From Late Triassic HP/UHP metamorphism to Early Cretaceous anatexis recorded in the North Dabie migmatite, China

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It's well known that the Dabie orogen was suffered from continent-continent collision to orogenic collapse. As for North Dabie terrane, it was traditionally considered as high-T metamorphic belt and evidences of HP/UHP metamorphism have rarely been found in there. In this study, Late Triassic HP granulite-facies metamorphism was found in the Early Cretaceous migmatite at there. In order to investigate the HP metamorphism during exhumation of deeply subducted continental crust and the anatexis during collapse of it, we carried out a combined study on layered leucososme from the Zhangjiazui migamtite in the North Dabie terrane, eastern China. The leucosomes are millimetric to centimetric in thickness and mainly consist of K-feldspar + quartz + amphibole. Zircon grains separated from the leucosome generally have core-rim zoning or core-mantle-rim structures, and they were subdivided into three main domains: inherited magmatic cores, metamorphic domains, and magmatic rims. Weakly zoned, grey-white luminescent inherited cores preserve mineral inclusions of Qtz + Pl + Kfs + Bi ± Ap indicative of a felsic igneous protolith. Most age data of the inherited magmatic cores are discordant with apparent $^{206}Pb/^{238}U$ ages ranging from 273±6Ma to 580±6 Ma with an upper intercept age of 868±71 Ma, suggesting a variable isotopic resetting. The metamorphic domains generally occur at the core or mantle in zircons, and they are dark grey luminescent and un-zoned in CL images. The metamorphic domains contain HP granulite-facies mineral inclusion assemblage Cpx + Grt + Pl + Ru ± Ap ± amp (P>1.5-2.0 GPa). Ti-in-zircon and Zr-in-rutile thermometers give a high temperature ranging from 851 to 987 ℃.The metamorphic domains yield consistent Triassic ages around 205 – 232 Ma with a weighted mean age of 218±4 Ma, agreeing with exhumation ages of the UHP rocks in the Dabie orogen. In contrast, the bright luminescent zircon rims have clearly oscillatory zoning structure with mineral inclusion assemblage Amp + Kfs + Qtz, suggesting melt crystallization under an amphibole-facies condition. The magmatic rims have concordant $^{206}Pb/^{238}U$ ages ranging from 134±1 to 156±2 Ma with two distinct peak ages of 155±2 Ma and 139±2 Ma, respectively, suggesting multi-period anatexes during collapse of the Dabie orogen. These data suggest that the subducted Neoproterozoic felsic igneous rocks in the North Dabie terrane underwent HP granulite-facies metamorphism at least during exhumation in Late Triassic and subsequent anatexis at the crustal level during the orogenic collapse in the Early Cretaceous.