



Seismic imaging of Middle Pleistocene gravels as a tool to clarify possible neotectonic activity above a major Alpine foreland overthrust (Jura mountains, Northern Switzerland)

Lukas Gegg (1), Marius W. Buechi (1), Herfried Madritsch (2), Thomas Spillmann (2), Gaudenz Deplazes (2), and Flavio S. Anselmetti (1)

(1) Institute of Geological Sciences & Oeschger Centre for Climate and Climate Change Research, University of Bern, Switzerland, (2) National Cooperative for the Disposal of Radioactive Waste (Nagra), Wettingen, Switzerland

The characterization of neotectonics in the northern foreland of the central Alps is challenging due to generally slow deformation rates and associated moderate seismicity. Potentially supportive geomorphic analyses of fault zones are often hampered by the strong imprint of glaciofluvial processes on the investigated landscapes. However, the deposits related to these processes represent potential archives of neotectonic activity. We present a case study where such an archive, located at a geodynamic key location, is investigated by means of high-resolution reflection seismic data.

The Ruckfeld plain, a remnant of a Late Quaternary outwash plain located within the lower Aare valley in Northern Switzerland, is an ideal study location to identify gravel stratigraphy and potential neotectonic activity near the transition between the Tabular Jura and the Folded Jura thrust belt. Elevated ca. 100 m above today's base level of the Aare river, the Ruckfeld plain lies at the Eastern end of the Mandach Thrust, a major thin-skinned overthrust within the Jura Mountains that coincides with the northern edge of a buried Permo-Carboniferous trough dissecting the crystalline basement. The Ruckfeld gravels have been deposited in the Middle Pleistocene so that potential displacements of the stratigraphy could hint at neotectonic activities along these structures since that time.

Three high-resolution seismic lines have recently been acquired on the Ruckfeld plain by the National Cooperative for the Disposal of Radioactive Waste (Nagra). The reflection seismic data image the sedimentary architecture of the Ruckfeld area comprised of underlying Mesozoic sediments unconformably overlain by Quaternary glaciofluvial material. The Mesozoic-Cenozoic contact as well as the overlying Quaternary strata show a series of discontinuities that might represent smaller-scale faults, or alternatively, that could be caused by a dynamic erosional/sedimentary regime. If of tectonic origin, these discontinuities would indicate movements of the shallow Mandach Thrust or the underlying basement faults during the last ca. 200 ka. We present first interpretations of the new data and encourage discussion on the nature and origin of these features.