



Meiofaunal bioturbation in the late Ediacaran: occurrence and modern analogues

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The Ediacaran—Cambrian boundary is defined by the appearance of the complex trace fossils. A large diversity of ichnotaxa are now known from late Ediacaran strata globally, and typically record simple movement traces of macroscopic metazoans. Recent discoveries of coeval and older meiofaunal traces have the potential to revolutionise not only our understanding of the evolution of the earliest animals, but also of the development of the mixed layer and its influence on early animal evolution and preservation.

We here report wide stratigraphic occurrence of meiofaunal (<0.5mm wide) trace fossils from the Urusis Formation of southern Namibia. These traces are restricted to fine-grained siliciclastic horizons, and vary in length from a few millimetres to a few centimetres. They are typically undulose, recording simple horizontal movement traces, but some traces branch. Density varies from single trace occurrences on a bed to densely bioturbated horizons, occasionally co-occurring with larger traces. Experimental aquaria containing simple ecdysozoans, lophotrochozoans and agglutinating foraminifera test potential modern analogues for the meiofaunal traces, providing critical insight into the diversity and likely behavioural complexity of microscopic trace makers in the late Ediacaran.