

Paleozoic echinoderm hangovers: Waking up in the Triassic

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We thank Blake (2017) for his Comment on our paper (Thuy et al., 2017), giving us the opportunity to further explain why we think *Migmaster* is a Paleozoic survivor.

The Paleozoic affinities of *Migmaster* were first suggested by Blake et al. (2006), who identified an axillary ossicle in the holotype, a character only found in Paleozoic asteroids, so his comments represent a surprising change of opinion.

Dan Blake has argued in his Comment (Blake, 2017) on our paper and elsewhere (e.g., Blake and Hagdorn, 2003) that Triassic asteroids are basically similar to modern forms, and can be placed in the same orders (e.g., *Trichasteropsis* in the Forcipulatida), and in some cases the same families (e.g., Poraniidae). This argument has been refuted in detail in a monograph on evolution of the asteroid skeleton (Gale, 2011) and a later study on the evolution of the mouth frame across the Paleozoic-Mesozoic transition (Gale, 2015). *Migmaster* has close affinities with Permian asteroids, which include the presence of interradial actinal ossicles, running from the interradial inferomarginal to the mouth frame (e.g., *Monaster clarkei*; see Gale, 2015 his figure 1G; Blake et al., 2006) not seen in any other post-Paleozoic asteroid. Additionally, the adambulacra are strikingly similar in detailed morphology to those found in taxa

from the Permian of Western Australia (Kesling, 1969). We are aware of convergent morphologies in Paleozoic and post-Paleozoic asteroids, but do not think that this is the case in *Migmaster*.

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