Paleoproterozoic UHT Metamorphism at Eastern Khondalite Belt in the North China Craton

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UHT granulites have been identified recent years in the North China Craton. In Tuguiwula out crop, UHT granulites are typical Mg-Al granulites with diagnostic UHT mineral assemblages, such as sapphirine + quartz, high alumina orthopyroxene + sillimanite + quartz and ternary feldspar. An anticlockwise P-T path is defined, in which the estimated peak metamorphic temperature is >1050℃ (Santosh et al., 2007a, 2007b). In Dongpo outcrop, 170km northwest to the Tuguiwula, we determined another type of UHT granulites. They are garnetiferous rocks containing abundant sapphirine up to 30%. The rocks contain also sillimanite, spinel, biotite, plagioclase and minor cordierite, rutile and ilmenite, but without quartz and orthopyroxene. A clockwise P-T path with peak metamorphic conditions of 910-980℃ and 8kbar has been delineated by reaction texture and pseudosection calculation using THERMOCALC programe. This sapphirine granulite occurs just next to a meta-gabbroic dyke, indicating that the UHT metamorphism from the Dongpo area was essentially lower crustal contact metamorphism caused by mantle derived mangma. Then, we determined another two localities of contact UHT granulites featured by high-Al orthopyroxene (Al2O3=8.9wt%) and ternary feldspar giving metamorphic temperatures of >1000℃. So, combine with geological occurrences and geochronological data, we suggest that the UHT metamorphism at eastern Khondalite belt in the North China craton was caused by the underplating of mantle-derived magmas during a post-collisional extensional event at ~1.92 Ga.

Keywords: ultrahigh-temperature (UHT) metamorphism; P-T path; Sapphirine granulite; Paleoproterozoic; Khondalite belt; North China Craton

References

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