Magnitude and duration of a CO_2 super greenhouse at the Triassic-Jurassic boundary

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Stratigraphic transitions from the Triassic to the Jurassic (Tr-J) around 200 Ma record an abrupt extensive global collapse and slow recovery of biodiversity, the cause of which has been tied to a massive abrupt, extrinsically caused climate change (Ward et al., 2001; Hesselbo et al., 2002). The main thrust of the proposed research will be to reconstruct Tr-J paleo-atmospheric CO_2, suggested to have risen dramatically at this time, using stomatal density of the thermophilic dipteraceous fern *Clathropteris meniscoides* and cheirolepidaceous conifers from outcrop and cores of lacustrine deposits from three coeval Early Mesozoic rift valleys preserved in eastern North America. These sections have already been shown to record a mass extinction in fauna and flora and preserve a modest Ir anomaly, a fern spike, and a negative $\delta^{13}C$ change of –5‰ at the boundary (Figure 1), in remarkable parallelism to the Cretaceous-Tertiary boundary (Olsen et al., 2002).