

## Morphological variability of the Paratethyan Oligocene–Miocene small reticulofenestrid coccolites and its paleoecological and paleogeographical implications

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The analysis of size changes (length of placoliths, their width, length of central opening and its width) in elliptical

reticulofenestrids from the NP25–NN5 zonal interval of the Central Paratethys allowed to discriminate two size categories of placoliths: (i) small *Reticulofenestra minuta* (*Reticulofenestra haqii*–*pseudoumbilicus* group (4–10.0  $\mu\text{m}$ ). The latter group appeared for the first time (FO, first occurrence) in the upper Egerian (size 4–7  $\mu\text{m}$ ) with the size of placoliths in this plexus increasing gradually. The FO of *R. pseudoumbilicus* > 8.0  $\mu\text{m}$  has been established in the Zone NN2 while its FCO (first common occurrence) in the Zone NN5. This study shows that the FOs of size-defined morphotypes of the *R. haqii*–*pseudoumbilicus* group differ in the Central Paratethys and oceanic realm. Blooms of *R. minuta* at the Oligocene–Miocene boundary and in the Early Middle Miocene may be correlated with the incoming of warm water into the higher latitude Central Paratethys basins during connection with the Mediterranean Sea. Transgression favored the expansion of near-shore areas associated probably by some short-time oscillations of salinity. The FO of *R. haqii*–*pseudoumbilicus* group and the FO of *R. pseudoumbilicus* > 8.0  $\mu\text{m}$  can be correlated with the opening of new pathways between the Mediterranean and the Central Paratethys. Gradual size changes in the *R. haqii*–*pseudoumbilicus* group probably reflect climatic changes: the decrease of coccolith size in the late Egerian may reflect cooling (Mi1 event) while the increase in coccolith size in the interval from the FO of *Helicosphaera ampliaperta* to the FO of *Sphenolithus heteromorphus* occurred due to warming. Two size categories of placoliths in the *R. haqii*–*pseudoumbilicus* group (3.5–6  $\mu\text{m}$  and 6–8  $\mu\text{m}$ ) recorded in the interval from Zone NN1 to the lower part of the Zone NN2 may represent seasonal populations.

**Key words:** Calcareous nannofossils, size changes, paleoecology, Oligocene, Miocene, Central Paratethys.

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