PP53A-1098: Understanding Late Triassic low latitude terrestrial ecosystems: new insights from the Colorado Plateau Coring Project (CPCP)

Friday, 15 December 2017
13:40 - 18:00
New Orleans Ernest N. Morial Convention Center - Poster Hall D-F

The Chinle Formation of southwestern North America is a key paleontological archive of low paleolatitude non-marine ecosystems that existed during the Late Triassic hothouse world. These strata were deposited at ~5-15°N latitude, and preserve extensive plant, invertebrate, and vertebrate fossil assemblages, including early dinosaurs; these organisms lived in an unpredictably fluctuating semi-arid to arid environment with very high atmospheric pCO_2. Despite this well-studied fossil record, a full understanding of these ecosystems and their integration with other fossil assemblages globally has been hindered by a poor understanding of the Chinle Formation's age, duration, and sedimentation rates.

Recently, the CPCP recovered a 520m continuous core through this formation from the northern portion of Petrified Forest National Park (PEFO) in northern Arizona, USA. This core has provided a plethora of new radioisotopic and magnetostratigraphic data from fresh, unweathered samples in unambiguous stratigraphic superposition. These constraints confirm that virtually all fossil-bearing horizons in Chinle outcrops in the vicinity of PEFO are Norian in age. Furthermore, they indicate that the palynomorph zone II and Adamanian vertebrate biozone are at least six million years long, whereas the overlying palynomorph zone III and Revueltian vertebrate biozone persisted for at least five million years, with the boundary between 216-214 Ma. This confirms that the rich late Adamanian-early Revueltian vertebrate fossil assemblages, where dinosaurs are exclusively rare, small-bodied carnivorous theropods, are contemporaneous with higher latitude assemblages in Europe, South America, and Africa where large-bodied herbivorous sauropodomorph dinosaurs are common. The age constraints also confirm that several palynomorph biostratigraphic ranges in the Chinle Formation differ from those of the same taxa in eastern North American (Newark Supergroup) and Europe. These data are consistent with the hypothesis that latitudinal differences in climate sorted the biota found across Pangaea during the Late Triassic Period.

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