The Proterozoic Kibaran Belt in central Africa: intracratonic 1375 Ma emplacement of a LIP

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The Kibaran Belt is often portrayed as a 1500 km long continuous orogenic belt, trending NE from Katanga (Democratic Republic of Congo, DRC) to SW Uganda. The "belt", however, consists of two segments, separated in the DRC by a Palaeoproterozoic (Rusizian) basement rise in continuity with the Ubendian shear belt further south. We define the two segments on either side of the rise as the "Kibaran Belt s.s." (including the Kibara Mountains type area) and the "Northeastern Kibaran Belt (NKB)". Two contrasting geodynamic models for the "Kibaran Belt s.l." (comprising the two segments) have been proposed: an intraplate extensional setting with bimodal magmatism and compressional event(s) versus a protracted convergent setting along an active continental margin.

Previous attempts at reconstructing the history of the belt s.l. relied on a few zircon ages and lots of Rb-Sr or K-Ar data. We obtained fourteen new zircon U-Pb SHRIMP ages (magmatic and detrital) and new 40Ar/39Ar and laser ablation zircon Hf data. Our constraints are in agreement with the recent isotopic data for magmatism and lithostratigraphy of the belt s.s., and support a 1250 Ma long history for the belt s.l. marked by only a few prominent events. Our data show that since 1.78 Ga, repeated reactivation of the Ubendian-Rusizian basement rise, controls volcano-sedimentary basin development. Peak basin infill (intermittent subsiding shallow-water deposits and bimodal volcanism) shifts from the E (Eburnean molasse at 1.78 Ga) to the W (Neoproterozoic Itombwe Supergroup, including a tillite). Extension culminates at 1375-1380 Ma with the intracratonic emplacement of a LIP (Large Igneous Province) related to activity of a mantle thermal anomaly located in SE Burundi and giving rise to coeval bimodal magmatism (350 km long Kabanga-Musongati alignment of (ultra)mafic layered complexes and S-type granitoids with subordinate mafic rocks).

At 1.0 Ga a first compressional event results in the morpho-structural shaping of the Kibaran Belt s.l. as a far-field effect of collisional events in the Irumide Belt further south. Post-compressional relaxation gave rise to the emplacement of the "post-Kibaran" Sn-Nb/Ta-W metallogenic province. Due to the indentor palaeomorphology of the Archaean Tanzania Craton, a new compressional event affects the southern NKB as a far-field effect of the 550 Ma East African Orogen, including folding of the Itombwe Syncline, isotopic resetting and post-compressional 530 Ma emplacement of late Pan African Au mineralisation. This far-field effect is lacking in the Kibaran Belt s.s. and the Neoproterozoic evolution of the two segments of the Kibaran Belt s.l. is thus different.