

supported by the high percentage of reticulofenestrads within the calcareous nannoplankton. On the contrary, protoperidiniacean are common and fairly to well preserved in the Shukheir boreholes. Their abundance is directly related to that of the calcareous nannoplankton species *Coccolithus pelagicus* in some intervals. This may indicate high nutrient content, upwelling and/or fresh water input. The dominance of *Polysphaeridium zoharyi* and its inverse relation to *Lingulodinium machaerophorum* in the Kareem-30 borehole may indicate a hypersaline environment (unlike in Shukheir samples). Considering the dinoflagellate assemblages of the studied sequences they clearly indicate rapidly changing environmental conditions in space and time.

## KARPATIAN – BADENIAN (MIDDLE MIOCENE) DINOFLAGELLATE CYSTS OF THE STYRIAN BASIN, AUSTRIA

Ali SOLIMAN & Werner E. PILLER

Institut für Erdwissenschaften, Bereich Geologie und Paläontologie, Universität Graz,  
Heinrichstraße 26, A- 8010 Graz

From Lower/Middle Miocene strata of the Styrian Basin only one short report on dinoflagellate cysts was published so far (SOLIMAN & PILLER, 2004). Work on this material was continued including two surface outcrops along the Middle Styrian Swell - Wagna and Retznei - and two deep wells of exploratory drill holes of the RAG – Waltersdorf-1 and Blumau-1. In the section of Wagna, the Karpatian/Badenian boundary is included, all other sites deal with Badenian sediments only.

The dinoflagellate cysts are mostly well preserved and diversified. In addition, other palynomorphs as acritarchs (*Cymatiosphaera* spp., *Nannobarbophora gedlii*, *Cyclopesilla* spp.), foraminiferal test linings and miospores were recorded.

The presence of many biostratigraphic dinocyst markers such as *Cerebrocysta poulsenii*, *Cleistosphaeridium placacanthum*, *Habibacysta tectata*, *Hystrichosphaeropsis obscura*, *Labyrinthodinium truncatum* subsp. *truncatum/modicum*, *Operculodinium? borgerholtense*, *Palaeocystodinium miocaenicum*, *Tityrosphaeridium cantharellus*, and *Unipontidinium aquaeductum* strongly supports the Early-Middle Miocene (Karpatian-Badenian) age.

The dinoflagellate cyst assemblages indicate an inner to outer neritic environment. Sub-tropical climate conditions are suggested by the presence of *Tuberculodinium vancampoe*, *Tectatodinium pellitum* and *Melitasphaeridium choanophorum*. For the investigated samples, the gonyaulacoid/protoperidinioid - ratio is very high. The rare occurrence of protoperidiniacean genera may be interpreted either as primary due to a shortage in nutrients or taphonomically due to a low sedimentation rate since they are very sensitive to oxidation. In Retznei, our preliminary data indicate that dinoflagellate diversity and water depth increase upsection. In Waltersdorf-1 and Blumau-1, which are in a basal position, the open marine conditions are indicated by the abundance of *Nematosphaeropsis* spp.

### Reference:

SOLIMAN, A. & PILLER, W. E. 2004: Miocene Dinoflagellate cysts of the Styrian Basin, Austria. - Ber. Inst. Erdwiss., K.-F.-Univ. Graz, 9: 379, Graz.