



The post collisional metamorphic evolution from Ultra High Temperature to Amphibolite facies metamorphism in the Odesan area during the Triassic collision between the North and South China cratons.

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The Odaesan Gneiss Complex (OGC) is the eastern end of the Hongseong-Odesan collision belt in Korean Peninsula which is the extension of the Dabie-Sulu collision belt between the North and South China blocks. The OGC mainly consists of banded and migmatitic gneiss with porphyritic granitoid and amphibolite. The banded gneiss can be subdivided into garnet-biotite and garnet-orthopyroxene banded gneisses. The highest metamorphic P/T conditions of the migmatitic and garnet-biotite banded gneiss were 760–820°C/6.3–7.2kbar and 810–840°C/7.2–7.8kbar respectively. On the other hand, the garnet-orthopyroxene banded gneiss records 940–950°C/10.5–10.7kbar that is corresponded to UHT metamorphic condition. These data indicate that the peak UHT metamorphic condition of the study area was preserved only within the garnet-orthopyroxene banded gneiss because its lower water content than other gneisses and UHT metamorphic mineral assemblage was completely replaced by the granulite facies metamorphism in other gneisses due to their higher water content than the garnet-orthopyroxene banded gneiss. Finally all gneisses experienced amphibolite facies retrograde metamorphism which is observed locally within rocks, such as garnet rim and surrounding area. The peak UHT metamorphism is estimated to occur at ca. 250–230 Ma using SHRIMP zircon U-Pb age dating and was caused by the heat supplied from asthenospheric mantle through the opening formed by slab break-off during early post collision stage. The calculated metamorphic conditions represent that geothermal gradient of the study area during the post collision stage was 86°C/kbar indicating the regional low-P/T metamorphic event. Besides the Triassic metamorphic age, two Paleoproterozoic metamorphic ages of ca. 1930 and 1886 Ma are also recognized by the SHRIMP age dating from the banded gneisses and Paleoproterozoic emplacement age of ca. 1847 Ma is identified from the porphyritic granitoid which formed in the within plate tectonic setting. These ages are well matched with 1880Ma–1885Ma regional post-collision igneous and metamorphic activities in other areas of the GM indicating that the OGC had undergone Paleoproterozoic metamorphic and igneous activities before the Triassic metamorphism. However it is difficult to confirm the Paleoproterozoic activities due to the strong Triassic metamorphism.