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THE COLORADO PLATEAU CORING PROJECT: THE TIMESCALE AND TEMPO OF BIOTIC CHANGE OF THE EARLY MESOZOIC

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The proposed Colorado Plateau Coring Project (CPCP) is an interdisciplinary, multi-institutional coring project designed to recover continuous core through mostly continental strata spanning ~100 million years of the Triassic and Jurassic. Its principal purpose is to tie the incredibly rich faunas, floras, and environmental record of this interval to a rigorously developed timescale and thus to biotic, environmental, and tectonic events at a global-scale. The overall strategy involves 3 long cores (~1000 m) and 2 shorter cores (300-500 m) intended to recover the full expression of the critical early Mesozoic transitions in clear superposition. The cores would span from the base of the Moenkopi to the top of the Morrison formations with sufficient overlap to splice the sections together without gaps and assess lateral facies variations, thickness changes, and stratigraphic completeness. The initial phase of the CPCP, currently under review, is a ~500 m core at Petrified Forest National Park (PFNP) that will recover virtually the entire pre-Owl Rock Mb. of the Late Triassic age Chinle and underlying Early-Middle Triassic age Moenkopi formations. Despite excellent outcrop and a long and distinguished history of study, striking ambiguities exist in local correlation, the temporal duration and resolution of biotic events, global correlations, and the paleolatitudinal position of the region that prevent tests of major competing climatic, biotic, and tectonic hypotheses of global significance. For example, correlations of existing paleomagnetic polarity data for the Chinle of PFNP (1) with the Newark basin astronomically tuned geomagnetic polarity timescale are consistent with new U-Pb dates from reworked volcanics in the Chinle, and result in three sets of implied hypotheses. First, most or all of the Chinle Fm. is Norian and younger in age (< ~ 220 Ma). Second, the supposed Carnian-Norian boundary in the Chinle is actually a late middle Norian extinction that may coincide with the 215.5 Ma Manicouagan impact (2). Third, tetrapod faunas of tropical Pangea (i.e., Colorado Plateau) were radically different than those from contemporary higher latitudes despite the apparent geographic contiguity. These hypotheses cannot be directly tested, however, because the outcrop data are fraught with numerous intrinsic ambiguities. Unambiguous testing of these ideas requires continuous coring, which promises to fundamentally change the certainty and specificity of addressing questions relating the rich surface record from the Chinle and Moenkopi to Earth system processes. 1, Steiner, M., Lucas, S.G., J.G.R. B, 105(11):25791; 2, Ramezani, J. et al., 2005, Geochim. Cosmochim. Acta 69(10):321 Suppl.