

Supplementary material to “Site Selected for Colorado Plateau Coring”

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A workshop was convened in May, 2009, in Albuquerque, New Mexico, to plan for the Colorado Plateau Coring Project (CPCP) and identify the target site for initial coring. The giant continental and near-shore to shallow marine epicontinental basins of the American southwest are particularly well exposed on the Colorado Plateau and its environs and contain a rich record of early Mesozoic strata (Fig. S1). This time period was punctuated by two major mass extinctions and is notable by the evolutionary appearance of the modern biota, and apparent dramatic climate changes (Figs. S1b, S1c).

Classic studies of these basins, their strata, and their fossils have made this sequence instrumental in framing our context for the early Mesozoic world. Ambiguities in temporal resolution, uncertainties in global correlations with other early Mesozoic strata, and major doubts about latitudinal position still hamper testing of competing climatic, biotic, and tectonic models for the evolution of western Pangea. A scientific drilling experiment is essential as the most continuous sections in outcrop are either inaccessible in vertical cliffs or are weathered and geochemically altered, making observations and sampling at the appropriate level of detail impossible. Characteristic shallow bedding attitudes and facies changes also compromise the ability to determine superposition in sections compiled over long distances.

Thirty seven researchers from nine countries participated in the CPCP workshop and focused discussion on the initial phase of a coring plan for the American Southwest. In a previous (2007) workshop, participants identified five major stratigraphic packages on and near the Colorado Plateau as key coring targets (Fig. S1c): Early to Middle Triassic Moenkopi Formation, Late Triassic Chinle Group, latest Triassic to ca. Middle Jurassic Glen Canyon Group, Middle to ca. Late Jurassic San Rafael Group, and the Late Jurassic Morrison Formation. These targets involve three long (~1 km) cores and two shorter cores designed to recover the critical early Mesozoic

transitions. The Triassic section (Moenkopi Formation and Chinle Group) at Petrified Forest National Park, northern Arizona, was identified in the 2009 meeting as the initial target for coring (Figs. S1b, S1c). The Petrified Forest core, about 460 m in length and HQ gauge (~6.4 cm diameter), will provide a robust reference section where geochronologic, magnetostratigraphic, environmental, and paleontologic information can be registered to a common thickness and unambiguous superposition of observations. Several levels in this section of Triassic strata have recently yielded high-precision U-Pb zircon dates; these and further age dates will provide an age-calibrated chronostratigraphic framework to link data from numerous outcrop studies and address questions concerning early Mesozoic biotic and environmental change. We anticipate that drilling would commence in Fall, 2010. The core will be logged on site and then shipped to a core slabbing service facility, with ultimate storage at the Rutgers University Core Repository.

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Related Link:

Colorado Plateau Coring Project (CPCP)–Workshops

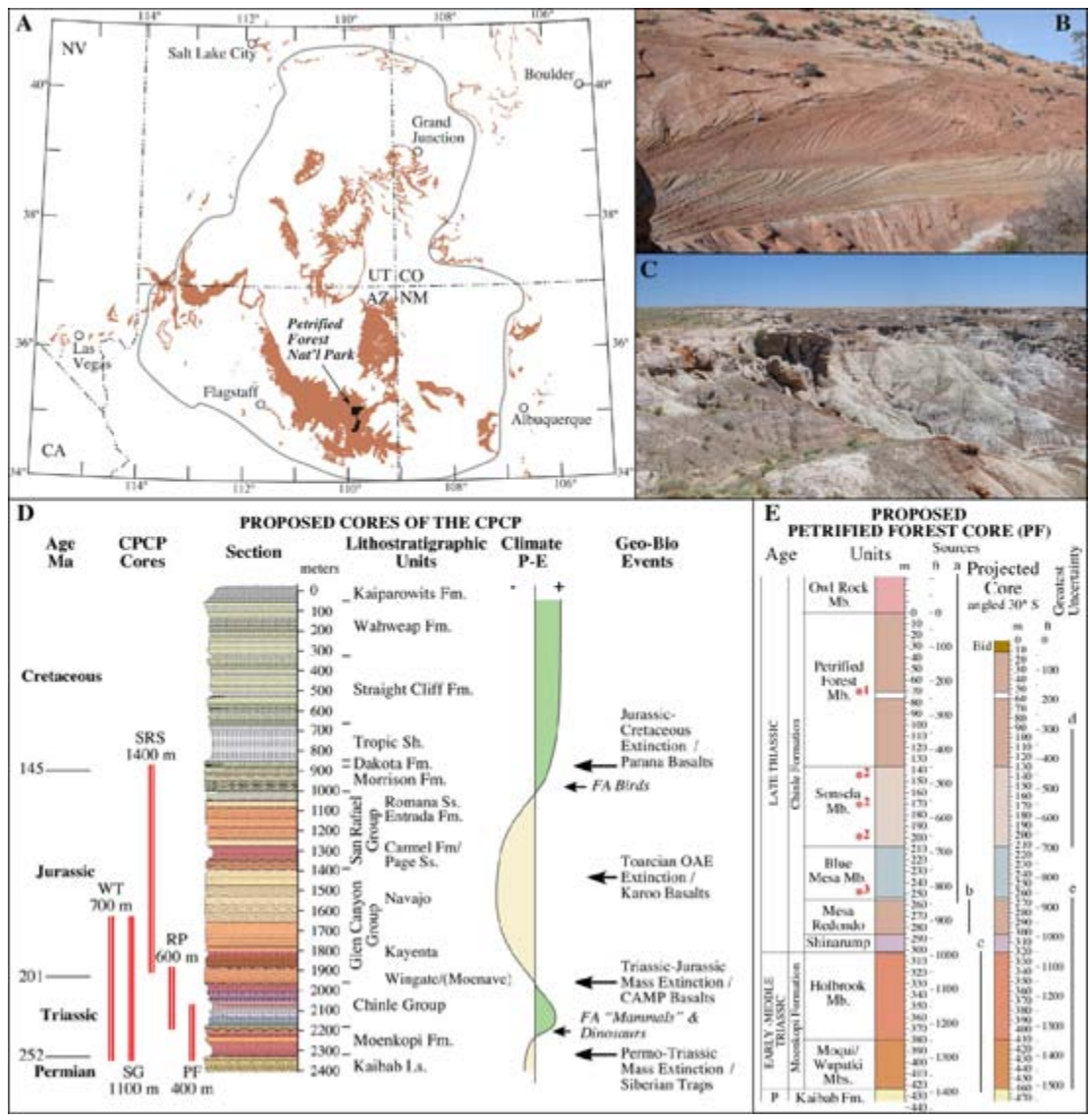


Figure S1. Colorado Plateau Coring Project. **A**, Distribution of the Chinle Formation in the Colorado Plateau area showing the position of the Petrified Forest National Park (black indicates park boundary before recent expansion). Limit of the Colorado Plateau shown by gray line. **B**, Dunes of the Jurassic Navajo Formation, the largest desert sand sea known in Zion National Park. **C**, Largely gray, fluvial clastic strata of the Triassic Chinle Formation containing large amounts of plant remains including abundant silicified trees and organically preserved foliage at Blue Mesa, Petrified Forest National Park. **D**, generalized Colorado Plateau section (Glen Canyon/Kaiparowits Plateau, based on http://jan.ucc.nau.edu/~rcb7/Glen_Can.jpg) with the cored sections recommended by the CPCP workshop participants, a generalized evaporation–precipitation (E-P) curve loosely based on climate sensitive facies, and major globally important events. Core areas are: PF, Petrified Forest, Arizona; RP, Rock Point, Utah; SG, St. George, Utah; WT, Wards Terrace, Arizona; SRS, San Rafael Swell, Utah. **E**, proposed Petrified Forest core interval showing Triassic section present in the Park and section to be cored in core

coordinates (based on a 30° inclined core hole. Labels are: a, outcrop information; b and c, interpretation by subsurface information from the water well records; d, uncertainty in correlating from the south to the north end of the park; e, uncertainty due to total lack of outcrop of units within PFNP. Bid is an abbreviation for the Miocene-Pliocene Bidahochi Fm. comprised of lacustrine muds and basalts. Red asterisks indicate known datable layers within Park: 1, Black Forest reworked ash bed; 2, at least three datable reworked ashes within the Sonsela Mb, 3, datable ash at base of Blue Mesa Mb.