

An integrated palaeontological, geochemical & palynological study of the Rhaetian Zlambach marls in the Northern Calcareous Alps (Austria)

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The end-Triassic mass extinction event is regarded as one of the big five extinctions in the Phanerozoic. The cause and nature of this event is controversially discussed as one side favors a single catastrophic event while others favor a prolonged period of biotic turnovers throughout the Late Triassic. The “Kleine Zlambach” section near Bad Goisern (Salzkammergut, Austria) is one of the classical Rhaetian outcrops in the Northern Calcareous Alps where the top of the underlying Norian Pötschen limestone and the Zlambach marls are exposed. On the basis of ammonoid and conodonts this interval can be assigned to the early (“Sevatian 2”) – middle Rhaetian.

Throughout the section the pollen and spore assemblages are dominated by *Granuloperculatipollis rudis*, *Classopollis meyeriana*, *C. torosus*, and *Ovalipollis pseudoalatus*. Accompanying elements are *Rhaetipollis germanicus*, *Ricciisporites tuberculatus*, and *Tsugaepollenites pseudomassuleae*. In the lower part of the Zlambach marls *Enzonasporites vigens*, *Vallasporites ignacii*, *Patinasporites toralis*, *Ellipsovelatisporites rugosus*, *Partitisporites* and *Triadispora* are present, while higher up in the section new elements, such as *Chasmatosporites*, *Quadraeculina anaeliformis*, *Limbosporites lundbladii* enter the record. These sporomorph assemblages correlate with the transition between the TL and LR concurrent-range zones of MORBEY (1975) within the Karpathian facies of the Koessen beds in the Kendelbach section. The same palynofloral turnover is also easily recognizable in the Germanic Triassic basin within the Exter Formation at the transition between the Postera and Contorta beds and in the Danish North-Sea sector (e.g. LUND, 1977, 2003).

Intriguingly, the marine organic-walled phytoplankton record shows a significant increase in abundance which reflects the mid-Rhaetian transgression. A concurrent acme of dinoflagellate cysts (*Rhaetogonyaulax*, *Noricysta*, *Heibergella*) at the maximum is further time-correlative to a very prominent ammonoid boundary with the additional FO of *Cycloceltites*, *Vandaites* and “*Choristoceras*” (s. l.) as well as the disappearance of *Sagenites*, *Dionites* and *Pinacoceras*. Other important bio-events are the appearance of the cosmopolitan bivalve *Otapiria* and the demise of the classical Dachstein barrier reefs of the western Tethys. The studied section is characterized by a long-term trend to more positive O - and C – isotopes values superimposed by several minor cycles.

We discuss the biostratigraphic, palaeo-environmental and palaeogeographical meaning of this important intra-Rhaetian event.

References

LUND, J.J. (1977). Rhaetic and Lower Liassic palynology of the onshore south-eastern North Sea Basin, Dan. Geol. Unders., Ser. **109**, 2: 1-103.

LUND, J.J. (2003). Rhaetian to Pliensbachian palynostratigraphy of the central part of the NW German Basin exemplified by the Eitzendorf 8 well. - Cour. Forsch.Inst. Senckenberg, **241**: 69-83.

MORBEY, S.J. (1975): The palynostratigraphy of the Rhaetian stage, Upper Triassic in the Kendelbachgraben, Austria. - Palaeontogr. B **152**: 1-75.