The Karpatian of the Korneuburg Basin (Lower Austria)

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Abstract. In recent years, a comprehensive dataset on the Karpatian fauna and flora of the Austrian Korneuburg Basin was developed and published in the monographs of Sovis & Schmid (1998, 2002): "Das Karpat des Korneuburger Beckens I + II". In total, more than 500 taxa have been studied during these investigations. This large number of taxa and the synoptic approach makes the Korneuburg Basin one of the best studied basins of Europe and as key point for paleobiogeographic and paleoecological considerations for the uppermost Lower Miocene of the Central Paratethys.

Geological setting

The formation of the asymmetric Korneuburg Basin was triggered by pull apart effects within the Alpine-Carpathian thrustbelt during late Alpine movements (Wessely 1998). The SSE–NNE elongated basin is about 20 km long and attains a maximum width of 7 km, but is strongly narrowed in its northern extension. A swell in the area of Obergänserndorf-Mollmannsdorf separates a southern part of the basin with about 880 m depth from a shallower northern depocenter with about 530 m depth.

The basin margins are formed in the northern part by the Waschberg Zone and towards the south by the Flysch Zone (Fig. 1). Consequently, the basement of the Korneuburg Basin is formed by these units. These Alpine-Carpathian nappes are underlain by an autochthonous basement formed mainly by Upper Cretaceous and Jurassic units and finally by the crystalline of the Bohemian Massif (Malzer *et al.* 1993). The basin subsided on its western border along the Schliefberg Fault down to 880 m depth. By contrast, the eastern margin of the basin which is also formed by the Flysch Zone lacks faults except for its northernmost part. The considerable increase of sediment thickness towards this western fault zone is witness to synsedimentary tectonic activity during the Karpatian.

Sedimentation started during the Eggenburgian comprising shallow marine marls and sands of the Ritzendorf "Formation" (Hekel 1968). The main phase of deposition, however, started in the Karpatian. The majority of the Karpatian basin fill is united in the Korneuburg Formation. This depositional sequence is represented mainly by grey to yellow marly silt and fine to medium sand. Rarely gravel and boulder may occur in close position to the Flysch Zone. A second lithological unit is formed by clayey marls with intercalated diatomites ("Diatomeenschiefer mit Fischresten") which crop out in the northern part of the basin in the vicinity of Großrußbach. Wessely (1998) assumed a Karpatian age for these diatomite-bearing marls based on the benthic foraminifera assemblage identified by F. Rögl. Nevertheless, in the older literature a dating to the Ottnangian was also discussed. A more detailed introduction into the geology, paleoecology and the history of investigations of the Korneuburg Basin was presented by Wessely (1998) and Harzhauser (2002).

Integrated stratigraphy, paleoecology and paleogeography

The Karpatian deposits of the Korneuburg Basin are dated to the uppermost Lower Miocene. The correlation of the mammal fauna with paleomagnetic data allowed a dating to the mammal Zone MN 5 spanning a time of about 16.5–16.7 Ma (Daxner-Höck 1998, Harzhauser *et al.* 2002). Magnetostratigraphic and paleomagnetic data of Scholger (1998) suggest a counter-clockwise rotation of the basin of 20 degrees since the Karpatian. Additionally, a rather southern position of the Korneuburg Basin 16 Ma ago in 34 degrees paleolatitude can be deduced (Scholger 1998).

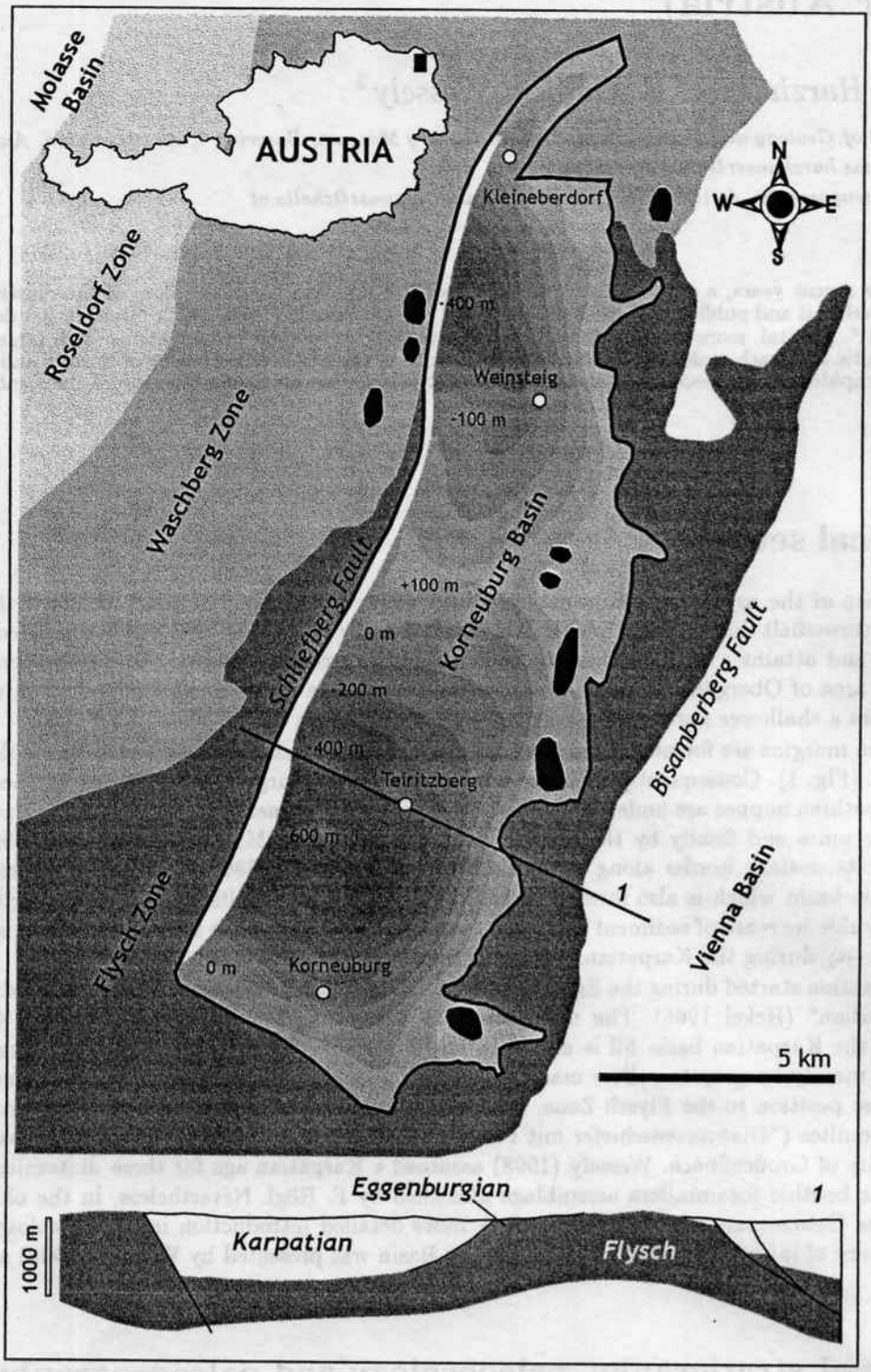

Figure 1: Pre-Neogene basement of the Korneuburg Basin and adjacent areas (modified from Wessely 1998). The basin is strongly subdivided into a northern and a southern depocentre.

During the Karpatian, the basin was strongly cut off from the open Paratethys Sea. In the neighbouring Vienna Basin limnic/fluvial environments of a meandering river system were established on a slightly NE inclined fluvial plain (Weissenbäck 1995). This depositional environment is witnessed by the sandstones with intercalations of pelites and scattered fine conglomerates of the Aderklaa Formation. The distinct fluvial input along the eastern margin of the Korneuburg Basin in the area of the Obergänserndorf-Mollmannsdorf Swell suggests that the influence of the meandering river system of the southern Vienna Basin reached much farther to the north than proposed in earlier studies (e.g., Seifert in Sauer *et al.* 1992). A connection to the marine realm was therefore only warranted along the northern tip, where the Paratethys Sea extended into the Alpine-Carpathian Foredeep. This situation is also reflected in the internal facies patterns. Thus, according to Harzhauser *et al.* (2002), the small, elongated basin was divided into a southern, estuarine part and northern, predominately marine part. In the latter, shallow marine settings of 20–30 m water depth (Rögl 1998) formed where scattered corals dwelt the silty to sandy bottom.

The southern basin, separated from the marine northern basin by the Obergänserndorf-Mollmanssdorf Swell, is characterised by estuarine settings. Tidal mudflats with extended *Crassostrea* bioherms developed along large parts of the coasts. Small-scale fluctuations of the relative sea-level caused repeated marine floodings in the southern basin.

A subtropical climate with a minimum value of the mean annual temperature (MAT) of 17 °C based on the requirements of crocodiles and cordylid lizards was proposed by Böhme (2002). The winter month were frost free; the minimal cold month temperature (CMT) ranged from at least 3 °C to about 8 °C.

Acknowledgements This paper is part of FWF-Project-13745-Bio supported the Austrian Science Fund.

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