

STRUCTURE AND METAMORPHISM OF DAMARAN ROCKS IN THE UGAB PROFILE

Progress Report for 1982/83

by

I.W. Hälbich and E.E. Freyer

Geology Department
University of Stellenbosch
Stellenbosch 7600

1. FIELD WORK

Structural data and samples were collected over a 70 km stretch from the Brandberg westwards up to the confluence of the Gembok River with the Ugab River.

Fresh outcrops very near the coast have revealed a suite of cataclastic rocks that is of granitic origin and in which recrystallisation of low grade outlasted the cataclastic episode. The relationship of these rocks to the main rocks in the profile has yet to be determined.

2. RESULTS AND INTERPRETATION TO DATE

2.1 Structures

1. That the regional structure across the profile is an anticlinorium is brought out by structure as well as stratigraphy. NNE-trending F_1 folds associated with a co-axial s_1 schistosity are the dominant structures. Three domains can be recognised.

The western one is characterised by more open asymmetric F_1 folds verging west. The cleavage is not axial planar but superimposed with a small angle to the shallower eastward-dipping normal limb. Anisopach folding (with oblique flattening) is the result.

The central domain consists of open, upright and symmetrical F_1 folds with an axial planar s_1 . The fold intensity is similar to that in the west.

The eastern sector has tight, nearly upright F_1 folds in which the cleavage s_1 again is not axial planar.

The superposition of the cleavage east and west of the central sector can be explained by rotation relative to the active force direction before cleavage was imparted.

2. An s_2 cleavage has developed in the western and central domains. It is a NNE-trending near vertical crenulation structure that is still co-axial with B_1 and s_1 .

3. North of the Ugab River a set of chevrons (macro-folds) and kinks (micro-folds) has developed. Their axial planes and cleavages s_3 strike NE to ENE and always dip nearly vertical. Interference of these younger structures with those pre-existing ones that were formed during F_1 has occurred in places. To the south of the river the younger structures are on a micro-scale only.

Kinematic analysis indicates that the F_3 structures are the result of NW-SE directed shortening probably related to the deformation in the NW-SE trending coastal branch of the Damara orogen.

3. METAMORPHISM

M_1 - Greenschist facies (albite, biotite, muscovite, quartz) is syntectonic with F_1 . Micas are very fine.

M_2 - Second biotite blastesis, syn- to late-tectonic with s_2 . Micas are larger.

M_3 - Third biotite blastesis, post-dating even s_3 . Micas are largest.

X - Cordierite-garnet blastesis locally in the western domain - not yet definitely correlated.

Y - A possible sillimanite blastesis with retro-grade effects in the extreme east.

Z - A static? low-grade metamorphism post-dating the cataclastic movements in the far west. Not yet correlated with the main phases.