

## **Sedimentology, Early Stratigraphic Evolution, and Sediment Provenance of a Submarine Axial Channel System: Lower Puchkirchen Formation, Molasse Basin, Austria**

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### **ABSTRACT**

The Molasse Basin of Austria is an asymmetric foreland basin that contains Oligocene to lower Miocene deep-water strata, including the Puchkirchen Formation. Based on the deposition of the extensively studied upper Puchkirchen Formation in and proximal to a large east-west, meandering axial channel belt, it has been preliminarily proposed that such a channel belt may have been active during the deposition of the lower Puchkirchen Formation. This study focuses on the ongoing sedimentological and stratigraphic architectural work from a study of the lower Puchkirchen Formation that integrates a suite of sub-surface data to investigate the early evolution of the Molasse Basin axial channel belt. We identified the deposits of low-density turbidity currents, high-density turbidity currents, debris flows, and slurry flows in approximately 250 m of drill core from the lower Puchkirchen Formation, which were acquired from 13 wells and graphically logged at the centimeter scale. Using a 3D seismic volume of the study area, we have identified stratigraphic architectural elements associated with main channel belt deposits, overbank wedges, overbank lobes, mass transport complexes, slide blocks, and tributary channels. Our work confirms the hypothesis that a deep-water channel system was active in the Molasse Basin during the deposition of the lower Puchkirchen Formation. Furthermore, our work suggests that topography created by the emplacement of mass transport complexes influenced the distribution of sediment gravity flow deposits in the main channel belt, as well as the overall migration direction of the channel system.