DOES THE MOENKOPI/CHINLE CONTACT REPRESENT A 10MY DEPOSITIONAL HIATUS ON THE COLORADO PLATEAU?

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The Moenkopi Formation of the Colorado plateau is considered to be entirely of Lower Triassic age, based on poorly constrained fossil data. The overlying Shinarump Conglomerate is assigned to the Upper Triassic on the basis of its abundant Upper Triassic (Carnian) fossils. The contact between the two has been described as an unconformity of ten to more than fifteen million years.

We have examined the contact between the two deposits at most outcrops in southern and central Utah and northern Arizona during a regional study of the Moenkopi Formation. Across much of this area the Shinarump-Moenkopi contact appears to be conformable. We traced individual beds of the uppermost sandy siltstones and mudstones immediately below the contact for over 50 km. In many outcrops there is little evidence of erosion. In places load casts and flute casts can be seen at the contact, indicating that the upper Moenkopi was water saturated and unconsolidated at the time of Shinarump deposition. In some areas a 2-3 cm bed of white siltstone in contact with the Shinarump represents the uppermost bed of the Moenkopi formation. This bed, traceable over a km along outcrop in some places, indicates a general absence of erosion during the interval of exposure. In central and eastern Utah, and occasionally elsewhere, tens of meters of post-Moenkopi erosion occurred prior to or accompanying Shinarump deposition. The erosion appears to have affected the sediments prior to lithification as indicated by the erosional margins and the lack of Moenkopi clasts in the Shinarump fill.

The general absence of erosion of the unlithified uppermost Moenkopi formation over widespread areas is inconsistent with prolonged exposure between final deposition of Moenkopi sediments and initiation of Chinle deposition. A scenario which would involve several million years of non-deposition (and thus erosion) seems unlikely. Based upon extensive field observations, and the absence of fossil evidence to the contrary, we are proposing, as has been suggested by others, that Moenkopi deposition extended well into the Middle Triassic, perhaps until just prior to onset of Shinarump deposition. This proposal would greatly shorten the interval of the Tr-3 unconformity in the southern Utah region and may have implications for its duration elsewhere.