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The Steilrandberg of Namibia: relict or reentrant?

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During the assembly of Gondwana, three cratonic blocks came together in the region that is now northern Namibia. These blocks were the Congo craton, the Kalahari craton, and the Rio de la Plata craton, which is now largely on the South American continent [1]. Remnants of the deformation that resulted from collisional processes that brought these cratons together can be found in the NNW oriented Kaoko belt and the ENE oriented Damara belt. About 250 kilometers north of the Damara belt the E-W oriented Steilrandberg exposes a folded sequence of Nosib and Otavi group rocks orthogonal to, and east of the highly folded and sheared Kaoko belt that runs along the northern coast of Namibia. We propose that this Steilrandberg deformation is part of a reentrant along the SW Congo craton margin. At the eastern end of the Steilrandberg, fold structures bend to the south and then wrap back to an east-west orientation again (Fig. 1). The middle section of this large U-shaped structure consists of north-south oriented, tight, upright folds. Several east-west striking shear zones in the Steilrandberg show evidence of left-lateral strike-slip offset, consistent with east-directed transport of the central part of the proposed reentrant structure. Detrital zircon geochronology supports a Congo craton provenance for Steilrandberg units and units of the same stratigraphic age in the Kaoko belt [2].

The NNW-oriented Kaoko belt to the west exposes tight upright folds and steeply dipping mylonite zones with largely sinistral displacement (ref.). This deformation has been attributed to the transpressional deformation following collision of the Rio de la Plata craton. Goscombe et al. [3] describe the Kaoko belt has a “half-flower structure” with east vergent thrusts to the east of the major



mylonite zones that were active between 580 and 550 Ma. An embayed Congo margin could have been responsible for the development of fold structures whose axes parallel the dominant transport direction of thrusts in this transpressional margin. Alternatively the Steilrandberg orientation could be a relict from a pre-Kaoko north-south compressional event, however evidence for pre-580Ma folding has not been recognized in the Congo margin strata of this age in the immediately adjacent part of the Kaoko belt.

Figure 1: Google Earth image of Steilrandberg

region

Dashed lines represent faults and proposed fault locations.

The open arrow represents transport direction within possible reentrant.

References:

[1] Porada, H (1979) *Tectonophysics* 57:237-265

[2] Dehler, C et al. (2016) 35th IGC:this volume

[3] Goscombe, B et al. (2003) *Journal of Structural Geology* 25: 1049-1081

