



Climate Related Stressors and Mass extinctions

Michael M. Joachimski

GeoZentrum Nordbayern, FAU Erlangen-Nuremberg, Germany (michael.joachimski@fau.de)

Phanerozoic Mass extinctions were shown to coincide with Large Igneous Provinces (e.g. Late Devonian, Permian-Triassic, end-Triassic, end-Cretaceous). These catastrophic volcanic events may have been a potential source for greenhouse gases by volcanic CO₂ degassing and more importantly by thermogenic heating of organic carbon-rich sediments. Global warming, a decrease in marine dissolved oxygen concentrations culminating in anoxia/euxinia and lowered oceanic pH were potential consequences. These climate related stressors (CRS) may have affected marine life and contributed to mass mortality.

Proxy records have been used more or less successfully to document CRS in the fossil record. The palaeosol CO₂ barometer was applied to document changes in atmospheric CO₂. Addition of thermogenic CO₂ and thus changes in the global carbon cycle were identified by carbon isotopes measured on inorganic or organic carbon. Oxygen isotopes measured on biogenic calcite or apatite were used to reconstruct changes in marine palaeotemperatures while boron isotopes served as a pH proxy.

The proxy records for *p*CO₂, global carbon cycle changes and climate warming as well as the temporal coincidence of climate related stressors with LIP volcanism will be reviewed for the Late Devonian, Permian-Triassic and end-Triassic mass extinctions with special emphasis given to the Permian-Triassic event.