Geophysical Research Abstracts
Vol. 13, EGU2011-2236, 2011
EGU General Assembly 2011

Chronostratigraphy of the Rupelian-mid Chattian deposits from the Danish land area

Katarzyna K. Sliwinska (1), Kaare Ulleberg (2), Claus Beyer (3), Erik Thomsen (1), Niels Abrahamsen (1), Thomas Brünings-Hansen (4), and Claus Heilmann-Clausen (1)

(1) Department of Geoscience, Aarhus University, Høegh-Guldbergs Gade 2, 8000 Aarhus C, Denmark (kasia.sliwinska@geo.au.dk), (2) Kløverstien 7, 3070 Sande, Norway, (3) CB-Magneto, Nørregade 27, 8670 Låsby, Denmark, (4) Billund Kommune, Teknik & Miljøforvaltningen, Natur og Miljø, 7200 Grindsted, Denmark

Both Oligocene stages, Rupelian and Chattian, have their original unit-stratotypes located within the North Sea Basin (Belgium and Germany, respectively). However, the calibration of the sections to the international geologic time-scale remains problematic due to the restricted marginal marine setting of the North Sea Basin. The interregional correlation is hampered by the endemic nature of some microfossils used for zonation within the basin and by the lack of key calcareous nannofossils for parts of the Oligocene. Thus, the recognition of calcareous nannofossil zones NP24 and NP25 is based on substitute marker species. Moreover, parts of the Oligocene sucession are non-calcareous and therefore barren in calcareous micro- and nannofossils. In contrast, rich and well preserved dinoflagellate cyst assemblages are present in all Oligocene deposits from the Danish land area.

Recent advances in dinoflagellate cyst biostratigraphy facilitates the correlation of sections from the North Sea Basin with sections in e.g., the Tethyan Realm, and thus with the global chronostratigraphic scale.

To improve the interregional correlation of the Rupelian - mid Chattian deposits from the Danish land area we carried out a dinoflagellate cyst study (utilizing the NSO- and D-zonations) in the most complete onshore sections, including the cored boreholes Branden, Harre-1, Horn-1, Viborg 1, and Linde-1, and the classical outcrop at Hesselbjerg (Skive). Where possible, the dinoflagellate cyst study was supplemented with foraminifera (Ulleberg- and NSB-benthic foraminifera zonations) and calcareous nannofossil data (NP zonation).

In order to calibrate the studied sections with the geomagnetic polarity time scale the biostratigraphic study was integrated with a magnetostratigraphic study of the Harre-1 and Horn-1 boreholes and the Hesselbjerg outcrop.

The present results can be summarized as follows:

The Grundfør Member, a basal transgressive part of the Viborg Formation, belongs to the NP21 and D12nc/NSO-1 zones and is referred to chron C13n in the Horn-1 borehole.

The Viborg Formation belongs to NP21 and the D12nc/NSO-1 - D13/NSO-2 zones and is a time equivalent of the Grimmertingen-Neerpen deposits from NE Belgium. The Viborg Formation is referred to chron C13n and C12r.

The Linde Clay belongs to the NP22 and D14na/NSO-3 zones. It is of reverse polarity in the Horn-1 borehole and is referred to chron C12r. It is a time equivalent of a part of the Boom Formation (Terhagen Mb?).

The Hvorslev Clay belongs to the Globigerina Zone, the NP24a*, and the D14na/NSO5a zone. The dominantly reverse polarity and the biostratigraphy suggest that the unit belongs to the C11r.

The Branden Clay belongs to the NSB8a and NP24b* zones, and in terms of dinoflagellate cysts it belongs in the NSO5b/D14nb and lowermost part of NSO7/D15 zones. The Branden Clay can be correlated with the 'Asterigerina Horizon' at the base of the Chattian type section in Doberg, Germany and elsewhere in the basal Chattian onshore NW Europe.

The results represent the so far most complete bio-magnetostratigraphy of Rupelian - mid Chattian successions from the North Sea Basin. The work thus provides a new chronostratigraphic frame for further examination of the basinal geology, paleoclimate and sea level fluctuations.