The Extent and Duration of the Permian-Triassic Superanoxic Event

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Abundant sediments, geochemical and palaeontological data indicate that marine sediments of the Permian-Triassic (P-Tr) interval were deposited under low oxygen conditions. It has been suggested that this anoxic was the main cause of the delay in the recovery of the Lower Triassic fauna. These hypotheses can be tested using high resolution conodont biostратigraphy to document the global extent and duration of this event across the P-Tr interval.

Evidence for oxygen-restriction appears in the Late Longanian-early Changxingian deep water sediments of Japan. In shallower-water settings the onset of anoxic/dysoxic conditions is generally later; over broad areas of equatorial Tethys and Boreal Realms the event has been dated to within the latidentatus changxingensis Zone of the latest Changxingian Stage. However, in high southern latitudes (the Salt Range of Pakistan) anoxic did not begin until the carinata Zone of the Griesbachian Stage. In all areas the appearance of anoxia coincides with the demise of the Permian shelly taxa and ichnogenera.

The duration of the anoxic event has only been documented in a handful of sections. In the Dolomites of northern Italy, low oxygen conditions extended into shallow water settings throughout most of the Griesbachian. Only peritidal facies record evidence of oxygenated conditions in this region. Anoxic waters receded below storm wave base in the late Griesbachian although there is some evidence that deeper water settings were still affected at this time. An identical temporal-spatial pattern of anoxia is seen in the sections of Spitsbergen. Shallow marine anoxia may have persisted well into the Dienerian in South China. In the deeper water sections of Japan dysoxic conditions persisted throughout the Early Triassic indicating that normal ventilation only returned to the world's oceans in the Middle Triassic.

The presence of low oxygen conditions above storm wave base for most of the Griesbachian would have seriously hindered recovery of the marine benthos. It also suggests that only the most proximal, peritidal settings would have provided any refuge form the effects of the P-Tr crisis.