

Petrography and geochemistry of mafic metamorphic rocks in the Lutzow-Holm Complex, East Antarctica

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The Lutzow-Holm Complex (LHC) in East Antarctica consists of granulite- to amphibolite-facies metamorphic rocks including pelitic to psammitic, mafic rocks with basic to intermediate compositions, with subordinate calc-silicate, marbles and ultramafics. Hiroi et al. (1983) indicate that metamorphic grade in the LHC progressively increases from east to west dividing into amphibolite-facies area (eastern domain), transitional area (central domain) and granulite-facies area (western domain). The mafic metamorphic rocks which occur as layers, lens and blocks into the pelitic gneiss or felsic gneisses are widespread in these areas. Main mineral assemblage of the mafic metamorphic rocks vary from hornblende-plagioclase (i.e. amphibolite) to orthopyroxene-clinopyroxene-plagioclase (i.e. mafic granulite) in the LHC, which occur almost correlated with the metamorphic areas defined by Hiroi et al. (1983).

Field occurrence suggests that the mafic metamorphic rocks in the amphibolite facies terrane are likely to have originated from mafic magma, which has intruded into sedimentary rocks. Geochemistry of the mafic metamorphic rocks vary from tholeiitic volcanic arc basal (VAB)-like through within-plate basalt (WPB)-like to N-type MORB-like compositions, further classified into oceanic island basalt (OIB)-like through N-type MORB to E-type MORB-like compositions. In a regional context the VAB-like ones predominantly occur in the eastern domain of the LHC, whereas OIB-like, N-type MORB-like and E-type MORB-like ones predominantly occur in central and western domains of the LHC. The difference of occurrence of the mafic rocks may be related to a tectonic background of the LHC.