Ber. Inst. Erdwiss. K.-F.-Univ. Graz	ISSN 1608-8166	Band 11	Graz 2006

Constraining sedimentation rates in the Cretaceous of the Eastern Alps by carbon isotope stratigraphy

Stephanie Neuhuber[1], Michael Wagreich[1], Christoph Spötl[2]

[1]Department of Geodynamics and Sedimentology, Universität Wien
Althanstrasse 14, A-1090 Wien, Austria, e-mail: stephanie.neuhuber@univie.ac.at
[2] Institut für Geologie und Paläontologie, Leopold-Franzens-Universität Innsbruck, Innrain 52, 6020 Innsbruck, Austria

Introduction

The application of stable isotope stratigraphy has been widely used in marine Cretaceous sediments. This technique uses temporally well-defined carbon isotope excursions as chemostratigraphic markers. Our poster presents the first application of stable isotope stratigraphy to Upper Cretaceous carbonates in the Eastern Alps. The studied section (Buchberg) was correlated to the absolutely dated chalk composite curve of Jarvis et al. (2006). The duration of so-called oceanic red beds in our section was constrained by correlating carbon isotope excursions to the chalk composite curve.

Methods

The stable carbon and oxygen isotope composition of bulk samples (micrite) was determined using a ThermoFinnigan DeltaPulsXL mass spectrometer equipped with a GasBench II following the procedure described in Spötl and Vennemann (2003). Trace element data (Mn/Sr vs. $\delta^{13}C$) were used to assess the degree of diagenesis (Jacobson and Kauffmann, 1999).

Sedimentation rates were calculated by comparison with the composite curve of Jarvis et al. (2006). Linear age-depth correlations were calculated using AnalySeries 2.0 (Paillard et al., 1996).

Results

Stable isotope data and trace element distribution suggest negligible diagenetic alteration. Biostratigraphy employing nannofossils and foraminifera (Perch-Nielsen, 1985) places the studied profile into the Lower to Middle Turonian. The main part of the profile was

deposited during the total range zone of *H. helvetica*. Within this zone several carbon isotope events were identified thus providing a higher temporal resolution.

The isotope events were calibrated based on the absolute timescale of Jarvis et al. (2006). The sedimentation rate in our section varies between 1 and 7 mm/kyrs. This further constrains the duration of oceanic red bed deposition to between 30 and 360 kyrs, whereas periods of grey marl deposition lasted between 70 and 470 kyrs.

References

Jacobsen, S.B., Kaufman, A.J., 1999. The Sr, C and O isotopic evolution of Neoproterozoic seawater. Chemical Geology 161, 37-57.

Jarvis, I., Gale, A.S., Jekyns, H.C., Pearce, M., 2006. Secular variation in Late Cretaceous carbon isotopes: a new d13C carbonate reference curve for the Cenomanian - Campanian (99.6-70.6 Ma). Geological Magazine, 143, 561-608.

Paillard, D., Labeyrie,L., Yiou, P., 1996. Macintosh program performs time series analysis. Eos, AGU 77, 379.

Perch-Nielsen, K., 1985. Mesozoic Calcareous Nannofossils. in: Bolli, H.M., Saunders, J.B., Perch-Nielsen, K. (Eds.) Plankton Stratigraphy. Cambridge University Press, Cambridge, pp 329-426.

Spötl, C., Vennemann, T., 2003. Continuous -flow isotope ratio mass spectrometric analysis of carbonate minerals. Rapid Communications in Mass Spectrometry, 17, 1004-1006.