Fluid- and deformation-induced Pan-African overprint in the Western Domain of the Karagwe-Ankole Belt (Central Africa)

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Combined step-heating Ar-Ar and in-situ LA-ICP-QMS Rb-Sr phyllosilicate geochronology was carried out on samples from the Gatumba-Gitarama area (West Rwanda) to investigate the deformation timing in the Western Domain of the Mesoproterozoic Karagwe-Ankole Belt and to compare this timing to the proposed tectonic evolution in the Eastern Domain [deformation at 1326 ± 10 Ma; Ar-Ar muscovite; 1].

Muscovite samples (n = 6) from the Western Domain show remarkably young Rb-Sr ages, ranging from Early to Late Neoproterozoic (901 – 589 Ma). The regional temperature during the Neoproterozoic was 540 °C, which partly overlaps with $T_{c,Sr,musc}$ and most likely explains the Rb-Sr muscovite age range observed. The youngest ages clearly reflect a deformational and possibly metasomatic influence during the Late Neoproterozoic, as indicated by muscovite growth along crenulation cleavage in muscovite schist (619 ± 71 Ma) and sericitization (589 ± 94 Ma).

Biotite samples have a Late Neoproterozoic – Cambrian age (625 – 494 Ma). Remarkably, biotite Ar-Ar ages (625 – 567 Ma, n = 2) are significantly older than biotite Rb-Sr ages (530 – 494 Ma, n = 4), even within the same sample. Partial resetting of the K-Ar and Rb-Sr isotope systems due to Pan-African deformation and hydrothermal circulation has been recognized in muscovite of the Karagwe-Ankole Belt [e.g. 2, 3]. This probably is also the case for biotite. Detailed investigation of the Rb-Sr, as well as the Ar-Ar isotopic data, indicates that the age difference could be a consequence of saline, alkali-rich fluids present in the Western Domain [cfr. 4]. This fluid induced isotopic resetting of the Rb-Sr system in biotite while the K-Ar systematics were left largely undisturbed.

[1] Koegelenberg et al. (2015) *Precambrian Res.* **269**, 147-161. [2] Dewaele et al. (2011) *J. Afr. Earth. Sci.* **61**, 10 – 26. [3] Fernandez-Alonso et al. (2012) *Precambrian Res.* **216-219**, 63-86. [4] Prochaska et al. (1992) *J. Afr. Earth. Sci.* **14**, 499 – 509.