A TRANSIENT "40 KYR" WORLD DURING THE TRIASSIC-JURASSIC TRANSITION BASED ON A NEW X-RAY FLUORESCENCE (XRF) ELEMENTAL ASTROCHRONOLOGY *(Invited)*

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A new chronology for the continental end-Triassic mass extinction (ETE) and Triassic-Jurassic transition has been developed from continuous XRF elemental scans (1) of Newark and Hartford rift basin cores. Based on multiple methods of timeseries analysis on Mn/Fe (redox), K/Al (clay), and Zr/Rb (detrital) and other environmental proxies, U-Pb zircon CA-TIMS geochronological constraints (2) on interbedded lavas of the Central Atlantic Magmatic Province (CAMP) and correlation to fossiliferous outcrops by paleomagnetic reverse chron E23r (3-5), we show that the ETE and succeeding 300 kyr unfolded during a transient obliquity-dominated interval during a Mars-Earth (g_4-g_3) eccentricity low antinode. Hence, the new ETE-Triassic-Jurassic boundary astrochronology is marked by obliquity-, not precession-pacing. Although obliquity expression should be at a maximum during such intervals, it is far stronger than seen at any of the other 12, g_4-g_3 low antinodes in the 24 Myr Newark-Hartford paleotropical record, even at times of similarly high pCO_2. This very strong obliquity response implies an amplification specific to the ETE and Triassic-Jurassic interval. The Late Triassic-Early Jurassic continental Arctic already was experiencing wintertime freezing (6) and we hypothesize increased polar ice-albedo feedback during CAMP mega-volcanic winters amplified Earth System sensitivity to obliquity forcing, perhaps not unlike the obliquity amplification during the onset of the "40 kyr" world of the Late Neogene [e.g. (7-9)]. Onset of this latest Triassic obliquity pacing modality marked the major continental phase of the ETE (10).

1, Kinney+ PP25D-0899 AGU (2022); 2, Blackburn*+ Science* **340**:941 (2013); 3. Kent+ *JGR* **104**:12831 (1999); 4, Kent+ *JGR* **100**:14965 (1995); 5, Olsen+ *Science* **296**:1305 (2002); 6, Olsen+ *Sci Adv* **8**:eabo6342 (2022); 7, Tabor+ *Climate of the Past* **10**:41 (2014); 8, Lourens in Climate change: Letcher (Ed) Elsevier, 583 (2021); 9, Westerhold+ *Science* **369**:1383 (2020). 10. Funded by NSF & the Heising-Simons Foundation.