

Orthopyroxene-bearing metabasites from the Ryoke metamorphic rocks in the Yanai district, SW Japan

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This study firstly describes the occurrence of orthopyroxene-bearing assemblages of basic rocks from the Yanai district, SW Japan.

The Ryoke metamorphic rocks are mainly composed of pelitic and siliceous lithologies and associated rarely with basic rocks. Orthopyroxene-bearing basic rocks have been described only in one outcrop in the Ina district, central Japan (Hokada, 1996). The highest grade of the Ryoke metamorphism has been, therefore, recognized to be the upper-amphibolite facies. This study, in contrast, describes the occurrence of orthopyroxene-bearing metabasites in seven outcrops in the Yanai district, SW Japan. The outcrops are located regionally in the highest-grade zone of the study area, garnet-cordierite zone, which is defined by the pelitic mineral assemblages. Orthopyroxene grains are irregular-shaped, most of which as well as hornblende are associated with aggregates of cummingtonite. Hornblende and ilmenite occur not only in the matrix but also as inclusions in orthopyroxene. The mineral assemblages at the peak metamorphism, judged from microstructures, are:

orthopyroxene + clinopyroxene + hornblende + biotite + ilmenite + plagioclase + quartz

and

orthopyroxene + hornblende + biotite + ilmenite + plagioclase + quartz.

The hydrous minerals such as biotite and hornblende have coexisted with orthopyroxene without any reaction relation, suggesting that the highest grade of the Ryoke metamorphism is the lower-granulite facies and is not the higher-amphibolite facies, as has been considered previously.