



Late Paleogene reticulate Nummulites of the Western Tethys

G. Less (1), B. Kertész (2), and E. Özcan (3)

(1) University of Miskolc, Dpt. of Geology and Mineral Resources, Miskolc, Hungary (foldlgy@uni-miskolc.hu), (2) COLAS-Északkeő Bányászati Kft., Tarcsl, Hungary, (3) Istanbul Technical University, Dpt. of Geology, Istanbul, Turkey

Reticulate Nummulites can be found very often in rock-forming quantity in the Bartonian to lower Chattian beds of the Western Tethys; however their nomenclature is extremely complicated and rather controversial. Therefore, and since B-forms are quite rare and often missing, in the first phase of the research we have concentrated on the comparative morphometric study of megalospheric forms without prejudicing formerly introduced typological names to particular populations. We used material from forty-six localities extending from SW France to Cutch (W India) and spanning from the early Bartonian to the early Chattian. Fifty-six populations could be encountered, fifty-five of which could be arranged safely into the well-known Nummulites fabianii-fichteli group. However, in the middle Bartonian locality of Keçili 1 (eastern Turkey) another population of reticulate Nummulites bearing about five times larger embryo than that of the population belonging to the N. fabianii-fichteli-lineage from the same sample could be observed. This population has been identified with N. hottingeri (the end-member of the N. partschi-lorioli-lineage) on the one hand but also with the original description of N. ptukhiani (later widely accepted as the precursor of N. fabianii) on the other. This means that the two names are synonymous and N. ptukhiani bearing priority advantage over N. hottingeri has to be applied for these forms. On the other hand, it can by no means be used for the precursor forms of N. fabianii.

The fifty-five populations belonging to the Nummulites fabianii-fichteli group have been analyzed qualitatively by means of the surface characteristics and quantitatively by means of the internal features observable in the equatorial section of A-forms. In order to distinguish the evolutionary trends from the ecologically or ontogenetically induced phenomena we arranged these populations according to their supposed ages based on the accompanying fossils and/or stratigraphical positions.

The inner cross-diameter of the proloculus has been proven to be the most reliable evolutionary parameter. Beside, the evolution of surface characteristics (not detailed here) is also usable in this sense, although it shows great intrapopulation variation partly because of the ontogeny. The increase of the average length of chambers (accompanied by general flattening) in the third whorl is of secondary importance in recognizing the evolution of the group because it is affected also by ecological factors. Finally, the tightness/laxity of the spire and the relative width of the spiral cord in the third whorl are clearly the functions of the actual paleoenvironment.

As a result, the Nummulites fabianii-fichteli group is proven to form a single but rather variable evolutionary lineage within the early Bartonian to early Chattian development of which six evolutionary stages (considered as species) could be recognized (we could not study the middle-late Lutetian precursor forms). The safety of identification of these evolutionary stages with particular species names is of different degree. The six species are defined primarily on the basis of the average inner cross-diameter of the proloculus (Pmean) and secondarily by the surface characteristics as follows:

- Nummulites bullatus (late Lutetian to basal Bartonian, SBZ 16 to early SBZ 17 zone): Pmean = 65–100 μm ; granules, no reticulation.
- N. garganicus (early to middle late Bartonian, late SBZ 17 to SBZ 18B): Pmean = 100–140 μm ; heavy granules + reticulation.
- N. hormoensis (late Bartonian, SBZ 18): Pmean = 140–200 μm ; heavy granules + umbo + reticulation.
- N. fabianii (Priabonian to early Rupelian, SBZ 19–21): Pmean = 200–320 μm ; heavy reticulation + umbo + weak granules.
- N. fichteli (late Priabonian to early Rupelian, SBZ 20–21): Pmean = 200–300 μm , weak reticulation to irregular mesh.
- N. bormidiensis (late Rupelian, SBZ 22A): Pmean = 300–450 μm ; irregular mesh.

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