



FORAMS 2006

## **The updated orthophragminid zonation and main turnovers based on the late Paleocene to Priabonian record from Turkey**

Ercan Özcan<sup>1</sup> & György Less<sup>2</sup>

<sup>1</sup>*Department of Geology, Faculty of Mines, Istanbul Technical University, Ayazađa/Istanbul 34469, Turkey - ozcanerc@itu.edu.tr*

<sup>2</sup>*University of Miskolc, Department of Geology and Mineral Resources, 3515, Miskolc-Egyetemváros, Hungary*

Orthophragmines constitute one of the major larger foraminiferal groups of the shallow-water western Tethys spanning from the late Paleocene to the terminal Eocene. This group comprises two, phylogenetically independent families, Discocyclinidae (with genera *Discocyclina* and *Nemkovella*) and Orbitoclypeidae (with genera *Orbitoclypeus* and *Asterocyclina*). Each genus yields several evolutionary lineages that are morphometrically segmented into chronosubspecies. Based on them Less (1998) encountered eighteen zones (marked by OZ) that are integrated into the shallow benthic zonation (SBZ) system by Serra-Kiel *et al.* (1998). An almost complete succession of Turkish orthophragmines have been morphometrically investigated focusing mainly on features of the equatorial section. The about one-hundred samples come from twenty-one localities and sections of the Haymana-Polatli, Safranbolu, Kastamonu, Sivas, Elazig, Sarköy and Sile basins and cover the middle Thanetian to early Priabonian interval with a minor hiatus only in the middle Lutetian. All the major orthophragminid lineages of the more western parts of peri-Mediterranean realm could be detected with small differences only in their proportions. Sporadic deviations from the typical forms and few endemic forms could only be recognized. The age of these orthophragminid assemblages is controlled by the associated nummulitids, planktic foraminifera and calcareous nannoplankton, too. The results confirm that the orthophragminid zonation of the western and central Mediterranean can be extended towards the eastern Mediterranean. Based mainly on the Turkish orthophragminid record the evolutionary track of several lineages could be completed and précised, having erected thirteen new chronosubspecies, too. Four new (mainly endemic) species are introduced as well. As a result, the taxonomy of western Tethyan orthophragmines has been updated and the stratigraphic distribution of some taxa is rearranged. Some of the previously assigned eighteen orthophragminid zones (OZ 2, 8A, 8B and 12 to 14) were redefined and simultaneously recalibrated in the context of the shallow benthic zonation of the Tethyan Early

Paleogene by Serra-Kiel *et al.* (1998). According to our recent knowledge six main steps can be encountered in the evolution of the western Tethyan orthophragmines as follows: 1) Two unribbed species of *Discocyclina* (*D. seunesi* and *D. tenuis*) and *Orbitoclypeus* (*O. schopeni* and *O. multiplicatus*) each appeared in the early Thanetian (SBZ 3, OZ 1A). 2) Ribbed *Orbitoclypeus* (*O. munieri*, *O. bayani*) and the genera *Asterocyclina* (*A. taramellii*) and *Nemkovella* (*N. evae*) appeared around the Paleocene/Eocene boundary (SBZ 5–6, OZ 2–3), simultaneously with specific changes within *Discocyclina* (*D. archiaci* and *D. dispansa* instead of *D. seunesi*). 3) The main diversification of orthophragmines is observed to occur at about the Ilerdian/Cuisian boundary (SBZ 9–10, OZ 5–6) with the first appearance of such important lineages as *D. augustae*, *D. fortisi*, *N. strophiolata*, *O. douvillei*, *O. varians*, *O. furcatus*, *A. stellata* and *A. alticostata* simultaneously with the disappearance of *O. multiplicatus* and other forms. 4) Characteristic early Eocene lineages like *D. fortisi*, *N. evae*, *O. schopeni*, *O. munieri* disappeared gradually in the early Lutetian (SBZ 13, OZ 8B–9), simultaneously with the appearance of *D. pratti*, *D. pulcra* and the ribbed *D. radians* and also with the replacement of *D. archiaci* by *D. discus*. 5) The first main orthophragminid extinction event (with two sub-events) can be placed into the late Bartonian to earliest Priabonian interval (SBZ 17 to the early part of SBZ 19, OZ 13–14) and characterized by the disappearance of *D. pulcra* and *O. douvillei* first and then by the extinction of *D. discus*, *D. pratti*, *N. strophiolata* and *A. alticostata* and also by the common appearance of *D. trabayensis*. 6) All survivor orthophragmines disappeared at the very end of the Priabonian (SBZ 20/21 boundary, end of OZ 16).