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Gratkorn – A new late Middle Miocene vertebrate fauna from Styria (Late Sarmatian, Austria)

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Integrated stratigraphic approaches provide precise correlations of global standard stages with regional Paratethys stages. Nevertheless, higher resolution stratigraphic matching of terrestrial deposits remains challenging due to the lack of a practical continental biostratigraphy. The mostly used tool for biostratigraphic correlation of non-marine deposits in the Old World is still the concept of Neogene Mammal-zones (MN-zones). However, at higher biostratigraphic resolution (<1 million years) this concept looses its practicability and has to be replaced by a taxon-range-zonation. To solve this problem a higher number of independently dated small-mammal localities are needed. This is especially crucial for the late Middle to earliest Late Miocene, for which vertebrate faunas in the (Central-)Paratethyan area rare.

Recently, a new vertebrate fauna was discovered at the locality Gratkorn (clay pit St. Stefan) just beyond the northwestern margin of the Styrian Basin (Gratkorn Basin; 10 km NW Graz; 15°20'55"E/47°08'15"N). The fauna originates from a c. 0.5 m thick hydromorphic paleosol, underlain by fluvial sands and gravels and topped by c. 15 m thick limnic pelites (Gross, 2008). Sedimentological data as well as the gastropod (Harzhauser et al., 2008) and vertebrate faunas point to a highly structured, more or less vegetated alluvial fan/braided river landscape. Active and abandoned fluvial channels, moist floodplain-soils and ephemeral ponds but also nearby dryer open areas and limestone screes of the up-lifting Palaeozoic basement offered a wide range of habitats. The occurrence of xero- and thermophile terrestrial gastropods and ectothermic vertebrates correspond well with the late Middle/early Late Miocene dry-spell in Central Europe (Böhme et al., 2008). Furthermore, an overall semiarid climate is supported by the development of a calcrete horizon c. 0.6 m below the fossiliferous horizon.

The vertebrate remains are irregularly distributed throughout the paleosol. Although articulated skeletons are missing, skeletal elements belonging to the same individual were found frequently close to each other. Many bones are broken and display imprints of gnawing structures. These taphonomic features point to a longer surface exposure before burial without considerable transportation. Trampling and the activity of scavengers (crunching, displacement of cadavers) are probable. Locally small- and medium-sized mammal remains (jaws and postcranial elements) of e.g., hamsters, flying squirrels, gymnures and shrews are concentrated, perhaps demonstrating feeding places of carnivores or more probably of birds of prey. Nonetheless, from geologic point of view, this paleosol represents an event horizon, which accumulated rapidly maybe within tens or hundreds of years.

The vertebrate fauna comprises of scattered fishes (e.g. cyprinids, gobiids, ?channids), amphibians (e.g. salamandrids, ranids, discoglossids, bufonids, pelobatids,), reptiles (scincids, lacertids, gekkonids, anguids, varanids, colubrids, testudinids, emydids), birds (coliiformes), rodents and lagomorphs (cricetids, glirids, eomyids, sciurids, castorids), insectivores and chiropterans (erinaceids, soricids, talpids), and large mammals (suids, tragulids, moschids, cervids, ?palaeomerycids, equids, chalicotheriids, rhinos, proboscidians, carnivors).

Litho- and biostratigraphy (terrestrial gastropods) as well as magnetostratigraphic data and the sequence stratigraphic and geodynamic frame indicate an age of 12–12.2 Ma (early Late Sarmatian s.str., chron 5An.1n) for the locality. Therefore, Gratkorn is one of richest and most complete fauna of the late Middle Miocene of Central Europe and will be confidentially one of the key faunas for a high-resolution continental biostratigraphy and the comprehension of the faunal succession and interchanges near the Middle/Late Miocene transition.

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This is a preliminary overview of the Gratkorn vertebrate fauna. Several taxa are still under investigation. We are

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