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Bruce S. Rubidge; Douglas H. Erwin; Jahandar Ramezani; Samuel A. Bowring; William J. de Klerk

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## Abstract

Therapsid and other tetrapod fossils from the South African Karoo Supergroup provide the most detailed and best studied terrestrial vertebrate record of the Middle and Late Permian. The resulting biostratigraphic scheme has global applicability. Establishing a temporal framework for these faunas has proven difficult: magnetostratigraphy has been hampered by a Jurassic overprint, and intercorrelation with Permian marine sequences has been equivocal. Here we report U-Pb zircon isotope dilution–thermal ionization mass spectrometry (ID-TIMS) dates for five volcanic ashes interbedded with fossils from the *Pristerognathus*, *Tropidostoma*, and *Cistecephalus* vertebrate biozones of the Beaufort Group. This temporal framework allows correlation to marine zonations and improves understanding of rates of faunal evolution and patterns of basin evolution. Our results identify no correlative vertebrate extinctions in the Karoo Supergroup to the marine end-Guadalupian mass extinction and raise the question of whether there is any record of a terrestrial extinction related to the Emeishan large igneous province.

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