

Enclaves of Chromitite Bearing Layered Complex Within the Granulite of Schirmacher Hills East Antarctica : Fragments of An Ancient Metamorphosed Lower Continental Crust

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Several meter-sized enclaves of mafic and ultra mafic rocks showing an early fabric (S_1) occur within enderbitic gneisses in the Schirmacher Hills. The gneissic foliation (S_2) in the host rock swerves around the enclaves. The enclaves represent fragments of a layered igneous complex comprising of the following rock types : cumulate high magnesian and low magnesian websterite (clinopyroxene + orthopyroxene + plagioclase with late pargasitic amphibole and biotite), olivine + chrome - spinel bearing orthopyroxenite, chrome spinel bearing high-magnesian gabbro, magnesian gabbro, chromitite bearing melanorite and garnet bearing low magnesian gabbro. Additionally, fragments of chrome spinel bearing ilmenite occur as enclaves. All the enclaves show extensive recrystallization of the minerals and in the garnet bearing mafic enclaves geothermobarometry shows emplacement of the magma at 11 kbar (corresponding to approximately 35 km depth) and metamorphism at around 10 kbar followed by near isobaric cooling when coronal garnet appeared. The enclaves were carried up by later intruding enderbitic magma and were emplaced with the latter at a depth of approximately 25 km. Subsequently, all the rocks were metamorphosed under granulite facies conditions (8 kbar, 850°C), followed by an amphibolite facies (6 kbar, 600 ± 50°C) re-metamorphism.