



Paleoproterozoic igneous and metamorphic events in the Hongcheon area, southern margin of the Northern Gyeonggi Massif in the Korean Peninsula, and their links to the Paleoproterozoic collision in the North China Craton

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The Hongcheon area is located at the northern part of Gyeonggi Massif (GM) in the Korean Peninsula. The Hongcheon area is composed of the Paleoproterozoic Yongduri Gneiss Complex (YGC), Euiam Group (EG) and Euiam Gneiss Complex (EGC). Quartz-feldspathic gneisses in the northeastern part of the YGC record M2 peak metamorphic conditions of 790-840°C and 7.2-8.9 kbar, whereas granitic and garnet gneisses in the western part of the YGC record peak metamorphic conditions of 690-720°C and 6.1-6.9 kbar, and 640-660°C and 5.0-5.4 kbar, respectively. The M2 metamorphic conditions represent a regional low-P/T metamorphic event in which metamorphic grade increased towards east. SHRIMP zircon U-Pb age dating indicates that the M2 metamorphism occurred at ca. 1867-1883 Ma. The presence of relict kyanite in the gneisses within the YGC suggests that the M1 intermediate-P/T metamorphism (ca. 1925 Ma) occurred prior to the low-P/T metamorphic event. The YGC also records M3 metamorphic event related to Permo-Triassic continental collision between the North and South China Craton. Whole-rock geochemistry indicates that augen gneisses in the EGC were originally post-collision granitoids, and that amphibolites within these gneisses were originally within-plate mafic intrusions. These augen gneisses and amphibolites were emplaced between ca. 1864 and 1885 Ma, and metamorphosed during the Permo-Triassic event (ca. 246 and 265 Ma). The similarity in age between the Paleoproterozoic intrusion and the M2 low-P/T metamorphism indicates that the M2 metamorphism also occurred in a post-collision tectonic setting. The M1 intermediate-P/T metamorphism and post-collision events in the study area can be correlated to the 1.91-1.93 Ga collision related metamorphism and 1.84-1.88 Ga post-collision events in the North Korea and the Jiao-Liao-Ji collision belt in the North China Craton.