Geophysical Research Abstracts, Vol. 5, 01610, 2003


# LATE ARCHAEAN PLATE TECTONICS: THE WITWATERSRAND BASIN, SOUTH AFRICA

**O. Catuneanu**

University of Alberta (octavian@ualberta.ca)

The Witwatersrand Basin is part of a retroarc foreland system formed during the Late Archaean in response to crustal thickening along the northern margin of the Kaapvaal Craton. This foreland system is partitioned into foredeep, forebulge, and back-bulge flexural provinces. The preserved sedimentary fill occupies the region of the flexural foredeep, and displays a typical transition from underfilled (deep and shallow marine) to overfilled (fluvial and alluvial fan) phases. Loading in the Witwatersrand thrust belt took place in relation to the oblique convergence of two compressional stress fields. As a result, the foredeep is restricted along the strike to a distance of $<$ 400 km. The forebulge is constrained at the intersection between the areas of influence of the two stress fields, with the apex outlined by the gravity line of -130 mgal. The back-bulge region of the foreland system is superimposed on the divergent continental margin of the Kaapvaal Craton, and hosts the Mozaan Group of the Pongola sequence. The Mozaan and Witwatersrand successions are correlative and display in-phase stratigraphies, as being part of the same foreland system; the gap between their areas of occurrence may be related to the uplift and erosion in the forebulge region. The forebulge migrated a relatively short distance down dip (i.e., $<$ 100 km), causing the erosion and wedging out of the underlying Dominion Group. This erosional surface displays all the diagnostic features of a basal (forebulge) unconformity, with an increasing stratigraphic gap towards the foreland, and a correlative conformity in the more proximal parts of the basin. The Witwatersrand foreland system formed on a newly cratonized continental lithosphere, which gave the basin a small flexural wavelength (i.e., ˜ 490 km from the center of orogenic loading to the axis of the back-bulge) relative to most Phanerozoic counterparts. The forebulge unconformity may be associated with a lack of dynamic loading, which could indicate a steep angle of subduction and/or low subduction rates.