PP53A-1104: A brief exegesis of End Triassic Extinction issues

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13:40 - 18:00
New Orleans Ernest N. Morial Convention Center - Poster Hall D-F

Recent reports of environmental proxy records through the end-Triassic extinction (ETE), in some cases coupled with high-resolution geochronologic data, provide new insights into cause and effect. For example, the emplacement of vast volumes of basalt in the Central Atlantic Magmatic Province (CAMP) are temporally associated with carbon isotopic excursions (CIEs), indications of widespread oceanic euxinia, distinct regional and perhaps very abrupt global sea level change, massive changes in atmospheric CO_2, and the proliferation of “disaster” species, both on land and ocean. In the least, these indicate major disruptions in how the Earth works.

However some striking and critical issues remain unresolved at a very basic level. Most important are the uncertainties in the stratigraphic relationships of marine extinctions to the various environmental proxy sections, particularly the GSSP for the base Hettangian in Austria, and the UK sections (notably St. Audrie’s Bay). Here, the sequence of sporomorph and marine “invertebrate” turnover occurs in different order relative to the proxy record and lithostratigraphy. Thus the sequence of environmental events are, at present, of uncertain relationship to the extinction. Second, it is unclear what processes the various CIEs reflect in different environments; the canonical initial isotopic excursion in the UK, demonstrably correlatable over a huge area, was recorded in a lake in a restricted basin, unlike the isotopic data from surrounding marine strata. Could some CIEs in non-marine basins be diagenetic in nature, caused by the contact effects of overlying basalts? Finally, how does the clear and dramatic tropical non-marine record of the ETE, precisely located relative to the CAMP, relate to the marine record of the ETE, particularly at higher latitudes, where continental biotic turnover is not nearly as dramatic? Do these records correlate in a sufficiently tight temporal interval such that causation can be inferred?

These issues can be resolved by: 1) finding biologically-independent proxies of time, such as the magnetic polarity chron E23r in the marine and high latitude realms; and 2) appropriately designed resampling efforts in the marine sections to determine the position and magnitude of the ETE.

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