METAMORPHIC EVOLUTION OF THE LATE PROTEROZOIC LUTZOW-HOLM COMPLEX, EAST ANTARCTICA

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To the west of the well-known Archean Napier and Proterozoic Rayner Complexes in Enderby Land (longitude 45°—60°E), two Late Proterozoic metamorphic complexes, Lutzow-Holm and Yamato-Belgica, have been recognized in eastern Queen Maud Land (longitude 30°—45° E).

The Lutzow-Holm Complex is exposed along the Prince Olav Coast and around Lutzow-Holm Bay and is characterized by southwestward progressive metamorphism of the medium-pressure type from the amphibolite facies to granulite facies, prograde P-T-t paths of rocks from earlier relatively high-pressure and low-temperature conditions to later lower-pressure and higher-temperature conditions, and low initial $^{87}Sr/^{87}Sr$ ratios (0.705—0.706) of metasediments. The occurrence of ultramafic rocks is also characteristic of this complex. Six isograds based essentially on continuous reactions in various rock types have been mapped: staurolite-out and (epidote + quartz)- out in the amphibolite- facies terrain; orthopyroxene-in (1) at the boundary between the amphibolite-facies and transitional terrains; orthopyroxene-in (2) at the boundary between the transitional and granulite-facies terrain; wollastonite-in and (spinel + quartz)-in in the granulite-facies terrain. The staurolite-out isograd has a single exception; extremely Al- and Ti- rich staurolite occurs in the granulite-facies terrain. It is significant and peculiar to the Lutzow-Holm Complex that relict kyanite occurs in a small to trace amount as inclusions within garnet and plagioclase grains in many of sillimanite-bearing rocks regardless of metamorphic grade. Andalusite locally occurs in rocks cut extensively by the Early Paleozoic granite and pegmatite.

The Yamato-Belgica Complex to the southwest of the Lutzow-Holm Complex is characterized by the widespread igneous activity and contemporaneous metamorphism of the low-pressure type. Initial $^{87}Sr/^{86}Sr$ ratio of metasediments of this complex is relatively high (c. 0.709).

These two Late Proterozoic metamorphic complexes may have formed paired metamorphic "belts". The Lutzow-Holm Complex, as a whole, may be a suture zone between the older Rayner and Yamato-Belgica Complexes. This interpertation is compatible with the spatial distribution, mode of field occurrence, bulk chemical compositions, and mineral textures of mafic and ultramfic rocks of the Lutzow-Holm Complex.