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# Microstructural evolution and deformation mechanism of amphibole in Yeoncheon amphibolites in the Imjingang Belt, South Korea

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The Imjingang Belt preserved the deformation and metamorphism of rocks related to the Permo-Triassic continental collision between the North and South China Cratons. To understand the microstructural evolution of amphibolites, microstructures of amphiboles in Yeoncheon amphibolites were analyzed using electron back-scattered diffraction mapping and transmission electron microscopy. The Yeoncheon amphibolites exhibit well-developed foliation, as defined by the compositional layering of hornblende, garnet, and quartz. The hornblende porphyroclasts in amphibolites show relict clinopyroxene and/or undulose extinction. Two different types of lattice preferred orientations (LPOs) of amphibole were observed: type- II and type-IV [1]. Type-IV LPO of amphibole can be interpreted as a fabric developed under peak metamorphic conditions. The subgrain boundaries of amphibole, misorientation axes distribution of amphibole, and existence of relict clinopyroxenes inside the amphibole indicate that the type-IV LPO of amphibole resulted from deformation by dislocation creep and topotactic growth of amphibole. On the other hand, type-II LPO of amphibole might have been produced during the retrogression of amphibolite at low temperatures. The low-angle boundaries of amphibole associated with cracks and fractures in some samples indicate that type-II LPO of amphibole resulted from cataclastic flow associated with rigid body rotation during retrogression.

[1] Jung, S., Kim, J., Jung, H., 2024. Deformation microstructures and seismic anisotropy of Yeo-ncheon amphibolites in the Imjingang Belt, South Korea. Episodes 47, 537-553.