U-Pb zircon ages from the southwestern Karoo Basin, South Africa—Implications for the Permian-Triassic boundary: COMMENT

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Fildani et al. (2009) proved the Permian and Triassic age of the Ecca Group. However, the claim of proving “the first evidence of a marine Permian-Triassic (P-T) boundary in the Karoo Basin” (Fildani et al., 2009, p. 719) is doubtful.

Fildani et al. referred repeatedly to the Ecca Group in the southwestern part of the Karoo foreland basin as “marine.” However, marine fossils are known only near the base, suggesting fresh or brackish water for the rest of the time (McLachlan, 1973; McLachlan and Anderson, 1973; Visser, 1989). Many authors have interpreted much of the southern and southwestern Ecca Group as lacustrine (Lake Karoo of Higgs, 2008), based on paleontological and/or geochemical evidence (Marchant, 1978; Kingsley, 1981; Visser, 1989; Veevers et al., 1994; Faure and Cole, 1999; Bradly and Briggs, 2002). A modern analog proposed by Tankard et al. (1982) for part of the Ecca Group is the Black Sea, whose salinity varied from fresh to brackish during late Quaternary time due to variable eustatic overtopping of the Bosphorus sill (Aksu et al., 2002). The deposits of such “sea-level lakes” (Golding, 1978) can contain thin (centimeter to decimeter) marine bands, reflecting extreme eustatic highs, while lowstands are characterized by fresh water (Higgs, 1991).

One of the formations sampled by Fildani et al., the Skoorsteenberg, is popular as an outcrop analog for deep-sea-turbidite petroleum reservoirs, with profound economic implications (Higgs, 2009). The Skoorsteenberg deep-sea-fan model (after Bouma and Wickens, 1991) was accepted by Fildani et al., despite the lack of reported marine fossils, and despite their own Late Permian age coinciding with the lowest long-term eustatic sea level of Phanerozoic time (Miller et al., 2005; Haq and Schutter, 2005). The deposits of such basins are interpreted as fresh and brackish (Archer and Maples, 1984; Pemberton et al., 2001). Regardless, thin marine bands would be unsurprising in the Skoorsteenberg Formation, representing exceptional eustatic highs. The known Skoorsteenberg ichnofauna differs significantly from the conventional marine shelf (Cruciana), slope (Zoophycos), and basin plain (Netrites) ichnofacies. Two elements (Gordia, Helminthopsis) are typical of the (fresh) lacustrine Merinia ichnofacies (Buatoo and Mángano, 1995); others will surely be discovered.

REFERENCES CITED


