

Terrestrial causes for the Permian-Triassic biotic crisis

KOZUR, H.W., Altwachwitz 7, 01326 Dresden, Germany

Marine warm-water biota and plankton were strongly affected by the Permian-Triassic biotic crisis. The extinction of the cold-water and terrestrial biota was gradual and occurred long before the Permian-Triassic boundary. The recovery of the warm-water benthos, some of the plankton (radiolarians) and of terrestrial plant productivity was strongly delayed and occurred only from the upper Olenekian to the Middle Triassic. The number of the Lazarus taxa that re-appeared in the upper Olenekian and in the Middle Triassic is very high (about 50 %) and in some fossil groups 90-100 % at the generic level.

The most important causal factors in the Permian-Triassic biotic crisis were: (1) the extinction event at the Guadalupian-Lopingian boundary that restricted the diverse Upper Permian warm-water benthos to the Tethyan shelves; (2) the latest Dorashamian to lower Olenekian oceanic superanoxia; (3) the long-lasting Siberian Trap volcanism (Dzhulfian-lower Scythian); and (4) the very strong explosive felsic-intermediate volcanism around the Permian-Triassic boundary, close to the margin between eastern Tethys and Panthalassa. These volcanic activities resulted in those climatic changes that were directly and indirectly (as cause of the oceanic superanoxia) responsible for the Permian-Triassic biotic crisis, such as periodic cooling of the climate by volcanic dust and sulphate aerosols, acid rain, strongly reduced input of sunlight during the uppermost Dorashamian, possible destruction of the ozone layer, and a 3-6 month „volcanic winter“ at low latitudes, followed by global warming in the lower Scythian.