Geophysical Research Abstracts, Vol. 8, 07075, 2006
SRef-ID: 1607-7962/gra/EGU06-A-07075

Abrupt climate changes at the Triassic – Jurassic boundary inferred from palynological evidence

W. M. Kuerschner (1), N. R. Bonis (1) and L. Krystyn (2)

(1) Palaeoecology, Laboratory of Palaeobotany and Palynology, Utrecht University, Budapestlaan 4, 3584 CD Utrecht, The Netherlands (w.m.kuerschner@bio.uu.nl), (2) Department of Paleontology, University of Vienna, Geozentrum, Althanstrasse 4, Vienna, Austria A-1090 (leopold.krystyn@univie.ac.at)

The end – Triassic biotic crisis and associated environmental changes, the processes that may have caused this crisis, its duration and the degree of extinction among different biota are discussed controversially. The possible climate scenarios that are proposed to have been invoked include both, a global cooling as a result of volcanism or the opposite, global warming as a result of volcanic CO_2 outgassing or methane release. The contradictory views on the nature of the end-Triassic climate change may be the result of an inadequate stratigraphic framework, uncertainties in the correlation of marine with continental records and/or sampling density of previous studies. While, to date, geochemical proxy records are lacking because of the paucity of appropriate material quantitative palynological records may reveal short term vegetation changes that may be converted into climate proxy records based on multivariate ordination techniques. High resolution palynological records across the Tr–J boundary from the Northern Calcareous Alps (Tiefengraben and Eiberg sections) have been statistically analyzed in order to reveal the short-term climate history in the Western Tethys region. The stratigraphic framework has been established by carbon isotopic, bio – and palynostratigraphic events. The first axis of the correspondence analysis may represent a hydrological gradient because of the orientation of wet versus dry tolerant elements. The second axis may represent a temperature gradient as pollen from high latitude plant taxa are oriented versus those from the low latitudes. The first two axes explain about 70% of the total variance in the palynological matrix. The scores of each sample on the first two axes plotted in a stratigraphic order reveals (semi-) quantitative temperature trends through the Tr–J boundary. Associated with the double negative

isotope excursions are two marked periods of warming, an abrupt initial warming and a second longer period of warmth interrupted by a short term cooling. The warming at the Tr-J boundary is accompanied by increased humidity as indicated by the second ordination axes.