

## INTEGRATION OF DRILLING HISTORY AND BOREHOLE IMAGES FOR IMPROVED WELL COMPLETION

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### Summary

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The Swiss National Cooperative for the Disposal of Radioactive Waste (NAGRA) is currently exploring the so-called Tabular Jura at the northern front of the Alps to characterize its containment capacity for high level radioactive waste. A scientific drilling campaign investigates the geological, hydrological and geomechanical characteristics of the Jurassic Opalinus Clay, as well as the entire confining Permo-Mesozoic and Tertiary units.

Severe static circulation losses were detected in several boreholes, causing delays and even abandonment of wells. The objective of this study was to identify zones of circulation losses, to design safe mud windows and to adjust the completion schemes for new boreholes based on a multi-well correlation of drilling histories.

Integration of borehole image logs (BHI) and core data substantially improved the drilling history analysis, leading to better forecasts for borehole completion. The locations of unstable zones and their internal geometries could be defined accurately and were correlated with the drilling events in time- and depth domains. Based on these findings the mud weight windows for future boreholes were adjusted and a new casing and completion scheme was introduced. The detailed BHI analysis of natural vs. induced fractures was fundamental to characterise the fracture contribution to the circulation losses.