

# **Stratigraphic and Sedimentary Sequence of a Large Pleistocene Glacigenic Tunnel Valley, Lake Geneva, Switzerland: Relevance for Hydrocarbon Plays and Reservoir Characterisation**

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The sedimentary architecture and facies distribution of glacigenic deposits accumulated in the western part of Lake Geneva, investigated by high resolution 3-D reflection seismic and geotechnical boreholes, unravel the complex sedimentary history associated with the advance and withdrawal of Rhone glacier during the Last Glacial Maximum (LGM) cycle. This study offer valuable insights on the complex geometry of incised tunnel valley infill formed during the LGM ice advance and subsequent deglaciation, on the effects of subsequent sedimentation and deformation related to temporary ice re-advances and recessions and on the pro-glacial lacustrine succession accumulated during the final ice withdrawal. Over sub-glacial tunnel-channels deposits a sequence of glacial diamicts has been deposited below an ice tongue of a thickness close to the floating equilibrium. Esker deposits are interstratified in the diamicts. Proglacial turbidites with dropped boulders and till layers indicate two shorts glacial stops stages and advances at about few kilometers of distance from each other. The data from Lake Geneva demonstrate that high resolution seismic investigations of Pleistocene sequences may represent valuable reservoir analogues which can help the definition of the internal architecture and composition of glacial tunnel valleys found in older, deeply buried, often poorly imaged glacigenic sequences. The results of this study also highlights the importance of analogue studies to understand the complexity of hydrocarbon plays associated with glacigenic sedimentary systems and their potential for containing stratigraphic traps.