PROGRADE METAMORPHISM OF THE LUTZOW-HOLM BAY GRANULITES, EAST ANTARCTICA WITH SPECIAL REFERENCE TO THE PETROGRAPHICAL SIMILARITY WITH THE HIGHLAND SERIES, SRI LANKA

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Granulite-facies rocks from the Lutzow-Holm Bay region (LHB granulites), East Antarctica, comprise four major groups, namely pelitic/ psammitic gneisses, basic/intermediate gneisses (including charnockitic rock), calc-silicate rocks and ultramafic rocks. These rocks have been subjected to granulite-facies metamorphism probably during the late Proterozoic (ca. 700 Ma). Subsequent granite and pegmatite activity occurred at 500 Ma.

The LHB granulites have undergone prograde metamorphism involving an increase of T from the kyanite field to the sillimanite field as evidenced by kyanite and/or staurolite as relict inclusions in garnet porphyroblasts contained in garnet-sillimanite gneisses. Moreover, sapphirine — kyanite — biotite association included in garnet porphyroblast in a certain garnet-sillimanite gneiss may also suggest the prograde metamorphism.

Relict inclusions of staurolite and kyanite have been recognized in a garnet-sillimanite gneiss collected by Yoshida in 1985 from the Highland Series of Sri Lanka, and the chemical compositions of staurolite and associated biotite are quite similar to those of the LHB region (Hiroi, personal communication). This indicates a similar metamorphic history for the two areas and is consistent with a reconstruction of Gondwanaland in which the Highland series and LHB granulites are juxtaposed. Further geochronological investigations will confirm this suggestion.