Mesoproterozoic High-Grade Metamorphism in Pelitic Rocks of the Northwestern Ubendian Belt: Implication for the Extension of The Kibaran Intra-Continental Basins to Tanzania

Author(s)

Nelson Boniface
Volker Schenk
Peter Appel

Abstract

Paleoproterozoic basement rocks are thought to form the northwestern end of the Ubendian Belt in Tanzania that disappears towards the north below a Mesoproterozoic sedimentary cover. The northwestern end of the Ubendian Belt is known to constitute three litho-tectonic terranes of Katuma, Wakole and Ubende. Through dating of zircon (SHRIMP U–Pb) and monazite (U–Th–total Pb electron microprobe ages) of high-grade metasedimentary rocks of the Wakole Terrane we have detected solely Mesoproterozoic ages, showing no sign of reworking of older Paleoproterozoic basement. These findings signify that the Wakole Terrane hosts younger sediments of Mesoproterozoic times metamorphosed to high-grade *P–T* conditions (peaked at 670–680 °C/8.5–8.9 kbar).

Two distinct phases of Mesoproterozoic metamorphic events separated by 160 Ma have been dated at 1166 ± 14 Ma and 1007 ± 6 Ma (SHRIMP U–Pb zircon). Zircon ages are supported by *in-situ* dating of monazite with ages at 1170 ± 10 Ma, and 1022 ± 5–1016 ± 10 Ma. The first age is closely related to the period of S-type granitoid emplacement at about 1200 Ma in the Karagwe-Ankolean and Kibaran Belts. The second age cluster overlaps with a period of global Mesoproterozoic orogenic cycle, also recorded in the neighboring Irumide and Kibaran Belts. This age group is associated with the assembly of the hypothetical Mesoproterozoic Rodinia Supercontinent.

The recent model for the evolution of the Kibaran Belt suitably explains the spatial and temporal settings of Mesoproterozoic metasedimentary rocks of the Wakole Terrane overlying the Paleoproterozoic Ubendian Belt. Due to its proximity to the Kibaran Belt and by being bound by the Paleoproterozoic Terranes of Ubende and Katuma, it can be interpreted that the Wakole Terrane metasediments initially were deposited in an intra-continental basin that was later squeezed between these old terranes by the regional ca. 1000 Ma compressional event recorded in the Irumide, Kibaran and Karagwe-Ankolean Belts.

Keywords
Zircon;

Monazite;
Tanzania;
Ubendian Belt;
Wakole Terrane;
Mesoproterozoic