

**THE END-TRIASSIC EXTINCTION (ETE) EVENT IN MOROCCO: AN OVERVIEW.** Mohammed Et-Touhami<sup>1</sup>, Paul E. Olsen<sup>2</sup>, Jessica H. Whiteside<sup>3</sup>, Dennis V. Kent<sup>2,4</sup>, and Sarah J. Fowell<sup>5</sup>, <sup>1</sup>Département des Sciences de la Terre, Université Mohamed Premier 60,000 Oujda, Morocco (mohammed\_et\_touhami@yahoo.com), <sup>2</sup>Lamont-Doherty Earth Observatory, Palisades, New York 10968 USA, <sup>3</sup>Department of Geological Sciences, Brown University, 324 Brook Street, Box 1846, Providence RI 02912, <sup>4</sup>Department of Geological Sciences, Rutgers University, Piscataway, New Jersey 08554 USA., <sup>5</sup>Department of Geology and Geophysics, University of Alaska Fairbanks, Fairbanks, AK 99775, USA.

The Triassic-Jurassic (Tr-J) boundary marks one of the most severe Phanerozoic mass extinctions. With a turnover of at least 50% of continental biodiversity [1,2], the event set the ecological stage for the ascent of dinosaur-dominated ecosystems.

In Morocco, Late Triassic-Early Jurassic predominately continental red beds formed during the Triassic/Jurassic rifting of Pangea crop out over large portions in the northern part of the country, comprising several sedimentary basins now partly dismembered by the subsequent Alpine orogeny. These basins have facies broadly similar to the Fundy basin (Nova Scotia, Canada) but also show some similarities to the Triassic age sequences of the Newark basin (New Jersey, USA) [3]. Both eastern North America and Moroccan basins recorded the ETE and the plausibly causally related eruptions of the Central Atlantic Magmatic Province (CAMP) [4,5]. Outcrops of strata just below CAMP lavas in the Fundy basin and all of the Moroccan basins comprise a very distinctive suite of thin red, gray and black mudstones, which are generally palyniferous (barring local metamorphism from the basalt) [4,5]. In the subsurface of several Moroccan basins, this suite gives way to thick salt sequence with an order of magnitude higher accumulation rates [6]. In these settings the Triassic-Jurassic boundary is entirely within bedded halite and potash salts (e.g. Khemisset basin) [6,7].

Fundy sporomorphs indicate a floral extinction event occurred just prior to the eruption of the basal CAMP [8], associated with locally abundant ferns and fern spores and floral extinctions continued into the time of the initial CAMP eruptions [9]. This floral extinction event, previously identified as the Triassic-Jurassic boundary is within ~100 ky of the initial marine ETE [10, 11]. However, the new GSSP for the base Jurassic is now defined by the FAD of the ammonite *Psiloceras spelae* [12], well above the ETE. Because the ETE itself has yet to be found below the CAMP in Morocco [13] it is plausible that eruptions were synchronous with its initiation. Other observations including chondritic PGE anomaly [14], a "fern spike," a stomata density (CO<sub>2</sub>) anomaly, and a pair of negative d<sup>13</sup>C<sub>org</sub> excursions separated by a positive excursion have been interpreted as condign

with extraterrestrial impact [15]. The Rochechouart impact (SW France) which apparently predates the extinctions by a few thousand years, has been hypothesized by some of us as a possible contributing factor to the ETE [14].

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