

Facies of Paleogene deep-water deposits of the Gams basin (Styria, Austria)

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The sedimentary succession of the Gosau Group of Gams comprises deposits of Late Turonian to Ypresian age of the Northern Calcareous Alps (Wagneich et al., 2009a). In the Gams area, Cretaceous/Paleogene-boundary intervals (K/Pg) as well as Paleocene/Eocene-boundary intervals (P/E) are exposed (Egger et al., 2004). Detailed sedimentological studies within the Upper Gosau Subgroup above the K/Pg-boundary are done, and a comparison of the Gams slope basin with already published models of turbidite basins.

The Nierental Formation and the Zwieselalm Formation in the eastern outcrop area (Upper Gosau Subgroup, Campanian – Ypresian) are composed of deep-water deposits, mainly turbidites and hemipelagites (Egger et al., 2004, Wagneich et al., 2009a, b). There are several outcrops of the Gosau deep-water succession along the Gamsbach creek and tributary creeks at Krautgraben- and Gamsforst area, near the village Gams, but no continuously exposed section.

The Danian section of the Nierental Formation (calcareous nannoplankton zone NP1–NP4) consists of hemipelagic to pelagic red and grey marls and marly limestones (carbonate contents range from 27–61 wt%) intercalated with some thin sandstone turbidite beds as well as slump layers and debris flow deposits. The turbidite sandstones are rich in carbonate and include redeposited material from the Northern Calcareous Alps, biogenetic components (foraminifera, corallinacea) are common. The debris flow deposits comprise miscellaneous components, including reworked Lower Gosau Subgroup and shallow-marine, Paleocene Kambühel limestones.

The basal part of the Zwieselalm Formation is marked by the first thick (>1 m) turbidite sandstone bed (NP5). Sandstones, grey marls and marly claystones are deposited on top of the Nierental Formation (NP5–NP9), changing into a largely carbonate-free succession composed of turbidites and dark claystones (carbonate contents 2–6 wt%). The turbidites display only weak cementation, due to a very low carbonate content. Turbiditic shales are dark grey, mainly only a few centimetres thick and largely devoid of carbonate. A sedimentation depth below CCD is supposed.

The P/E-boundary interval is characterized by red to brown claystone and marly claystone layers. Occasionally, concretions consisting essentially of early diagenetic siderite occur. The largely carbonate-free turbiditic succession of the P/E-transition grades into a succession dominated by carbonate turbidites (NP10–NP11), intercalated with hemipelagic marl layers (carbonate contents 3–29 wt%). Within the lower part of this succession (subzone NP10a) four 3–9cm thick yellowish to light-grey montmorillonite layers, which are interpreted as volcanic ashes, are exposed. The top of the Zwieselalm Formation (NP12) comprises a succession of marls and thin-bedded, fine-grained sandstone turbidites. Breccia layers at the basal part of the turbidites and slump beds are characteristic for the Zwieselalm Formation (Egger 2004, Wagneich 2009a, b).

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