

EGU21-4070, updated on 30 Jun 2022

<https://doi.org/10.5194/egusphere-egu21-4070>

EGU General Assembly 2021

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## The Evolution of the Paleo-Danube Deltas of the Lower Pannonian in the Vienna Basin

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### ABSTRACT

The Vienna Basin is a rhombohedral SSW-NNE oriented Neogene extensional basin that formed along sinistral fault systems during Miocene lateral extrusion of the Eastern Alps. The basin fill consists of shallow marine and terrestrial sediments of early to late Miocene age reaching a thickness of 5500 m in the central part of the basin. The early Pannonian was a crucial time in the development of the Vienna Basin, as it coincided with the formation of Lake Pannon. The lake formed at 11.6 Ma when a significant regressive event isolated Lake Pannon from the Paratethys Sea, creating lacustrine depositional environments. At that time the delta of the Paleo-Danube started shedding its sediments into the central Vienna Basin. Based on an existing age model delta deposition commenced around 11.5 Ma and continued until 11.1 Ma. These subsurface deltaic deposits of the Hollabrunn-Mistelbach Formation represent the coeval fluvial deposits of the Paleo-Danube in the eastern plains of the North Alpine Foreland Basin. Therefore, the Palaeo-Danube represents an extraordinary case in where coeval fluvial and deltaic deposits of a Miocene river are continuously captured.

This study provides an interpretation of depositional architecture and depositional environments of this delta in the Austrian part of the central Vienna Basin based on the integration of 3D seismic surveys and well data. The mapped delta has an area of about 580 km<sup>2</sup>, and solely based on the geometry we classify the delta as a mostly river – dominated delta with significant influence of wave – reworking processes. For seven time slices paleogeographic maps are created, showing the interplay between the lacustrine environments of Lake Pannon, delta evolution and fluvial systems incising in the abandoned deltaplain. Onlaps between single deltalobes indicate a northward-movement of the main distributary channel. Approximate water-depth estimates are carried out with in-seismic measurements of the true vertical depth between the topset deposits of the delta and the base of the bottomset deposits. These data suggest a decrease of lake water depth from about 170 m during the initial phase of delta formation at 11.5 Ma to about 100 m during its terminal phase at 11.1 Ma. A major lake level rise of Lake Pannon around 11.1 Ma caused a flooding of the margins of the Vienna Basin, resulting in a back stepping of riverine deposits and

termination of delta deposition in the study area.