

Planktonic foraminifera from the Cretaceous-Paleogene boundary deposits of Gams (Eastern Alps, Austria)

Oleg A. KORCHAGIN¹, & Heinz A. KOLLMANN²

¹Geological Institute of the Russian Academy of Sciences, Moscow, Russia; ²Natural History Museum, Vienna, Austria; okorchagin01@gmail.com

In Gams, the Cretaceous/Paleogene boundary clay has been found in three sections (Gams-1, Gams-2, Gams-3). The Gams sequence which is of world significance was studied comprehensively in a large sample across the boundary (the “monolith”) and in single samples taken at the outcrops.

In the monolith, the Cretaceous-Paleogene boundary layer (layer J) is a dark-colored, almost black clay of 1-2 cm in thickness. Its lower part is mainly composed of illite and the higher one of smectite. As a whole, layer J is characterized by high concentrations of As, Cr, Ni, Fe₂O₃, a very low content of Ca, and abundant cosmic particles, i.e., “meteoritic dust” and “meteoritic iron”.

Some of the planktonic foraminifera from the layer J and the overlying layers L and M differ by their appearance and preservation from those of underlying deposits as follows:

1. All tests of Globotruncanidae are slightly deformed and milk-white in color. The same is true for the Paleogene *Globoconusa daubjergensis* (smaller morphotype) from the upper portion of layer J and keeled forms tentatively referred to *Morozovella*.

2. Some tests of *Racemiguembelina fructicosa* from the upper part of layer J are evidently eroded while tests of small planktonic foraminifers of *Hedbergella* and Heterohelicidae and *Globigerina* from the underlying deposits are of common appearance and preservation.

3. Noteworthy is that changes in appearance and/or preservation occur exclusively in planktonic foraminifers but not in benthic forms of the same samples. What is the reason of such selectivity?

4. In the studied interval of the Late Maastrichtian *Abathomphalus mayaroensis* Zone (layers A-I), the diversity of planktonic foraminifer taxa ranges from 6-7 to 14-15 specimens per association. It is most abundant in the layers D (10 cm below layer J) and I (immediately below layer J).

5. A minimum of taxa was recorded in layer G (4 cm below J).

6. In the layers A-I, planktonic foraminifera associations are dominated by the families Heterohelicidae and Globotruncanidae whereas the Rugoglobigerinidae and Hedbergellidae are represented only by a few species. Species of the Globotruncanidae are more diverse but relatively rare. Finally, the Heterohelicidae are represented by 2-5 species, two of which (*Racemiguembelina fructicosa* and *Pseudotextularia elegans*) are most abundant.

Two peculiar features of the associations of planktonic foraminifers shall be emphasized:

7. In the layers A-I (inclusively), half of the total number of tests belongs to *Racemiguembelina fructicosa* and *Pseudotextularia elegans* of the family Heterohelicidae.

8. In the same layers, an increase in abundance of *Racemiguembelina fructicosa* is accompanied by a decrease of *Pseudotextularia elegans* (and vice versa).

Such trends may be interpreted by species competition. The species may also have occupied different ecological niches and the fluctuations of abundance reflect cycles of environmental changes, e.g. of water temperature.

At present, we cannot resolve whether the afore-mentioned distribution of *Racemiguembelina fructicosa* and *Pseudotextularia elegans* characterizes the pre-crisis populations or if it was common in the mid-latitude seas during a longer time interval.

It is also not clear whether the sharp predominance of these two species on one hand, and their competition on the other hand is related to the general extinction of planktonic foraminifers or not.

Nevertheless, it should be noted that a sharp decrease in the number and relative abundance of species was recorded in layer G, 4 cm below J. Immediately prior to the extinction of planktonic foraminifers, the Heterohelicidae species *Racemiguembelina*

fructicosa and *Pseudotextularia elegans* were most abundant. Very likely, they were in competition to each other.

9. In layer I, immediately below J, the population shows an increasing abundance of sinistral tests of *Contusotruncana contusa* var. *sinistralis* and *Globotruncana rosetta*. The latter passed into the lower part of layer J. Was the increase in abundance of sinistral tests caused by a general climatic deterioration before the deposition of layer J or by changes in water mass circulation in a separate basin?

10. The earliest “typical” Paleogene planktonic foraminifers of the genus *Globoconusa* were recorded in the higher part of layer J (Sublayers J-5 + J-6).

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Autor(en)/Author(s): Korchagin Oleg A., Kollmann Heinz Albert

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