

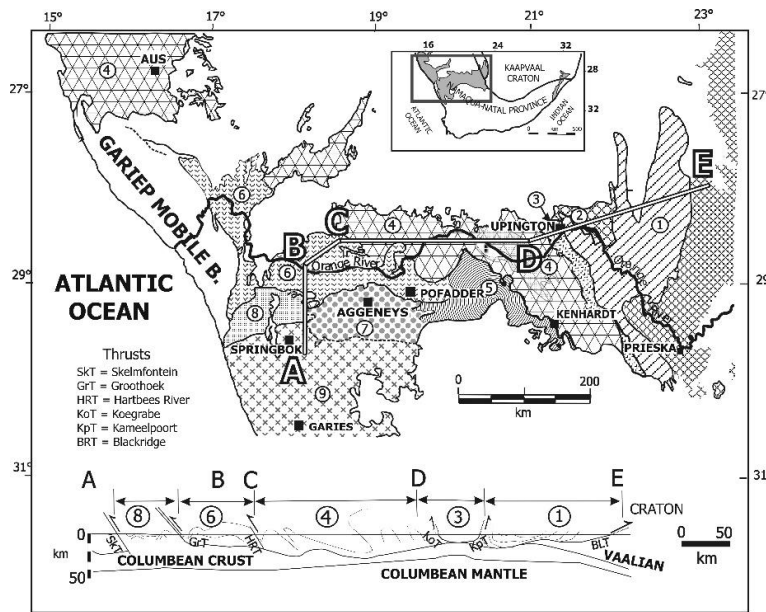
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Tectonic Tribulations of Rodinian-Columbian vintage along the western margin of the Kaapvaal Craton.

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The Kaapvaal Craton is tectonically bound to the west by crystalline and supracrustal rocks of several tectonostratigraphic terranes (Colliston et al. [1, 2]), juxtaposed during accretion of Rodinia [3]. A 20-25 km wide vergence-inversion zone (VIZ) separates craton-directed east-wards thrusting from southwest-wards tectonic transport. The NW-SE striking VIZ is characterised by prominent gravity and magnetic anomalies for more than a thousand km [1]. Formerly the linear gravity anomaly was referred to as the Namaqua Front [4]. High grade metamorphic rocks of the Upington and Grünau Terranes are overthrust onto the Archaean Kaapvaal Craton and the low grade Olifantshoek Terrane.



[1 = Olifantshoek; 3 = Upington; 4 = Grünau; 6 = Pofadder; 8 = Steinkopf]

The exposed terranes reflect crustal thickening owing to horizontal tectonics and emplacement of syntectonic granitoids at <1195 Ma [5]. During accretion at mid-crustal conditions the westerly terranes developed co-planar and co-linear tectonite fabrics of amphibolite to granulite grade. The linear fabrics and sheath fold axes reveal the SW-directed transport of the terranes. The eastern terranes trend NW and are characterised by lower metamorphic grades (greenschist) than the westerly terranes as well as by thrusts and eastwards verging recumbent macroscopic folds. This NW trend results from rotation into regional transcurrent shears, presumably

reflecting oblique collision of the Kalahari Craton with Laurentia [3] at 1018±11 to 1024±25 Ma [5].

Geophysical data [6, 7] supports a model according to which the deformation seen in outcrops represent folds and thrusts transported along a mid-crustal décollement [8]. This décollement separates crust with thin-skinned deformation from an underlying basement of Columbean age. The basement is exposed in the west as the migmatitic and granulite facies Steinkopf Terrane, and under-thrusts the Kaapvaal Craton in the east [Figure]. The Columbean age of the basement is supported by Lu-Hf isotopic compositions of zircon cores, with dates ranging from 1710 to 2069 Ma [5].

The terranes of the Namaqua-Natal mobile belt represent tectonic events associated with two ancient super-continents, Rodinia (1200-1000 Ma) and Columbia (2000-1800 Ma).

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