



## Upper Triassic conodont extinction events

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The Triassic / Jurassic extinction event is considered one of the "big five". It entailed the extinction of the class Conodonta. It has been argued, however, that the magnitude of this extinction event is largely an artifact of insufficient sampling (Tanner et al., 2004). We discuss the case of conodonts in the light of their evolutionary trends during the Late Triassic.

The highest concentration of extinction events is in the Carnian. Relict Ladinian forms (*Gladigondolella* spp., *Paragondolella tadpole*, *Parag. foliata*, *Parag. inclinata*) as well as typical early Carnian forms ("*Parag.*" *auriformis*, "*Parag.*" *baloghi*, "*Parag.*" *carnica*, *Nicoraella postkockeli*, *Parag. praelindae*) disappear by the early Carnian / late Carnian boundary. *Parag. polygnathiformis noah* is the only species that certainly survives this boundary, even if *Parag. praelindae* seems to be still present at the beginning of the late Carnian (Kozur, 2003). A subsequent rapid adaptive radiation follows the extinction event in the late Carnian.

By comparison, the Triassic / Jurassic extinction event appears less sharp, as only two conodont species reach the boundary (i.e. *Misikella ultima* and *Zieglericonus rhaeticus*), where they disappear.

The pelagic-hemipelagic Pignola 2 section, encompassing the early Carnian / late Carnian boundary, was measured and sampled at cm scale. This section is representative of the Lagonegro Basin (southern Apennines, southern Italy), which constitutes a southwestern branch of the Tethys ocean. Conodonts are abundant throughout the section, provide a high-resolution biostratigraphy, and exhibit the expected pattern of mass extinction – adaptive radiation across the boundary.

In this section, the extinction of conodonts corresponds to a sudden increase of fine siliciclastics (dark silts and argillites), lamination and absence of bioturbation, and a overlying interval of radiolarites and cherts that formed before the resumption of hemipelagic carbonate sedimentation.

The lamination and absence of bioturbation at the lower Carnian / upper Carnian boundary is interpreted to indicate an oxygenation crisis at the sea bottom. The contemporaneous deposition of radiolarites and cherts is interpreted as the evidence that the CCD (Carbonate Compensation Depth) rose temporarily in this basin.

Palynological analysis of Pignola 2 section can be integrated with conodont distribution to refine the biostratigraphy of the series. In the correlated shallow-marine succession of Cave del Predil (eastern Southern Alps), a quantitative palynological analysis suggests humid conditions (Roghi, 2004).

We thus regard the oxygenation crisis and CCD raise as the deep-water time-equivalent of the "Carnian Pluvial Event" (Simms and Ruffel, 1989).

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