

Unusual environmental conditions preserve a Permian mesosaur-bearing Konservat-Lagerstätte from Uruguay

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The environmental characterization of the Lower Permian mesosaur-bearing strata of the Mangrullo Formation (Paraná Basin, northeastern Uruguay) has been controversial. Historically, marine conditions were suggested for this unit, despite the absence of any normal marine fossils. More recently, some authors have argued for freshwater to brackish settings, inferring fluctuating environmental conditions, which would have generated abrupt changes in the composition of the communities. Mesosaurs are the only tetrapods found in this unit, and they colonized the basin at the time of highest isolation, and apparently increased salinity, coincident with a gradual global rise in aridity. An assemblage of extremely low diversity (the “mesosaur community”) developed, with mesosaur reptiles, pygocephalomorph crustaceans, and the vermiform producers of the trace fossil *Chondrites* as the dominant components. This community may have existed under temporary hypersaline, lagoon-like conditions, as suggested by ecological, anatomical and physiological attributes of its member taxa. This interpretation is supported by sedimentological and mineralogical features of the enclosing rocks, also seen in the correlative Brazilian Iratí and South African Whitehill formations. In the Uruguayan deposits, as well as in their Brazilian correlatives, relatively close volcanic events affected the basin. This particular environment, where bottom waters were depleted of oxygen and hypersaline, retarded decay of the carcasses, and precluded the development of bioturbating organism, and together with bacterial sealing, favoured exquisite preservation of the fossils, including soft tissues. This leads us to consider the fossil-bearing strata of the Mangrullo Formation as a Konservat-Lagerstätte, the oldest known for South America.

Key words: Mesosauridae, Pygocephalomorpha, hypersaline environments, "mesosaur community", Konservat-Lagerstätte, Mangrullo Formation, Lower Permian, Uruguay.

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