

Paper Number: 5347

South Africa's Triassic–Jurassic sauropodomorph fauna: phylogenetic fit to stratigraphy, evolutionary rates, and the biased appearance of characters in time

Choiniere, J.N.^{1,2,3,4}, McPhee, B.W.^{1,2,3} and Chapelle, K.E.J.^{1,2,3}

¹University of the Witwatersrand, Evolutionary Studies Institute, Private Bag 3, Wits 2050, Johannesburg, South Africa, Jonah.choiniere@wits.ac.za

²DST/NRF Centre of Excellence in Palaeosciences

³School of Geosciences, University of the Witwatersrand

⁴American Museum of Natural History, New York, NY, USA

South Africa's Triassic–Jurassic Elliot Formation contains the one of the world's richest fossil records of basal sauropodomorph dinosaurs [1-3]. Recent research by our working group and others has revised the taxonomy, phylogeny, and biostratigraphy of this palaeofauna, giving us a rigorous framework with which to test evolutionary hypotheses [3-7]. Using the Manhattan Stratigraphic Measure [8] and other phylogenetic methods, we assess how changes in Elliot Formation sauropodomorph biostratigraphy affect our understanding of ghost lineages within the clade. Using model-based approaches, we examine how our revised biostratigraphic data and taxonomic assessments affect our inferences about the rate of sauropodomorph evolution. Finally, using phylogenetic data matrices and biostratigraphic data, we examine how distributions of character-states change over time throughout the Elliot sauropodomorph fauna. Our results show that fine-scale biostratigraphy, coupled with accurate taxonomy and systematics, can help us understand the evolutionary dynamics of a group in deep time.

1. Kitching JW and Raath MA (1984) *Pal afr* 25: 111–125
2. Olsen PE and Galton PM (1984) *Pal afr* 25: 87–110.
3. McPhee BW et al (2015) *Sci Rep* 5(13224): 1–12.
4. McPhee BW et al (2015) *JVP* 36(5): e980504.
5. McPhee BW et al (2014) *Zool J Linn Soc* 171: 151–205.
6. Yates, AM (2008) *Pal afr* 43: 39–43.
7. Yates AM et al (2011) *JVP* 31: 610–625.
8. Norell, MA in Novacek MD and Wheeler QD Ed 1992, Columbia University Press, New York: 88–118.

