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The middle to late Eocene evolution of nummulitid foraminifer *Heterostegina* in the Western Tethys

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Megalospheric forms of Western Tethyan late Bartonian to late Priabonian involute *Heterostegina* from numerous localities, marking different ecological conditions, were morphometrically investigated. They belong to three species, *H. armenica*, *H. reticulata*, and *H. gracilis* based on the presence/absence of granulation, on the chamberlet characteristics and on the relative size of proloculus. Within these species a very rapid evolution could be observed in the reduction of the number of operculinid chambers, in the increase of the number of chamberlets and partially in the increase of the proloculus size. This evolution is demonstrated by stratigraphic superpositions in several localities (especially in the Mossano section), and is supported also by the change of co−occurring fossils, starting with the disappearance of large−sized *Nummulites*, then followed by the appearance of the genus *Spiroclypeus* and then by the disappearance of orthophragmines of middle Eocene acme. Based on the reduction of operculinid chambers, two chronosubspecies of *Heterostegina armenica* and seven of *H. reticulata* are defined biometrically (four of them: *H. armenica tigrisensis*, *H. reticulata tronensis*, *H. r. hungarica*, and *H. r. mossanensis* are introduced here). This allows to subdivide the Shallow Benthic Zone (SBZ) 18 into three and SBZ 19 into two subzones. The extremely rapid evolution of *H. reticulata* allows to calibrate larger foraminiferal events around the middle/late Eocene boundary. The extinction of large−sized *Nummulites* seems to be heterochronous in the late Bartonian in having migrated eastward, while the first appearance of *Spiroclypeus* is shown to be synchronous at the base of the Priabonian. The middle/upper Eocene (= Bartonian/Priabonian) boundary is to be placed at the base of the Priabona marls in the Mossano section corresponding to the SBZ 18/19 limit, to the first appearance of genus *Spiroclypeus* , to that of *Nummulites fabianii* and of *Heterostegina reticulata mossanensis*. It falls into the upper part of both the P 15 and NP 18 planktic zones. The Western Tethyan Eocene involute *Heterostegina* became extinct, apparently with no Oligocene successors.

Key words: Foraminifera, Nummulitidae, *Heterostegina*, biometry, evolution, stratigraphy, Eocene

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