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From the Cretaceous/Paleogene boundary to the Paleocene/Eocene-boundary in a turbidite setting (Gams, Austria)

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Paleogene deposits of the Gosau Group crop out near Gams (Northern Calcareous Alps, Austria), 120 km southwest of Vienna. The ca. 400 m thick sedimentary succession was deposited in a middle to lower bathyal environment and comprises the Paleocene and the lowermost Eocene (calcareous nannoplankton zones NP1 to NP12).

The Cretaceous/Paleogene boundary section includes the upper part of the Cretaceous Nephrolithus frequens Zone (CC26) and the lower part of the Paleocene Markalius inversus Zone (NP1). The boundary is characterized by (1) an enrichment of the contents of the siderophile elements Ir, Co, Ni, and Cr compared to background and continental crustal values, (2) a sudden decrease of carbon and oxygen isotopic ratios, (3) a sudden decrease of carbonate content, and (4) an acme of the calcareous dinoflagellate cyst Operculodinella operculata, which is succeeded by an acme of the small coccolith species Neobiscutum parvulum.

The Danian is characterized by a predominance of red and grey pelagic to hemipelagic marlstones and marly limestones. Thin sandy turbidite beds are present in variable amounts, but sandstone to shale ratios stay below 1:5. Turbidite beds are typically calcarenitic, with <10% siliciclastic material.

The Selandian to lowermost Ypresian is characterized by siliciclastic turbidites with sandstone to shale ratios between 1:1 and 5:1. The turbidites display only weak cementation due to a very low carbonate content. Turbiditic shales are dark grey, mainly only a few centimeters thick, and largely carbonate free. The Paleocene/Eocene-boundary interval has been recognized by the lower occurrence of the genus Rhomboaster. It occurs in a siliciclastic, high-frequency turbidite succession.

The largely carbonate-free turbiditic succession of the Paleocene/Eocene-transition grades into a succession dominated again by carbonate turbidites (NP10 to NP11). Within the lower part of this succession (sub-zone NP10a) four 3 to 9 cm thick montmorillonite layers were discovered, which are interpreted as volcanic ashes. Similar layers have been found in other Austrian sections and were correlated with the positive ash-series of the Fur Formation in northern Denmark. The wide dispersal distance of the tephras implies Plinian-scale eruptions and multiple ejections of large volumes of pyroclastic material.