

Paper Number: 3867

## A Refined Magnetic Polarity Stratigraphy and Paleomagnetic Pole for Upper Permian and Lower Triassic Strata Deposited Across the End-Permian Extinction Event, West Texas (USA)

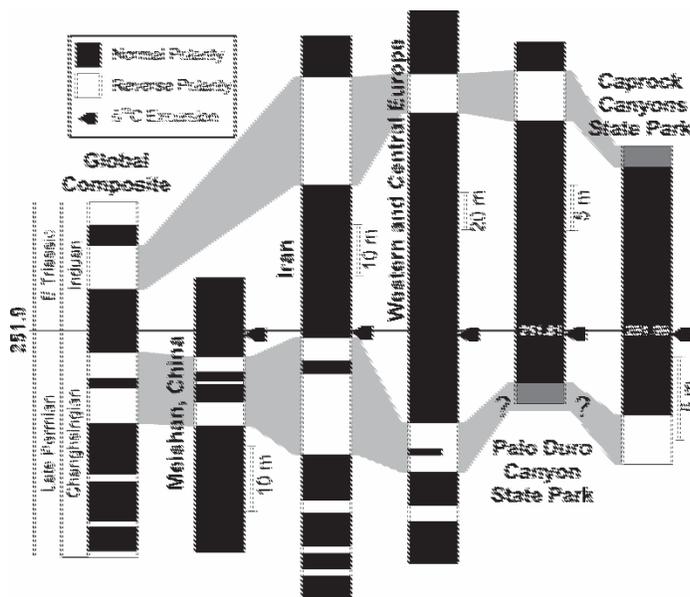
Jackson, J.<sup>1,3</sup>, Geissman, J.<sup>1</sup>, Tabor, N.<sup>2</sup>

<sup>1</sup>Dept. of Geosciences, University of Texas at Dallas, Richardson, TX, 75080, USA, geissman@utdallas.edu

<sup>2</sup>Huffington Dept. of Earth Sciences, Southern Methodist University, Dallas, TX, 75275, USA

<sup>3</sup>ExxonMobil Houston Campus, The Woodlands, Spring, TX, 77389

The exact stratigraphic position of the end-Permian extinction, which is considered to be the most severe biologic crisis of the Phanerozoic, is typically ambiguously located in the relatively few preserved terrestrial sequences deposited across the time interval of the Permian-Triassic boundary. We present a composite magnetostratigraphic record from red beds and related rocks exposed in West Texas that, together with previously published U-Pb zircon age data, demonstrates the end-Permian extinction interval to be preserved in the Whitehorse Group to Quartermaster Formation sedimentary succession representing western subequatorial Pangea. The uppermost Whitehorse Group is dominated by massive bedded gypsum and hematitic mudstones grading to hematite cemented mudstone/siltstone and fine- to medium-grained sandstones of the Quartermaster Formation. The composite polarity sequence includes a reverse polarity magnetozone in Whitehorse Group bedded gypsum followed by a normal polarity magnetozone, which includes key zircon-bearing ash deposits yielding age determinations that are statistically indistinguishable from the inferred age of the Permian-Triassic boundary, followed by a reverse polarity magnetozone that we interpret to be Early Triassic (Induan) in Quartermaster Formation strata. The ancient remanence is carried by a mixture of both detrital and authigenic hematite, based on laboratory unblocking temperatures, isothermal remanent magnetism (IRM) curves, and response to chemical demagnetization. However, detrital magnetite in Quartermaster strata carries a relatively young magnetization that is usually randomized by alternating field demagnetization to 100



mT. An in situ section mean direction based on data from each horizon sampled is  $D=340.0^\circ$   $I=16.0^\circ$   $k=21.18$   $\alpha_{95}=5.8^\circ$   $n=30$  site (bed) mean directions, and this yields a grand mean paleomagnetic pole for the latest Permian/earliest Triassic located at  $pLat=+58^\circ N$ ,  $pLon=117^\circ E$ ,  $n=30$ ,  $A_{95}=5.8^\circ$ . When corrected for inclination shallowing using a flattening factor of  $f=0.59$ , the pole shifts to  $pLat=+62^\circ N$ ,  $pLon=123^\circ E$ ,  $n=30$ ,

$A_{95}=5.8^{\circ}$ . We interpret these results to document an essentially continuous sedimentary record across the Permian-Triassic boundary in the continental strata of west Texas. The R-N-R-N polarity sequence for uppermost Whitehorse and lower Quartermaster formations is interpreted to correlate with the polarity time scale for the Changhsingian stage to Induan stage. As previously documented, the global negative  $\delta^{13}\text{C}$  isotope excursion reported in both marine and terrestrial strata is located within the lower normal polarity zone of the West Texas succession.

*Figure 1: Summary of magnetic polarity stratigraphy data from West Texas compared with the Global Composite and other Permian/Triassic sections. Inferred age of the Permian/Triassic Boundary (251.9 Ma) from [1].*

*References:*

[1] Burgess S D et al. (2014) Proc National Acad Sci 111: 3316-3321

