although these two groups of zircons show similarly steep HREE patterns and variably negative Eu anomalies, the younger group has much higher U, Th and REE contents and Th/U ratios, much lower $\varepsilon_{Hf}(t)$ values than the older group. This suggests their growth is associated with different types of dehydration reactions. The older zircon domains contain mineral inclusions of Grt, Cpx and Qz, indicating their growth through metamorphic reactions at high pressures. In contrast, the young zircon domains would have grown through peritectic reaction at low to medium pressures. The younger granulite-facies metamorphic age is in agreement not only with the adjacent diorite at 125±1 Ma in this study but also the voluminous emplacement of coeval mafic and felsic magmas in the Dabie orogen. Mineral separates from both mafic granulite and its adjacent diorite show uniformly lower $\delta^{18}O$ values than normal mantle, similar to those for UHP eclogite-facies metaigneous rocks in the Dabie orogen. In combination with major-trace elements and zircon Lu-Hf isotope compositions, it is inferred that the protolith of mafic granulites shares with the source rock of diorites, both being a kind of mafic metasomatites at the slab-mantle interface in the continental subduction channel. This provides a direct link in petrogenesis between the granulitic, migmatic and magmatic rocks in the collisional orogen to active continental rifting, whereby high heat flow was transferred from the asthenospheric mantle into the thinned orogenic lithosphere for partial melting.