

PROVENANCE OF THE LÜTZOW-HOLM COMPLEX,
EAST ANTARCTICA – ION MICROPROBE U-Pb
STUDY OF ZIRCONS (II) (ABSTRACT)

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In the sector of 30-45°E in East Antarctica, two high-grade metamorphic complexes, the Lützow-Holm Complex (LHC) in the east and the Yamato-Belgica Complex (YBC) to the west have been distinguished on the basis of protolith, type of metamorphism and igneous activity. The exact boundary between these complexes has not been established because of the continental ice sheet. Ion microprobe (SHRIMP) dating has been carried out on zircon separates from both meta-sedimentary and meta-igneous rocks of these complexes. U-Pb ages from six widely separated localities throughout the LHC show that the timing of regional metamorphism and folding in the LHC were between ~520 and ~555 Ma as recorded by new growth of metamorphic zircon. Many zircons contain centers which record a wide range of inherited ages from ~2900 to ~1500 Ma. ~1000 Ma zircon component has been identified in three locations. ~1000 Ma zircon component may indicate that either the ~1000 Ma adjoining Rayner Complex to the east was a source for the Lützow-Holm paragneisses or that a similar crustal prehistory is recorded in parts of the LHC. A heterogeneous zircon population in a metasedimentary gneiss from YBC gives a discordant age of ~2470 Ma. Although other analyses from this gneiss do not define unique ages, it is inferred that variable Pb loss at ~600 Ma occurred in zircons that originally crystallized at ~1000 Ma.

We have already reported, for the first time, the existence of a Pan-African mobile belt within the East Antarctic Shield (K. SHIRAIISHI *et al.*: Recent Progress in Antarctic Earth Science, ed. by Y. YOSHIDA *et al.* Tokyo, Terra Sci. Publ., 67, 1992). The present work provides additional evidence for an improved fit to the once contiguous fragments of Gondwana. The Highland/Southwestern Complex (HSWC) of Sri Lanka has remarkable petrological similarities to LHC. This metamorphic correlation is now supported by the identification of ~500 Ma age for the LHC, as the Sri Lankan HSWC metamorphism, and folding was also at ~550-600 Ma (A. KRÖNER ed.: Geol. Surv. Dept. Sri Lanka, Prof. Pap. 5, 1991). The age relations provide more specific correlations between Sri Lanka and Antarctica. The Wannu Complex, the HSWC and Vijayan Complex of Sri Lanka are the direct continuation of the Rayner Complex, Lützow-Holm Complex and the Yamato

Mountains, respectively, of the East Antarctic Shield. Thus the characteristics which make separation of three belts within each continent possible correlate with available data in terms of Nd model ages, U-Pb zircon ages, lithologies and style of metamorphism.

Gondwana did not finally amalgamate until the termination of Pan-African orogenesis at ~500 Ma (I.W.D. DALZIEL: *Annu. Rev. Earth Planet. Sci.*, **20**, 501, 1992). It is noteworthy that the provenance of the LHC developed at the margin of the Late Proterozoic Supercontinent. LHC-HSWC orogenesis coincided with large-scale convergence between East and West Gondwana.

(Received February 26, 1993; Revised manuscript received June 3, 1993)