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Non-destructive microtomography of Early Triassic vertebrate coprolites from South Africa.

Content

Fossilised faeces, known as coprolites, contain exceptional palaeobiological information. They provide direct information on the diet, feeding behaviours, trophic relationships, parasitism, and digestive systems of extinct organisms. Moreover, because they can selectively preserve the remains of tiny prey items, like arthropods and microvertebrates, they address specific taphonomic deficiencies in the fossil record. Surprisingly, coprolites remain understudied, despite their potential utility in reconstructing ancient ecosystems. Additionally, classical destructive means of investigating coprolites permanently lose critical information. We will provide a preliminary report, based on non-destructive microtomography (micro-CT), on the contents of approximately 40 coprolites from a fossiliferous Early Triassic locality on the farm Driefontein 11 in Free State, South Africa. Fish remains, mostly scales, teeth and unidentified skeletal fragments are the most common inclusions found in the coprolites. Other significant inclusions include bivalve molluscs, marking the second documented occurrence of freshwater bivalves of any kind from the Early Triassic. Terrestrial vertebrate remains, notably jaws and other postcranial fragments, are sporadically present. These coprolites represent the leavings of vertebrates inhabiting terrestrial and freshwater ecosystems that developed in the wake of the end Permian mass extinction. They are therefore a key component of understanding how trophic networks respond to biodiversity crises.

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