The Rupelian–Chattian transition in the north-western Transylvanian Basin (Romania) revealed by calcareous nannofossils: implications for biostratigraphy and palaeoenvironmental reconstruction

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The studied sediments are part of the Vima Formation and are located south of the Preluca Massif, in the NW Transylvanian Basin (Romania). In this area, three outcrops (Fântânele section) have been sampled in order to establish the precise age and to reconstruct the paleoenvironmental conditions. The investigated section consists of an alternation of claystones, marlstones and siltstones with thin sandstones intercalations. Sampling resolution varies from 10 cm to 50 cm, seventy-five samples having been analysed for calcareous nannofossil content. Multivariate Hierarchical Clustering by Ward's Method and Non-metric Multidimensional Scaling were applied to all counted samples.

Forty-nine calcareous nannofossil species were identified, 38 of them being autochthonous, while 11 species were reworked from Mesozoic and lower stages of the Paleogene. Based on the obtained results, the studied section falls into NP24 (*Sphenolithus distentus* Zone)–NP25 (*Sphenolithus ciperoensis* Zone). Thus, the age is late Rupelian–early Chattian.

The most abundant species from the assemblage are *Cyclicargolithus floridanus, Reticulofenestra minuta, Braarudosphaera bigelowii, Pontosphaera multipora, Coccolithus pelagicus, Reticulofenestra* gr. 3–5 µm, *Reticulofenestra bisecta, Cyclicargolithus abisectus, Reticulofenestra lockeri, Pontosphaera pygmaea, Reticulofenestra daviesii, Reticulofenestra stavensis, Helicosphaera recta, Sphenolithus moriformis* and *Pontosphaera desueta*. In the upper part of the third outcrop, a bloom of *Braarudosphaera bigelowii* and *Reticulofenestra minuta* was registered. A drastic decrease in the number of species (5 species) has accompanied this bloom.

The Multivariate Hierarchical Clustering indicates four main clusters and eight sub-clusters which are well differentiated. Cluster I comprises nine samples and groups the highest proportion of *Pontosphaera* spp.; Cluster II concentrates the highest number of samples containing the highest amount of *Cyclicargolithus* spp.; Cluster III has 13 samples from the first and the third outcrops and displays the highest amount of small reticulofenestrids and Cluster IV includes only 4 samples from the upper part of the third outcrop where the bloom of a single species (*Braarudosphaera bigelowii*) was registered.

The palaeoenvironmental conditions of Fântânele section are going from more stable open-marine regime, with temperate sea-surface temperatures interfering locally with influx of cooler water and enriched cool-nutrient supply for the late Rupelian–earliest Chattian (NP24) interval to shallower and possibly warmer near-shore marine eutrophic environment, with salinity fluctuations, increased terrigenous material run-off and freshwater influx for the remaining early Chattian (NP25).