

# **THE NE KIBARAN BELT (NKB): NEW UNIFORM STRATIGRAPHIES AND GIS-COMPILED GEOLOGICAL MAP**

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## **Geological Setting**

The Mesoproterozoic Kibaran Belt s.l. of Central-Eastern Africa has often been portrayed as a continuous, c. 1500 km long orogenic belt, trending NNE to NE from Katanga (DRC) in the south up to SW Uganda in the north. Satellite imagery, however, confirms early sketch maps showing that the “belt” consists of two distinct segments, separated in the DRC by a NW-trending Karoo rift superposed on Palaeoproterozoic “Rusizian” of older references. Its extension to the SE across Lake Tanganyika corresponds to the repeatedly reactivated basement of the Palaeoproterozoic Ubendian shear belt of SW Tanzania.

For the sake of clarity, the two “segments” of the Kibaran Belt s.l. are referred to as 1) the Kibaran Belt s.s. (Katanga Province of DRC, with the Kibara Mountains type-area) and 2) the Northeastern Kibaran Belt (NKB), discussed in this paper. It comprises Rwanda, Burundi, SW Uganda, NW Tanzania and part of DRC Kivu Province – redefined from Tack et al. (1994), who did not include the Kivu part.

## **GIS-compilation of the NKB**

A GIS compilation covering roughly 7 square degrees (Rwanda, Burundi, SW Uganda and NW Tanzania) of 1:250.000 geological maps has been conducted for the NKB. The DRC Kivu Province, with only a relatively obsolete 1:2.000.000 geological map (1974) is less well constrained geologically and stratigraphically, and could not be included in the GIS.

The geological limits on available maps were digitised, as were a number of structural features (faults, lineaments). Limits between units were not changed, but their stratigraphic position was adapted according to the revised lithostratigraphic tables.

Satellite imagery (TM5 Landsat, JERS radar), digital elevation modelling (DEM) and recently available geophysical data (aeromagnetism, gravity and gamma-ray spectrometry) were added to the compilation as extra information layers.

## **Subdivision of the NKB in structural domains**

Tack et al. (1994) introduced for the NKB the notions of: 1) a Western Domain (WD), built

up of deformed metasediments and metavolcanics that are intruded by widespread c. 1375 Ma S-type granitoids with subordinate mafic rocks and by c. 970 Ma tin-granites and accompanying mineralisations; in SW Rwanda, the WD is underlain by Palaeoproterozoic basement; 2) an Eastern Domain (ED) with relatively undisturbed to subhorizontal (meta)sedimentary sequences overlying the Archaean Tanzania Craton, and 3) a Boundary Zone (BZ), which contains and is flanked by the Kabanga-Musongati (KM) 1370 Ma mafic and ultramafic layered complexes.

This NKB subdivision is strongly supported by the geophysical data of the GIS compilation.

### **Summary of previously proposed lithostratigraphic concepts in the NKB**

The NKB in Rwanda, Burundi, DRC Kivu Province, NW Tanzania and SW Uganda has been mapped in different stages, by different authors, at different periods and in different (sub)regions. This, together with the monotonous character of the successions, general lack of distinctive marker horizons, overprinting metamorphism, folding and faulting, and the fact that the successions of the NKB span several countries, severely limited correlation attempts across the region, hence its confusing stratigraphic terminologies.

A 1984 (Cahen et al.) stratigraphic correlation attempt throughout the Kibaran Belt s.l. refers respectively to 1) a Kibaran Supergroup in Shaba (Katanga) for the Kibaran Belt s.s.; 2) a Burundian Supergroup in NE Rwanda (and also in DRC Kivu); 3) a Burundian Supergroup in east Burundi; and 4) a Karagwe-Ankolean Supergroup in Tanzania (and Uganda).

Baudet et al. (1989), paying attention to the depositional environment encountered within each tectonostratigraphic unit of Rwanda, defined the Rwanda Supergroup.

Lithologically, the (meta)sediments of the NKB consist mainly of monotonous siliciclastic shallow-water deposits (pelite and arenite sequences). Lateral and vertical facies changes are frequent and may be extreme, varying from starved basins to proximal turbiditic environments, shallow siliciclastic flats and/or deltaic zones. Carbonate rocks are scarce and restricted to lenticular deposits.

### **Definition of new uniform stratigraphies for the NKB domains**

No regionally accepted lithostratigraphy for the (meta)sedimentary successions of the NKB existed until now. Moreover, the prevailing national and local lithostratigraphies did not take into account the concept of the distinct structural domains in the NKB.

A belt-wide synthetic lithostratigraphy, taking into account this WD / ED concept and using the best available and constrained (litho)stratigraphical information is defined here below.

For the Western Domain (Rwanda, W. Burundi, SW Uganda) we used the detailed formal

Rwanda Supergroup lithostratigraphy as a guideline to correlate along-strike the less documented (litho)stratigraphic tables of the other countries. In this way, an updated, revised and uniform lithostratigraphy is created for the WD and the Rwanda Supergroup can be redefined as the “**Akanyaru Supergroup**” (*the “Akanyaru” river forms part of the boundary between Rwanda and Burundi*). This Supergroup consists of the 4 previously defined groups, respectively (from bottom to top) the Gikoro, Pindura, Cyohoha and Rugezi Groups.

Likewise, a similar exercise was performed for the Eastern Domain (E. Burundi, NW Tanzania, SW Uganda) using the well-documented units in eastern Burundi and, from there, expanded along-strike throughout NW Tanzania and SW Uganda. This completely redefines the lithostratigraphy of this region, introducing an entirely new “**Kagera Supergroup**” (*Kagera is the name for the administrative district in Tanzania covering the considered region*). A significant result here is that the new lithostratigraphy includes the “Bukoba Sandstone”, “Kavumwe” and “Nkoma” units, previously considered as Neoproterozoic.

In this new “**Kagera Supergroup**” of the ED, two separate, though adjacent (sub)basins, marked by a structural discontinuity, have to be taken into consideration. As a result, depending upon their relative (palaeogeographic) position, two lithostratigraphic columns must be envisaged here: 1) to the west the former “Lower Burundian” and Nkoma groups redefined as the “**Muyaga and overlying Ruvubu Groups**” and 2) to the east the “Bukoba Sandstone” and “Kavumwe” groups, redefined together as the “**Bukoba Group**”.

Intercorrelations between these three distinct lithostratigraphies are not possible because each of them applies only to a particular structural domain of the NKB, respectively the entire WD, and the western ED and eastern ED subdomains.

The new lithostratigraphies indicate that distinct sedimentary sequences have been deposited in individual (sub)basins under different conditions, each of them accompanied by volcanic events. Moreover, they show that the sedimentary (sub)basins of the WD and ED evolved differently, presumably because of different rheologies of their pre-Mesoproterozoic basement, i.e. the Archaean Tanzania Craton under the ED, as opposed to a Palaeoproterozoic “Rusizian Belt” under the WD.