THE EASTERN MARGIN OF THE TANZANIAN CRATON IN THE DODOMA-MPWAPWA AREA: PRELIMINARY FINDINGS

Thomas, R.J.[1], Bushi, A.M.[2] and Mruma, A.[2]

1British Geological Survey, Keyworth, Nottingham, NG12 5GG, UK; bthomas@bgs.ac.uk
2Geological Survey of Tanzania, Dodoma, Tanzania

Keywords: Tanzanian Craton, Mpwapwa Group

A number of traverses have been undertaken across a ca. 45 km section of the north–south oriented eastern margin of the Tanzanian Craton between Dodoma and Mpwapwa, Central Tanzania. The boundary is a SE-dipping zone of high strain between about 1 and 2 km wide. The rocks of the eastern craton are uniformly composed of coarse-grained, grey, migmatised granodiorite gneisses which are heterogeneous at outcrop scale but are regionally homogeneous. The orthogneisses have no regionally consistent fabric and foliations are variably oriented at outcrop scale. However, there is a gradual increase in strain eastwards towards the edge of the craton, manifest as an increasingly strong, regionally consistent, E to SE-dipping foliation. This strain increase eventually leads to mylonitic and porphyroclastic planar fabrics and strong, uniformly SE-plunging, linear fabrics. In most structural domains planar fabrics are predominant, but these alternate with minor domains dominated by linear fabrics, with fold mullions locally developed. The kinematics of the high-strain mylonites show a consistent, top-to-the-NW (oblique) sense of movement. The frontal thrust zone grades laterally into steep sinistral and dextral oblique strike-slip shear zones to the north and south respectively. The contact is a single wide deformation zone in the northern and southern segments of the study area, with a more complex imbricate belt in the central part.

To the east, the cratonic rocks are in contact with a high-grade supracrustal succession, termed here the "Mpwapwa Group" in the light of uncertain regional correlations and unknown depositional age. They may correlate with the "Isimani Suite" and be part of the Palaeoproterozoic Usagaran Belt (Reddy *et al.*, 2003). However, this does not accord with results of Cutten *et al.*, (2006), from a locality near the study area (Mautia Hill), which gave Archaean detrital zircon ages and may thus not be part of the Usagaran Belt. The Mpwapwa Group consists of a thick sequence of semi-pelitic, two mica-kyanitegarnet schists/gneisses, quartzites, marbles and calc-silicate rocks, leucocratic pink quartzo-feldspathic gneisses and migmatites and abundant metabasic layers ± garnet. There appears to be an east–west zonation of the Mpwapwa Group lithological units, with most of the quartzites, calcareous rocks and pelitic schists/gneisses tending to occur close to the craton margin, with semi-pelitic gneiss/migmatite to the east, along with interlayered bimodal repetitions of acid quartzo-feldspathic leucogneisses and mafic gneisses (amphibolite, garnet amphibolite).

Mineral assemblages, as evidenced by garnet-kyanite in pelitic rocks and garnet-clinopyroxene in some metabasites suggest metamorphism under moderate to high pressure amphibolite facies, as might be expected at the base of a thrust stack and resulting crustal thickening. Possibly, therefore, the Mpwapwa Group was deposited in a rifted margin setting at the edge of the Tanzanian Craton, with shallow marine environments at the immediate continental margin and bimodal volcanic rocks more distally. During collision orogeny (East African Orogeny?), thrusting took place at this rifted margin, inverted the Mpwapwa Group basin and transported the supracrustal rocks over the craton margin, an event which telescoped, but did not obliterate the original depositional zonation. The group may thus be viewed as a parauthochthonous succession. The rocks were intruded by plutons of largely unfoliated biotite granite, two-pyroxene charnockite and tonalite, the ages of which are unknown (Neoproterozoic?). With the above hypothesis and uncertainties in mind, a suite of samples are undergoing U-Pb zircon dating in order to constrain the timing of these events.

References

Cutten, H., Johnson, S.P. and De Waele, B. 2006. *J. Geology*, 114, 683–698.

Reddy, S.M., Collins, A.S. and Mruma, A. 2003. *Tectonophysics*. 375, 101–123.