

Calcareous nannofossils at the Cretaceous/Paleogene boundary of the Northern Calcareous Alps (Wasserfallgraben section, Germany; Nussdorf section, Austria)

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The Cretaceous/Paleogene (K/Pg) mass extinction is one of the five large mass extinctions that have occurred in Earth's history and the only major mass extinction event known so far to be connected to a major meteorite impact and simultaneously occurring flood basalt eruptions. The Wasserfallgraben section is the type section of the Campanian to Paleocene Nierental Formation, which belongs to the upper part of the Gosau Group of the Northern Calcareous Alps and consists of deep-marine, hemipelagic, and turbiditic sediments. The Nierental Formation was deposited in a deep-water environment that was the result of rapid subsidence due to subduction and tectonic erosion at the front of the Austro-Alpine microplate.

The transition from the Maastrichtian to the Danian in the Nierental Formation can be documented by changes in the calcareous nannofossil assemblage. Occurrences of *Micula prinsii*, *Cribrosphaerella daniae*, and other Late Cretaceous nannofossils occur in the lower two meters of the Wasserfallgraben section, allowing placement in the upper part of the uppermost Maastrichtian nannofossil Subzone UC20d (equivalent to Subzone CC26b). *Micula prinsii* and *C. daniae* were identified in all samples from the lowermost sample (profile height 200 cm) up to the K/Pg boundary (profile height 0 cm). Blooms of the genus *Thoracosphaera* (calcareous dinoflagellates), beginning with sample 32 (profile height 0 cm), document the massive change in the nannofossil assemblage in the lowermost part of the Paleocene sediments. Sediments from this part of the section contain *Biantholithus sparsus*, *Cyclagelosphaera alta*, *Prinsius tenuiculus*, and *Neobiscutum parvulum*. Based on the occurrences of these species and the absence of *Cruciplacolithus tenuis*, this part of the succession can be attributed to nannofossil Zone NP1 (CP1a). A short bloom of *Braarudosphaera bigelowii* and *Braarudosphaera pentagonica*, which were observed in sample 14 (profile height 68–80 cm), characterizes the lowermost part of the Danian.

Additionally, 33 samples were quantitatively investigated for calcareous nannofossils from the Nussdorf section in Austria, with 81 species identified within the Cretaceous part. Although they are not abundant, the marker species restricted to the Maastrichtian are *Ceratolithoides kamptneri*, *Chiastozygus antiquus*, *Lithraphidites quadratus*, *Micula murus*, *M. prinsii*, and *Russellia bukryi*. A total of 26 calcareous nannofossil species were identified in the five Paleogene samples. The calcareous dinoflagellates were counted separately under the *Thoracosphaera* spp. group, which includes *Calciodinellum albatrosianum*, *Cervisiella operculata*, *Thoracosphaera heimii*, *Pernambugia tuberosa*, and *Thoracosphaera* spp. The most abundant species in the Paleocene samples are *Thoracosphaera* spp. (77.10%), followed by *Cyclagelosphaera* cf. *alta* (13.03%), which combined represent 90.13% of the assemblage.