

Distribution of Turbidites and Deltaic Facies in the Underfilled Karoo Basin: A Model for Foreland Sedimentation

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Third-order sequence stratigraphic analysis of the Early Permian marine to continental facies of the Karoo Basin provides a case study for the sedimentation patterns which may develop in an underfilled foreland system that is controlled by a combination of supra- and sublithospheric loads. The tectonic regime during the accumulation of the studied section was dominated by the flexural rebound of the foreland system in response to orogenic quiescence in the Cape Fold Belt, which resulted in foredeep uplift and forebulge subsidence. Coupled with flexural tectonics, additional accommodation was created by dynamic loading related to the process of subduction underneath the basin. The long-wavelength dynamic loading led to the subsidence of the peripheral bulge below base-level, which allowed for sediment accumulation across the entire foreland system.

A succession of five basinwide Regressive Systems Tracts accumulated during the Artinskian (~ 5 My), consisting of foredeep submarine fans and correlative forebulge deltas. The progradation of submarine fans and deltaic systems was controlled by coeval forced and normal regressions of the proximal and distal shorelines of the Ecca interior seaway respectively (Fig. 1). The deposition of each Regressive Systems Tract was terminated by basinwide transgressive episodes, that may be related to periodic increases in the rates of long-wavelength dynamic subsidence (Fig. 2).

Figure 1: System dominated by flexural tectonics

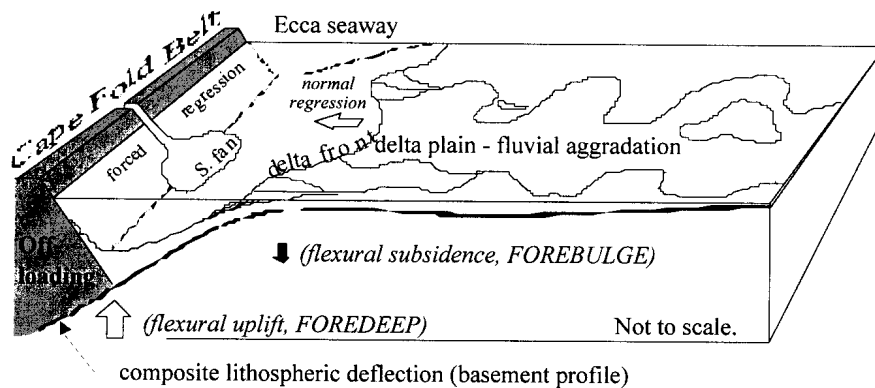
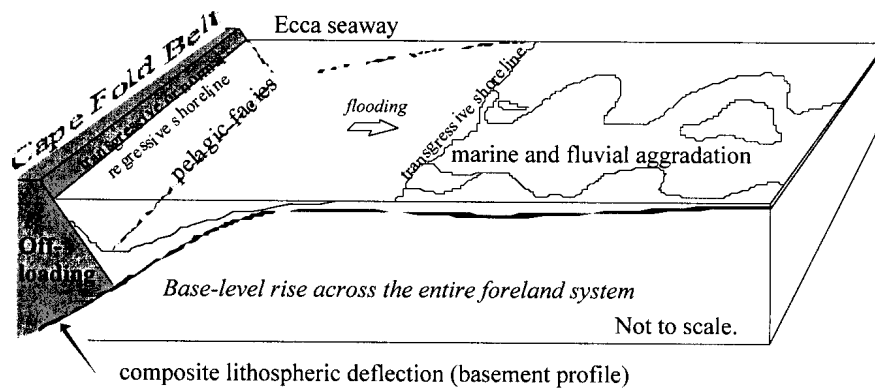


Figure 2: System dominated by long-wavelength base-level rise



Cape Fold Belt
 pre-Vryheid Karoo sequences