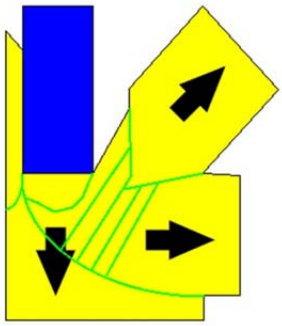
Geological Society of Zimbabwe, Annual Summer Symposium
Murewa, Zimbabwe, 26 November 2016

Field Excursion Guide
Field trip to the western margin of the Murehwa Batholith, Zimbabwe



Excursion Leader

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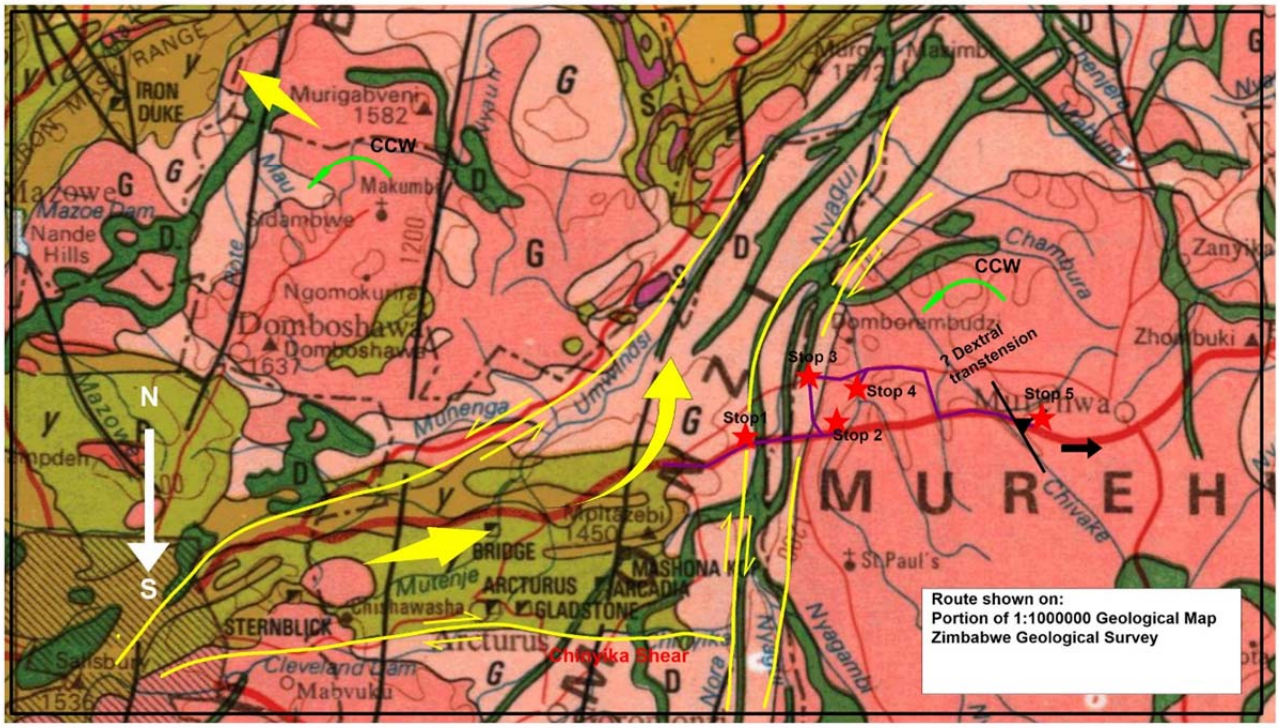


Fig 1. Inset of Route Map

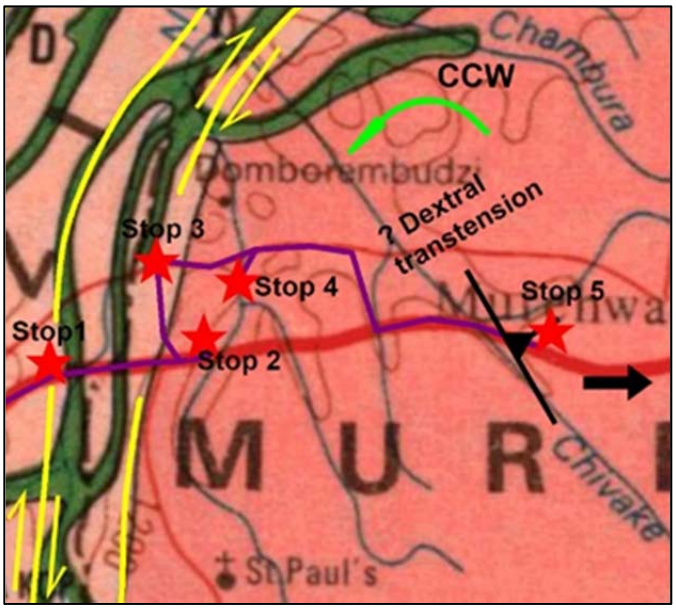
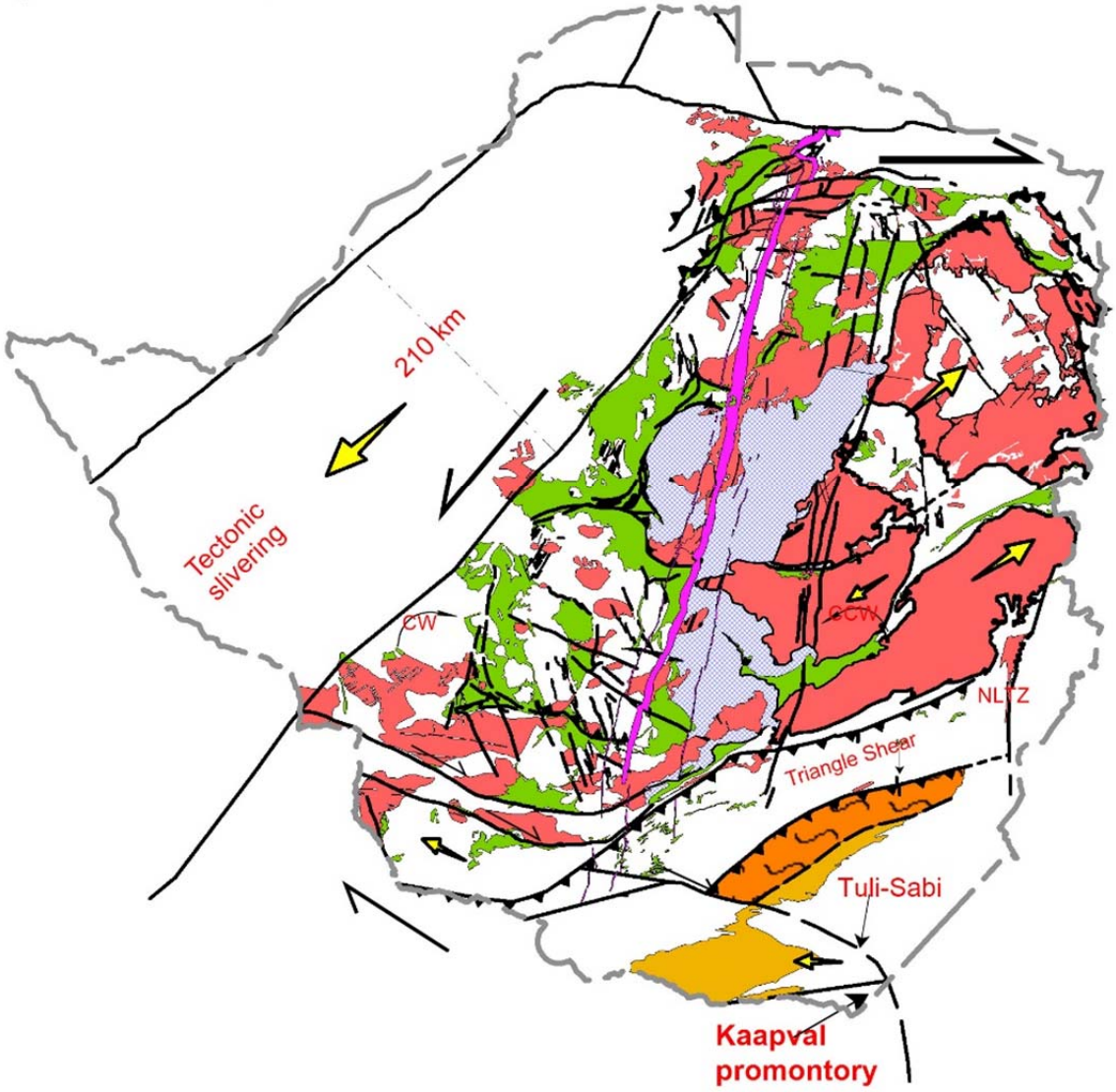


Fig 2. Tectonic domains of the Zimbabwe Craton as supported by analogue modelling predicting Great Dyke fracture, new Tuli-Sabi Fault and western domains.



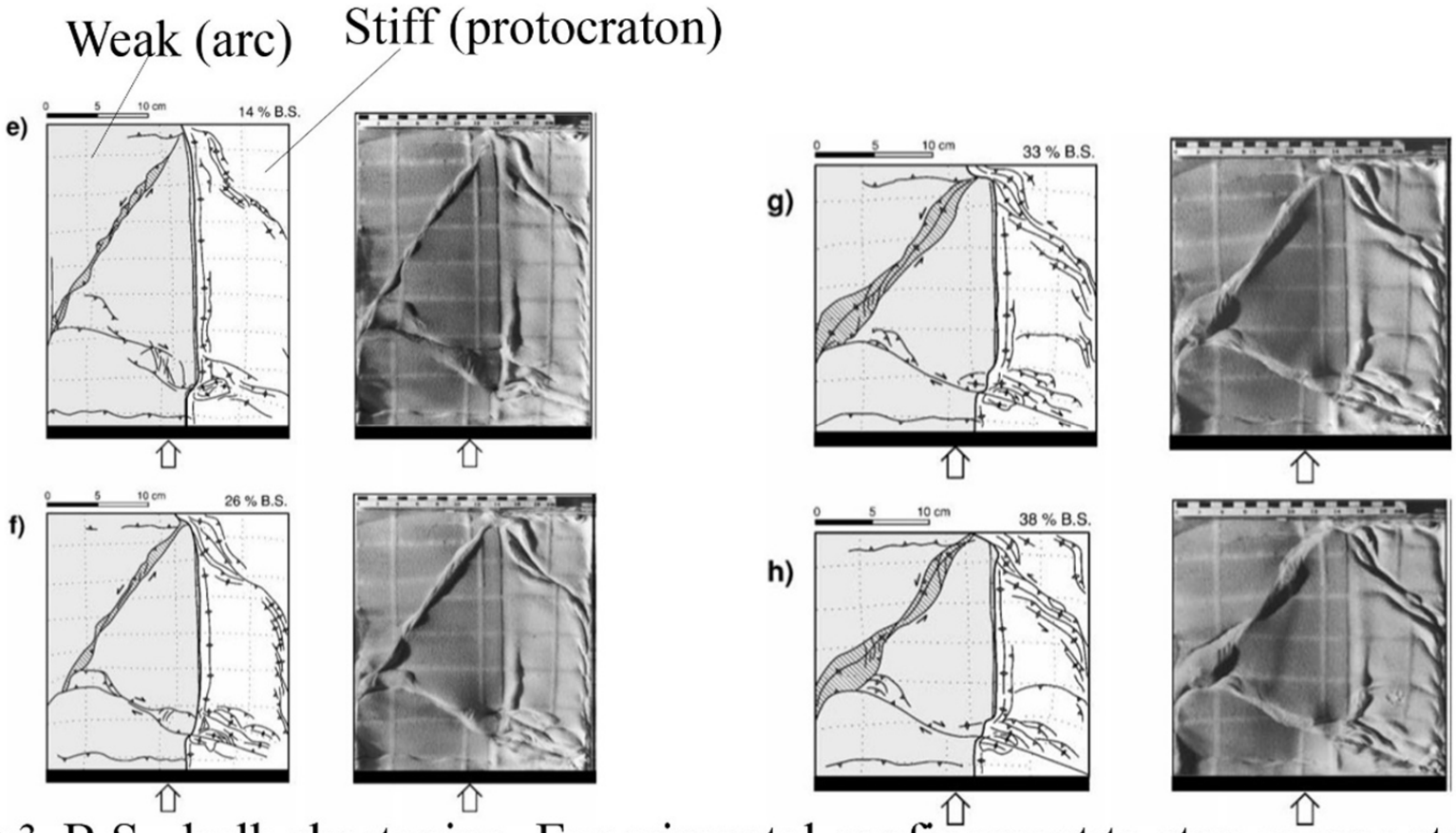


Fig 3. B.S - bulk shortening, Experimental confinement to stop escape structures.

Field trip to the western margin of the Murehwa Batholith

Theme: Discuss models of Chilimanzi granite emplacement emphasizing regional tectonic controls featuring transtensional tectonic controls versus traditional vertical tectonics (ballooning or diapirism). Regional Chilimanzi plutons east of the Great Dyke show distinct younging directions towards ENE or NNE that has not yet been explained, including peculiar fanned-shapes reminiscent of tectonic escape structures under a form of constrictional flow (Fig 2). Note that the Arcturus greenstone belt is wedge-shaped eastwards and bounded by sinistral Umwindisi and dextral Chinyika shear zones, hence escaped east to rotationally NE under N-S regional shortening (Fig 1). Bekker (2000) uses the same shortening direction in the regional controls that were active during emplacement NW of a loppolithic late-phase of the porphyritic late-phase of the Chinamora batholith.

Is the emplacement of the Murehwa batholith along its western margin via a process of tectonic extrusion similar to the proposed emplacement of granulite fold nappe of the Northern Marginal Zone? This requires thrust-sense in the footwall and normal-sense shear in the hangingwall (Blenkinsop and Kirsters, 1995).

Field Stops

Stop 1. Structural footwall of the Murehwa Batholith in sheared gneisses, near 17. 675108^{0}S, 31.513091^{0}E, west of Nyagui River.

Outcrop within 200metres of the main road to Murehwa show banded and foliated gneisses cut by predominantly dextral shears with easterly moderate dips (45^0). The shear zone trend(s) and shear sense are both anomalous in terms of the intraplate strike-slip model of Treloar and Blenkinsop (1995) whereby shears with NE-trend are sinistral and ESE-trending are dextral. In other words, such dextral shears are inconsistent with a simplistic NNW-SSE regional compression linked to the Limpopo orogeny. What are the alternatives? Transcurrent shearing within the structural footwall of the intrusive 2600Ma Murehwa Batholith may be part of a dextral transtension that this field trip discusses after stop 5.

Stop 2. Magmatic thin-layering near 17.665179^{0}S, 31.577922^{0}E

Hill outcrop presenting a variety of syn-magmatic and solid-state foliations including magmatic layering. What is the orientation of K-feldspar megacrysts and its relevance?

Is such a massive granite made up of cm-scale thin layers?

Stop 3. View of Domborembudzi, near 17.6333104^{0}S, 31.561183^{0}E

Postcard view of Domborembudzi whaleback from the north end.

Stop 4. Similar to Stop 2, but showing evidence of mafic or dioritic cognate xenoliths whose elongation is parallel to orientation of syn-magmatic K-feldspar megacrsyts. Time-permitting, we can visit outcrops of ultramylonites within Chilimanzi granite contact to the north of this stop. (LUNCH)

Stop 5. Tonalitic grey gneisses internal to the batholith, near 17.663735^{0}S, 31.708539^{0}E

The roadcutting exposes an oblique section of complex tonalitic gneisses showing sub-horizontal attitudes and porphyroclastic-style shear sense indicators for apparent normal-sense shear (east-down kinematics). Is this permissive evidence for constructing a 20km cross-section linking Stop 1 to Stop 5 and implying a NW-directed extrusion of this margin of the Murehwa batholith?