To Prof. Cyril Ponnamperuma

With kind regards.
P.W. Williams
Jan 20/1988

ZIRCON ION MICROPROBE DATING OF HIGH-GRADE ROCKS IN SRI LANKA[1]

A. KRÖNER, I. S. WILLIAMS, W. COMPSTON, N. BAUR, P. W. VITANAGE, AND L. R. K. PERERA
Institut für Geowissenschaften, Universität Mainz, P.O. Box 3980, 6500 Mainz, F. R. G.
Research School of Earth Sciences, Australian National University, G.P.O. Box 4, Canberra, Australia
Max-Planck-Institut für Chemie, P.O. Box 3060, 6500 Mainz, F.R.G.
Institute of Fundamental Studies, Kandy, Sri Lanka
Department of Geology, University of Peradeniya, Peradeniya, Sri Lanka

ABSTRACT

The high-grade gneisses of Sri Lanka display spectacular in-situ granulitization phenomena similar to those observed in southern India and of current interest for evolutionary models of the lower continental crust. The absolute ages of these rocks are poorly constrained and so, using the SHRIMP ion microprobe, we have analyzed small spots on zircons from upper amphibolite to granulite grade quartzitic and pelitic metasediments. Detrital grains from a metaquartzite of the Highland Group preserve premetamorphic U-Pb ages of between 3.17 and 2.4 Ga and indicate derivation of the sediment from an unidentified Archean source terrain. The Pb-loss patterns of these zircons and the other samples suggest severe disturbance at ca. 1100 Ma ago, which we attribute to high-grade regional metamorphism. Two pelitic gneisses contain detrital zircons with ages up to 2.04 Ga and also record an ≈1100 Ma event that is also apparent from metamorphic rims around old cores and new zircon growth. A granite intrusive into the Highland Group granulites records an emplacement age of 1000–1100 Ma as well as metamorphic disturbance some 550 Ma ago but also contains older, crustally derived xenocrysts. Zircons from a metaquartzite xenolith within the granitoid Vijayan Complex are not older than ≈ 1100 Ma; therefore the Vijayan is neither Archean in age nor acted as basement to the Highland Group, as previously proposed. We suggest that the Vijayan Complex formed significantly later than the Highland Group and that the two units were brought into contact through post-1.1 Ga thrusting. Although the granulitization phenomena in India and Sri Lanka are similar, the granulite event in Sri Lanka is not Archean in age but took place in the late Proterozoic.