Paper Number: 4679

The Beaufort-Stormberg contact in the main Karoo Basin – the most important unconformity surface for understanding the basin's development

Hancox, P.J.[1], Rubidge, B.S.[2]

[1]University of the Witwatersrand, School of Geosciences and Evolutionary Studies Institute, Private Bag 3, 2050 Wits, South Africa; jhancox@cciconline.com
[2]University of the Witwatersrand, School of Geosciences and Evolutionary Studies Institute, Private Bag 3, 2050 Wits, South Africa.

Strata of the main Karoo Basin of South Africa represent a semi-continuous fill, spanning the Late Carboniferous to Lower Jurassic. Within this fill the contact between the Beaufort and Stormberg groups represents the temporally largest unconformity. This hiatal surface has been proposed to range from 10 Ma in the south of the basin, to 50 Ma in the north, and to represent the entire Middle Triassic.

Understanding the changing character of this surface throughout the Karoo Basin is vital to understanding basinal development during the Triassic, and any model that tries to explain the formation of the Karoo Basin has to take cognisance of the nature of this unconformity.

In the past two decades fieldwork in the Burgersdorp and Molteno formations has added vastly to our knowledge of the spatial and temporal nature of the contact. In particular, biostratigraphic refinement of the Burgersdorp Formation shows there to be three temporally distinct faunas within the formation. A Middle Triassic (Anisian) aged fauna in the upper Burgersdorp Formation manifests that the contact in the south represents only the latest Middle Triassic (Ladinian), such that here its magnitude is far less than previously assumed. Palaeontological evidence from the northern Burgersdorp Formation shows that here the contact represents the entire Middle Triassic, a period of at least 10 Ma.

Coupled with detailed mapping of the spatial range of the Bamboesberg Member of the Molteno Formation, this work demonstrates that the unconformity at the base of the Molteno is regional in extent and highly diachronous in nature. The recognition of such regional unconformities is important as they are indicative of significant base level changes, which may be driven by a variety of different mechanisms. The nature of the Beaufort-Stormberg unconformity, its regional extent with distal merging, its diachronous nature, and the overall basinal setting favour a tectonic control to this unconformity.