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# Complex Pleistocene stratigraphy and structure within an inneralpine setting: The basin of Hopfgarten (Northern Tyrol/Austria)

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Most geological and applied investigations are focussed on the main valleys of the Eastern Alps. Thus, our knowledge on the sedimentary record and subsurface topography in terms of overdeepening of small basins and valleys within the former glaciated areas is quite restricted. (Ref. 1). We present a combined approach using geophysical methods (geoelectrics, seismic reflexion) and geological mapping to reveal the sedimentary record of the study area.

The Basin of Hopfgarten is located in the Brixen valley which is located southeast of the seismically active (Ref. 2) lower Inn valley. The record of $\sim$100 m thick terraces along the local rivers contains evidence of – starting from the top – Termination I (Würmian Lateglacial), the Last Glacial Maximum (LGM = Würmian Pleniglacial; both Marine isotope stage 2) and the early Würmian (MIS 5; Ref. 3). Hence during the LGM the $\sim$ 1000 m thick Inn glacier and the corresponding local glaciers were not able to erode the complete sequence deposited since Termination II within the basin. This fact can be explained by the impeded ice flow during the LGM due to the interaction of the various glaciers combined with the effect of topographical barriers. According to this model such conditions should have occurred during the previous glaciations as well, hindering a substantial glacial erosion and thus an overdeepening of the basin. However, a geophysical survey (seismic reflexion) shows a complex subsurface topography with the maximum depth of the bedrock/sediment boundary at a depth of 450 m below the level of the modern rivers. The seismofacies interpretation indicates a succession of two coarsening-upward sequences made up by banded

fine sediment at the base, which altogether is typical for glacio-deltaic sedimentation. Geoelectrical survey is in progress to link this evidence to the above mentioned geological mapping results. The lowest part of the basin fill, just above the bedrock (Paleozoic epimetamorhic rocks), comprises seismic features which are explained as coarse grained sediments. Synsedimentary tectonic activity is evident by faults displacing bedrock, and at least the lower sedimentary succession.

Summing up, the whole sedimentary sequence of the basin appears to be more complex as previously thought. The two deltaic sequences identified in the seismics may document two further terminations older than Termination I (probably Termination II and older). Like in the Inn valley, the lowest coarse grained layer could also be interpreted as tectonically subsided fluvial sediments of Paleogene age (e.g. Oberangerberg Fm). On the one hand the existence of such sediments shows the limitations of palaeo-glaciological models derived from the youngest sequences. On the other hand the preliminary results additionally pinpoint tectonic influence on basin formation. Conclusively, even the small inneralpine basins and valleys hint at a complex history of formation and infill, which needs to be deciphered by drillings.

References:


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