Regular Poster Session IV (Saturday, November 15, 2025, 4:30 - 6:30 PM)

A synoptic view of life and death in the Newark Basin—new perspectives from the ETE and beyond

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The end-Triassic mass extinction (ETE, 202 Ma) was pivotal in shaping the tropical communities of the earliest Jurassic, establishing a macrofaunal regime dominated by large dinosaurs that would last for over 130 million years. The emplacement of the Central Atlantic Magmatic Province (CAMP) triggered the extinction, creating hostile environmental conditions on a global scale. Although significant attention has been paid to the effects of rising CO_2 at the extinction event, the fossil record of terrestrial tropical communities exhibits a cold-forced extinction record. Allometric analysis of the theropod footprint record from a key site after the terrestrial extinction but before the emplacement of extrusive flows in the Newark Basin reveals that three previously distinct ichnotaxa are most parsimoniously interpreted as an ontogenetic series from one species exhibiting near perfect isometry, suggesting that the apparent allometry of other early Mesozoic brontozoiid tracks is a consequence of evolutionary allometry in different taxa as opposed to more traditional ontogenetic allometry. This is discernable because of the exceptionally low diversity at this site, as opposed to the younger, more diverse, Connecticut Valley type assemblages. Further study in the basin has also revealed that the smaller members of the faunal community had begun to take on a decidedly modern aspect, with traces that resemble those of modern saurians, as well as suggesting the Late Triassic origin of the crown group mammals. Additionally, a concurrent paleo-floral turnover demonstrates that the equatorward spread of previously temperate and subarctic plants adapted to colder conditions followed the observed extinction of prominent tropical forms. The effects of CAMP scale volcanic emissions on global climate are difficult to model because they are orders of magnitude larger than anything directly observed. But, they had the potential to dump enormous amounts of sulfur aerosols into the upper atmosphere, leading to protracted millennial-scale episodes of pulsed volcanic winters that could overwhelm the volcanic CO_2 global warming, perhaps causing transient polar glaciation with a concomitant dramatic sea-level decrease. Put simply, the environmental stresses induced by the albedo-increasing effects of sulfur aerosols from the CAMP caused the extinction of non-cold-adapted fauna, allowing the dinosaurs, mammals, and small burrowing groups to survive.

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