

### **No mass extinction at the Triassic-Jurassic boundary**

Lucas, S.G., New Mexico Museum of Natural History, 1801 Mountain Rd. NW, Albuquerque, NM, 87104, USA, slucas@nmmnh.state.nm.us, Tanner, L.H., Dept. Geography & Geoscience, Bloomsburg University, Bloomsburg, PA, 17815, USA, Chapman, M.G., Astrogeology Team, U. S. Geological Survey, 2255 N. Gemini Rd., Flagstaff, AZ, 86001, USA

Many paleontologists have long identified an end-Triassic extinction as one of the five largest extinctions in Earth history. Estimates of the severity vary, but typically include extinction of ~76% of species and ~20% of families. Some recent analyses posit a sudden, synchronous extinction on both land and sea attributed to a catastrophic cause, such as bolide impact or widespread volcanism. However, the apparent suddenness of this extinction is largely an artifact of poor stratigraphic resolution and thus an excellent example of the compiled correlation effect. According to most workers, the most severely effected groups in the marine realm were the ammonoids, bivalves, gastropods, articulate brachiopods, conodonts, and marine reptiles, and plants and tetrapod vertebrates on land.

Most taxa that supposedly became extinct at the end of the Triassic actually disappeared by the beginning of the Rhaetian, and further extinctions occurred stepwise during the Rhaetian. The sudden extinction of ammonoids, bivalves, brachiopods and conodonts disappears upon careful examination of detailed stratigraphic data. There is no record of a profound extinction of marine gastropods at the end of the Triassic. A substantial extinction of marine reptiles took place at the Ladinian-Carnian boundary, not at the end Triassic. Extinction of megafossil plant species at the end of the Triassic appears to be mainly regional, and the supposed dramatic palynological extinction in the Newark Supergroup is both less sudden than generally assumed and at most a local event. Tetrapod extinctions on land are difficult to document because the extensive tetrapod fossil record jumps from Norian to Sinemurian with little between. Recent claims of a sudden earliest Jurassic appearance of large theropod dinosaurs as a result of post-extinction “ecological release” are refuted by the long known presence of large Late Triassic theropods, including body fossils and footprints. A careful reading of the stratigraphic distribution of fossils across the Triassic-Jurassic boundary indicates a prolonged turnover of detectable duration, not a single mass extinction.