

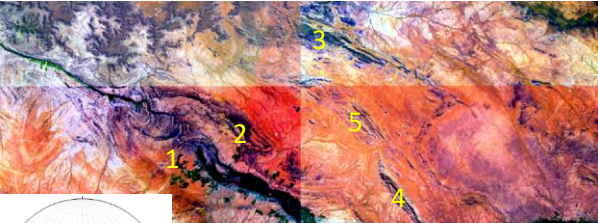
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Structural analysis of the Riemvasmaak Mega Sheath Fold (RKMS) situated in the Grünau Terrane of the Namaqua-Mobile Belt

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Mobile belts of the Earth are comprised of terranes juxtaposed to one another irrespective of the internal geological histories. Accurate delineation of terranes is challenging, because of the effects of shared geological history since assembly to the present. The Mesoproterozoic Namaqua-Natal Province is composed of severely deformed and metamorphosed tectonostratigraphic terranes bounded by major thrust and shear zones [1]. Nine out of sixteen tectonic terranes of the Namaqua-Natal metamorphic complex are distinguished with sufficient outcrop (the Aggeneys, Bladgrond, Grootdrink, Grünau, Upington, Okiep, Olifantshoek, Steinkopf and the Pofadder terranes) [2]. Mega-scale sheath folds in the granulite facies Grünau Terrane, provide insight into the ductile deformation processes that formed the Namaqua-Natal Provinces.

The RKMS contains four more macroscopic sheath folds apart from the Augrabies Sheath Fold, which consist of different ages of granites (gneiss), meta-sediments and volcanoclastic sequences. The Augrabies (1), Vaaldrift (2), Cnydas (3), Goede Hoop (4) and Central (5) Sheath Folds are bounded by one large granitic body known as the Rooipad Twee Granite-gneiss. The south-western limb of the RKMS consist of a deformed thrust fault (Waternal Thrust).

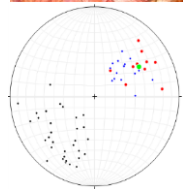


Figure 1: SPOT image of the Riemvasmaak Mega Sheath Fold. Stereonet represents the linear fabrics in the RKMS. (Red dots: major fold axes, blue dots: stretched mineral lineations, green dot: long axis of sheath fold, black dots: poles to regional foliation)

The Grünau Terrane, hosting all the sheath folds, is separated by a thrust zone (Hartebees River thrust) which forms the terrane boundary with the Bladgrond and Bushmanland terranes. This extensive thrust zone is important for an understanding of the Namaqua fold belt, because it demarcates the structural boundary along which the polymetamorphic Grünau Terrane, containing granulite facies rocks, is overthrust at <1195 Ma onto amphibolite facies terranes (Bladgrond/Bushmanland terranes [1]).

The mega sheaths have an average linear trend, defined by stretching lineations, fold axes of various fold phases and long axes of sheath folds. This north-westerly trend with north-easterly plunge reflects tectonic transport to the southwest (i.e. the Grünau Terrane overthrust onto the Bladgrond Terrane) [1]. A 3D understanding of mega-sheath folds will advance the understanding of deformation within the juxtaposed tectonic terranes.

References:

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