Stratigraphical position of Helicosphaera waltrans nannoplankton horizon NN5, Lower Badenian

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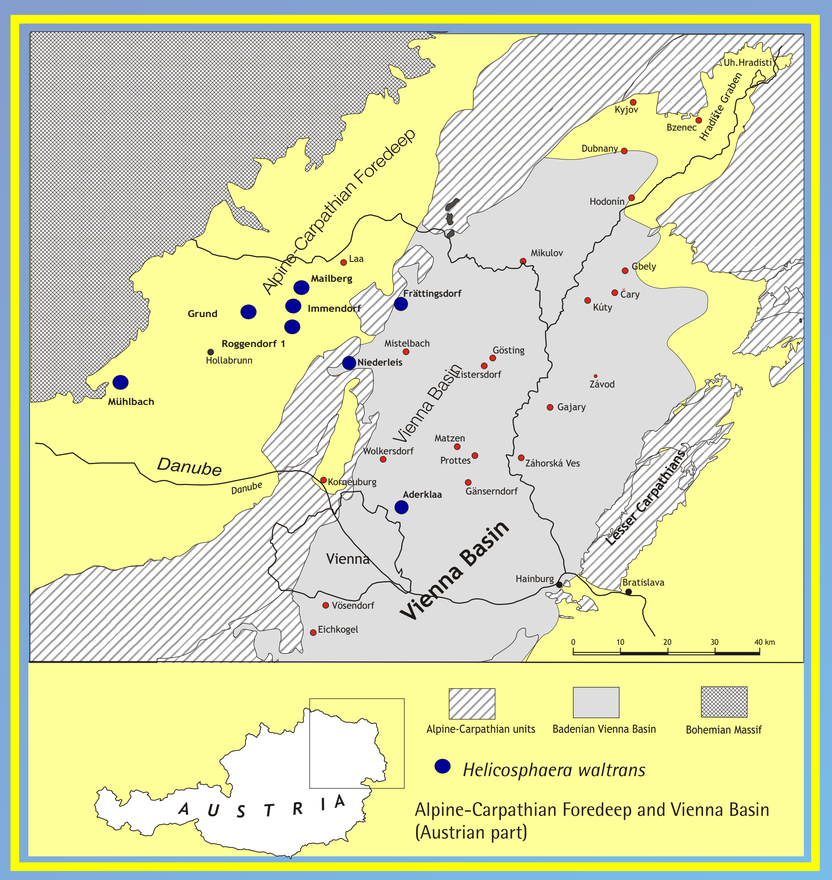
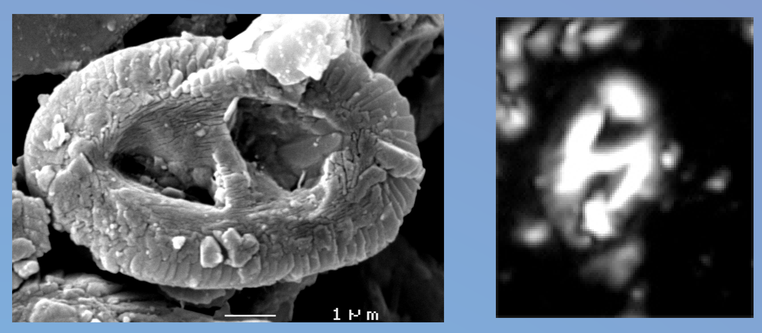
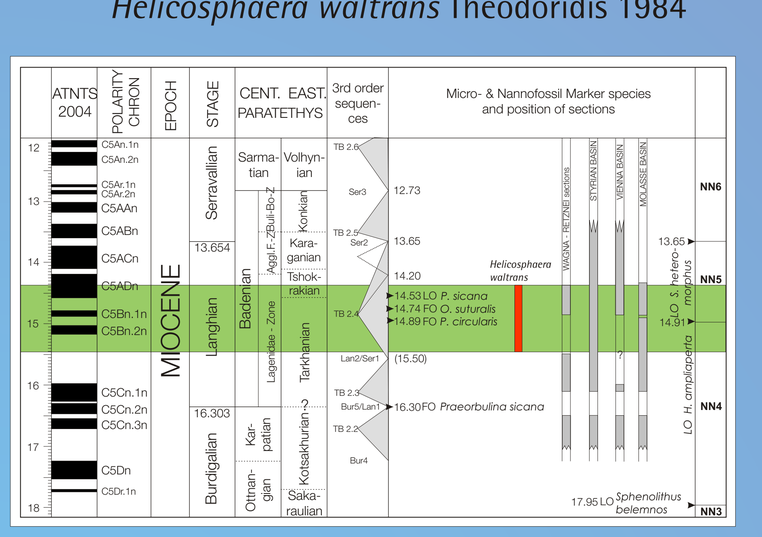
Natural History Museum Vienna

Czech Geological Survey

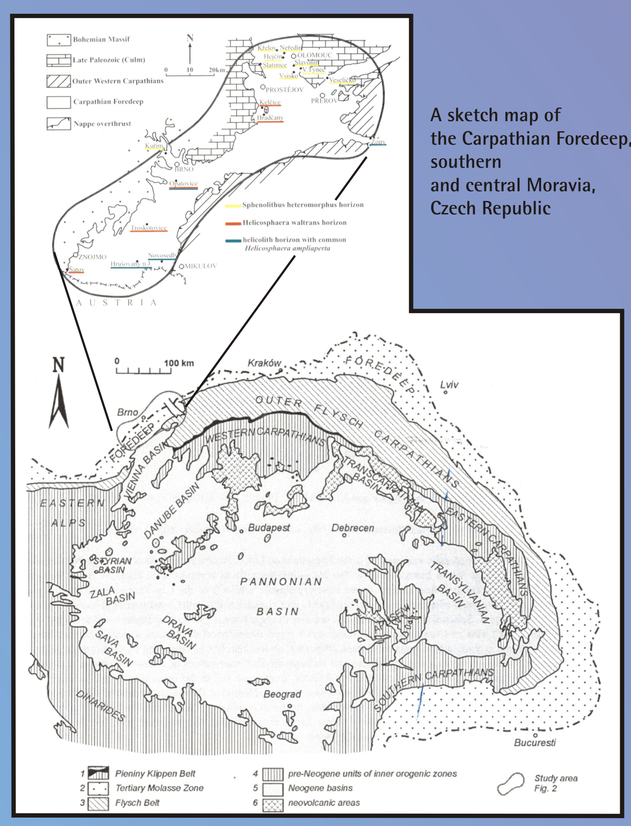




Helicosphaera waltrans Theodoridis 1984

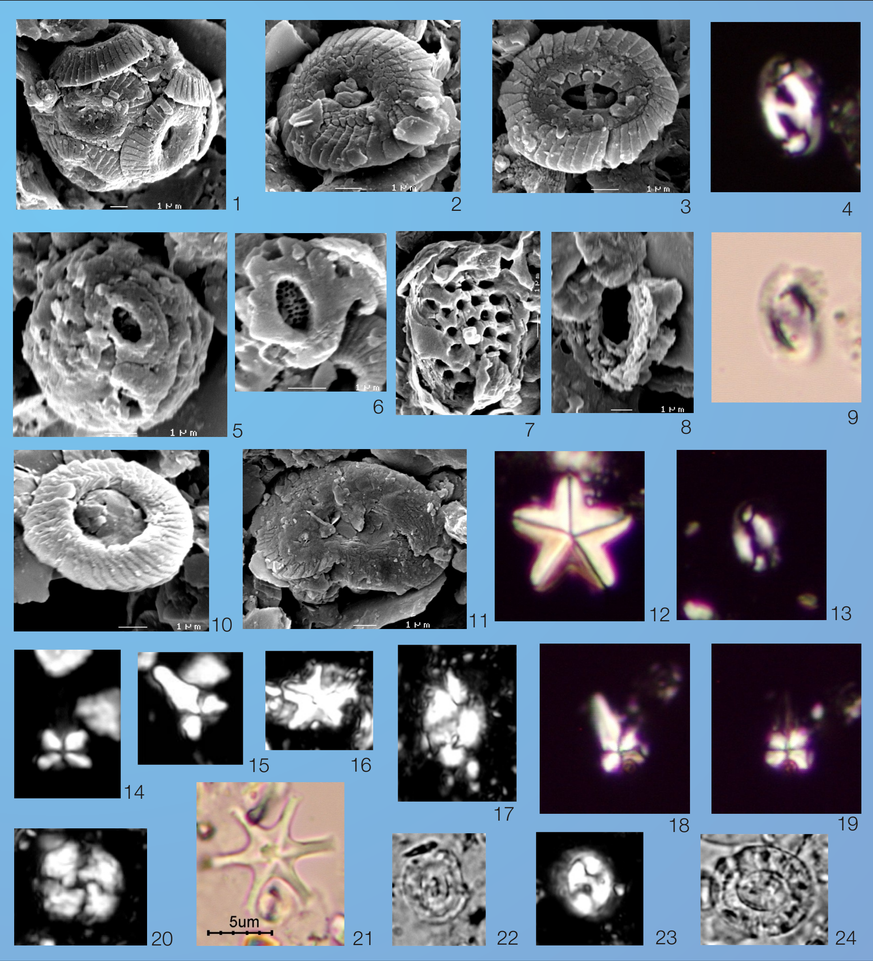


Stratigraphical position of *Helicosphaera waltrans* FCO at 15.476 Ma and LCO at 14.357 Ma

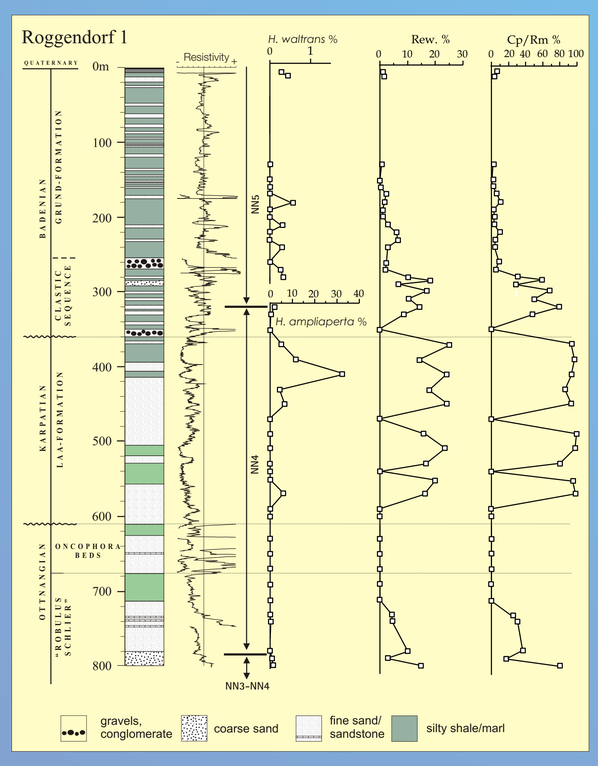


A sketch map of the Carpathian Foredeep, southern and central Moravia, Czech Republic

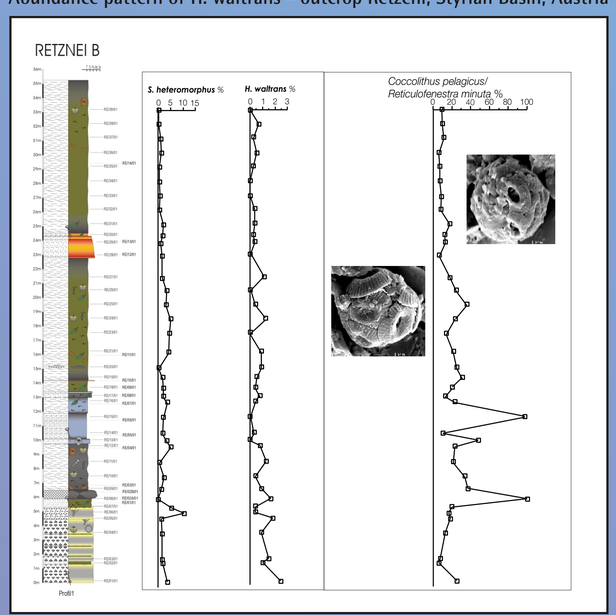
Miocene calcareous nannofossils of the Lower Badenian deposits in Austria and Czech Republic
Fig. 1 Coccosphaere of *Coccolithus pelagicus* (Wallich) Schiller; Retznei section 01, Sample 36.
Fig. 2 *Coccolithus pelagicus* (Wallich) Schiller, central area with transverse bar; Retznei section 01, Sample 36.
Fig. 3 *Coccolithus pelagicus* (Wallich) Schiller, with cross in central area; Retznei section 01, Sample 36.
Figs. 4, 9 *Helicosphaera waltrans* Theodoridis, Borehole Ivan 1.
Fig. 5 Coccosphaere of *Reticulofenestra minuta* Roth; Retznei section 01, Sample 36.
Fig. 6 *Reticulofenestra minuta* Roth; Retznei section 01, Sample 36.
Fig. 7 *Pontosphaera multipora* (Kamptner) Roth; Wagna section, Sample 26.
Fig. 8 *Helicosphaera ampliaperta* Bramlette & Wilcoxon; Wagna section, Sample 26.
Fig. 10 *Geminilithella rotula* (Kamptner) Backman; Retznei section 01, Sample 36.
Fig. 11 *Helicosphaera carteri* (Wallich) Kamptner; Retznei section 01, Sample 36.
Fig. 12 *Micrantholithus vesper* Deflandre
Fig. 13 *Helicosphaera walbersdorfensis* Müller, Borehole Vranovice 1.
Figs. 14, 15 *Sphenolithus heteromorphus* Deflandre; Wagna section, Sample 26.
Fig. 16 *Micrantholithus vesper* Deflandre; Retznei section 01, Sample 36.
Fig. 17 *Helicosphaera carteri* (Wallich) Kamptner; Retznei section 02, Sample 14.
Figs. 18, 19 *Sphenolithus heteromorphus* Deflandre; Borehole Vranovice 1.
Fig. 20 *Cyclicargolithus floridanus* (Roth & Hay) Bukry; Retznei section 02, Sample 1.
Fig. 21 *Discoaster variabilis* Martini & Bramlette
Figs. 22, 23 *Coccolithus pelagicus* (Wallich) Schiller, central area with transverse bar; Retznei section 02, Sample 1.
Fig. 24. Coccolithus miopelagicus Bukry; Retznei section 01, Sample 36.



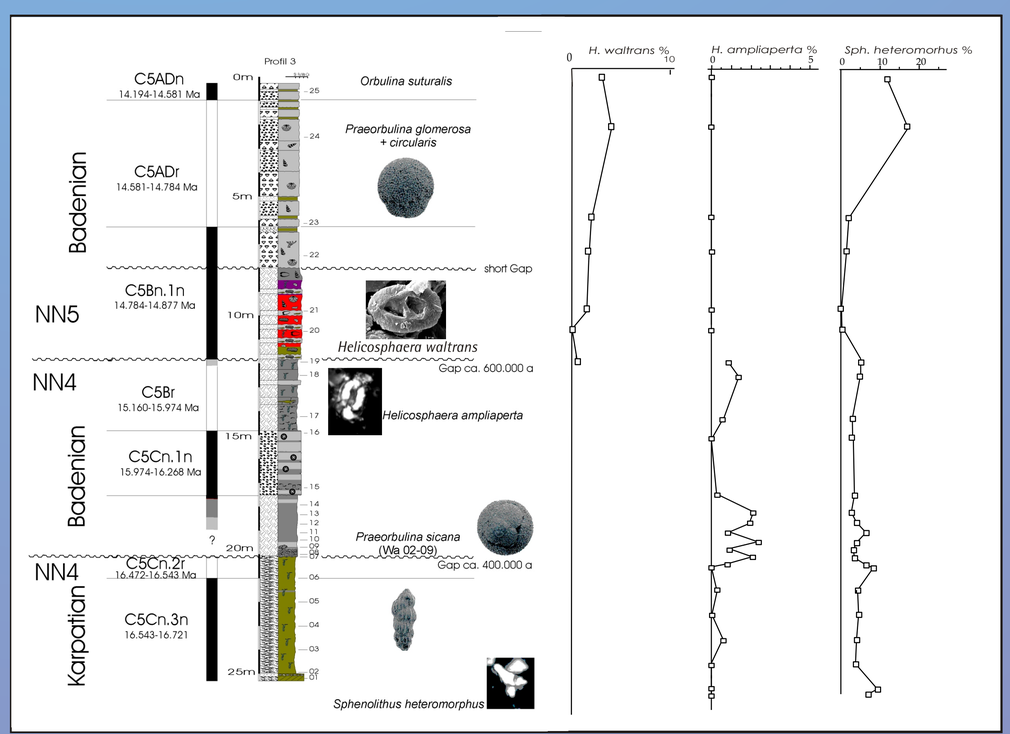
Abundance pattern of H. waltrans in borehole Rogenforf-1, Molasse Basin, Austria



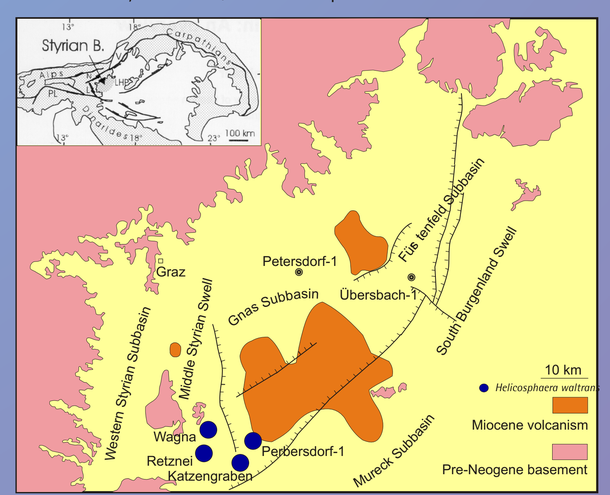
Abundance pattern of H. waltrans - outcrop Retzeni, Styrian Basin, Austria



Abundance pattern of H. waltrans - outcrop Wagna, Styrian Basin, Austria



Styrian Basin, Miocene deposits with *H. waltrans*



Badenian sediments were studied in the last few years through scientific projects at the localities of Austrian and Czech Republic parts of the Central Paratethys. Calcareous nannofossil and and foraminiferal content of Lower Badenian sediments yielded new important stratigraphical data. A short biohorizon with *Helicosphaera waltrans* (described by THEODORIDIS, 1984 from Gozo, Italy) within nannoplankton zone NN5 (Sphenolithus heteromorphus Zone, MARTINI, 1971) was used for the subdivision of Langhian sediments in the Mediterranean.

Helicosphaera waltrans horizon was also recognized in the Lower Badenian sediments of Carpathian Foredeep and used as a marker of zone NN5.

Species *H. waltrans* was recorded in the following depositional areas of Central Paratethys.

Alpine-Carpathian Foredeep Grund Formation: Austrian part: borehole Roggendorf - 1 and Grund section. *Helicosphaera waltrans* was also observed in the assemblages with high percentage of *Coccolithus pelagicus* in siliciclastic sediments of the Gaindorf Formation (Mühlbach at the Manhartsberg, Lower Austria). *H. waltrans* was found in the outcrops of Central Moravia (Czech Republic) near Olomouc (localities Opatovice HJ-103, Šatov, Troskotovice, Hradčany, Kelčice. Shallow-water deposits of boreholes Ivaň-1 and Vranovice-1 (located SE from Brno) contained *H. waltrans* with common specimens of genus *Micrantholithus* sp. and *Braarudosphaera bigelowii.* Overlying strata yielded nannofossils with alternating high numbers of small reticulofenestrids (forming 20-55% of assemblage) and *Coccolithus pelagicus* (30-70%). Here, the first occurrence of *H. waltrans* precedes first occurrence of foraminifer *Orbulina suturalis*.

Vienna Basin In the Austrian part was *Helicosphaera waltrans* found in marly sediments from Frättingsdorf (with diatoms and silicoflagelates) and at the sections of Niederleis. Foraminiferal assemblages contain hier *Orbulina suturalis* and *Praeorbulina glomerosa circularis*. In the Czech part (South Moravia) was this species found at the locality of Sedlecký mlýn, SE from Mikulov in association with *Helicosphaera walbersdorfensis, Sphenolithus heteromorphus, Calcidiscus* cf. *tropicus* and relatively common *Umbilicosphaera rotula*.

Styrian Basin This biohorizon outcrops in the Wagna quarry, at Retznei and Katzengraben (near the Slovenian/Austrian boundary). Horizon with this form was also observed in sediments from borehole Perbersdorf 1. Sediments from the Styrian Basin are characterised by very abundant and well-preserved nannoplankton assemblages with the dominance of small reticulofenestrids: *Reticulofenestra minuta* and *R. haqii*. Regularly occur *Coccolithus miopelagicus, C. pelagicus, Calcidiscus premacintyrei, Cd. leptoporus, Discoaster varaiabilis, D. deflandrei, Geminilithella rotula, Pontosphaera multipora, Reticulofenestra pseudoumbilica, Sphenolithus heteromorphus, S. moriformis, Umbilicosphaera jafarii*, helicospherids (*Helicosphaera carteri, H. euphratis, H. walbersdorfensis*). Rare *Helicosphaera ampliaperta* (NN2-NN4) in these sediments is probably result of the reworking from underlying Karpatian sediments.

Planktonic foraminiferal assemblages of the biohorizon with *H. waltrans* are typical for the Lower Lagenidae Zone: *Praeorbulina glomerosa glomerosa, P. glomerosa circularis, Orbulina suturalis, Globorotalia bykovae, G. transsylvanica, Paragloborotalia mayeri/siakensis, Globigerinoides bispherícus*. Also occur important benthic species: *Uvigerina macrocarinata, U. uniseriata, Vaginulina legumen, Lenticulina echinata, Psammolingulina papillosa, Pseudogaudryina lapugyensis, P. sturi, Colominella paalzowi.*

Rich calcareous nannoplankton and foraminiferal assemblages from biohorizon with *H. waltrans* is related to the Lower Badenian transgressive phase.

Acknowledgement
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