

A model for neritic and bathyal dinoflagellates around the K/Pg boundary and their paleoenvironmental indications in the Eastern Alps

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Aiming to increase the paleogeographic database on dinoflagellates in the Paleotethys, their distribution was studied across the Cretaceous/Paleogene (K/Pg) boundary in four sections in the Eastern Alps. Knappengraben and Gamsbach sections are located in the Gosau Basin of Gams. They are continuous across the boundary and represent a bathyal environment. The section at Waidach north of Salzburg (Austria) contains neritic deposits of the Helvetic unit but shows a hiatus at the boundary. The section Goppling between Teisendorf and Oberteisendorf (Bavaria) belongs to a turbidite-rich deep-water system (Ultrahelvetitic unit) and is considered to be continuous across the boundary. All studied sections comprise calcareous nannoplankton Zone CC26 (*Nephrolithus frequens* Zone) of latest Cretaceous age and part of the lowermost Paleocene Zone NP1 (*Markalius inversus* Zone), section Goppling reaches up to NP11. The dinoflagellate distributions yielded that *Trabeculidinium*, *Adnatosphaeridium* and *Codoniella* are restricted to the bathyal environment meanwhile *Manumiella* is restricted to the neritic environment.

In the Upper Maastrichtian, *Spiniferites*, *Pterodinium*, *Impagidinium* and *Achomosphaera* are dominant assemblages in the bathyal environment but *Areoligera*, *Manumiella* and *Trithyrodinium* are abundant in the neritic environment. The high abundance of heterotrophic taxa (*Trithyrodinium* and *Manumiella*) in the neritic Waidach section indicates a high nutrient supply. Two *Manumiella* spikes were recorded only at Waidach and interpreted to reflect slight coolings of oceanic surface waters. In the Danian, *Hystrichosphaeridium* dominated assemblages have been recorded in both neritic and bathyal environments. Acmes of *Spongodinium delitiense* are recorded ~1 m above the K/Pg boundary in the neritic and bathyal environments. These acmes could reflect slight coolings of surface waters in the earliest Danian.

The palynofacies analysis in the Gams Basin reflects a high abundance of AOM in the Maastrichtian and black phytoclasts in the Danian, which indicates intensified terrigenous run-off in the Danian with higher sea-floor oxygenation. In the Waidach section, palynomorphs are much more abundant; indicating a shelf to basin transitional area with dysoxic-anoxic conditions at the sea-floor.

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Artikel/Article: [A model for neritic and bathyal dinoflagellates around the K/Pg boundary and their paleoenvironmental indications in the Eastern Alps 114](#)