

Overdeepened glacial basins as archives for Pleistocene glaciation history and subglacial processes

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Results from scientific drilling in the Northern Alpine Foreland

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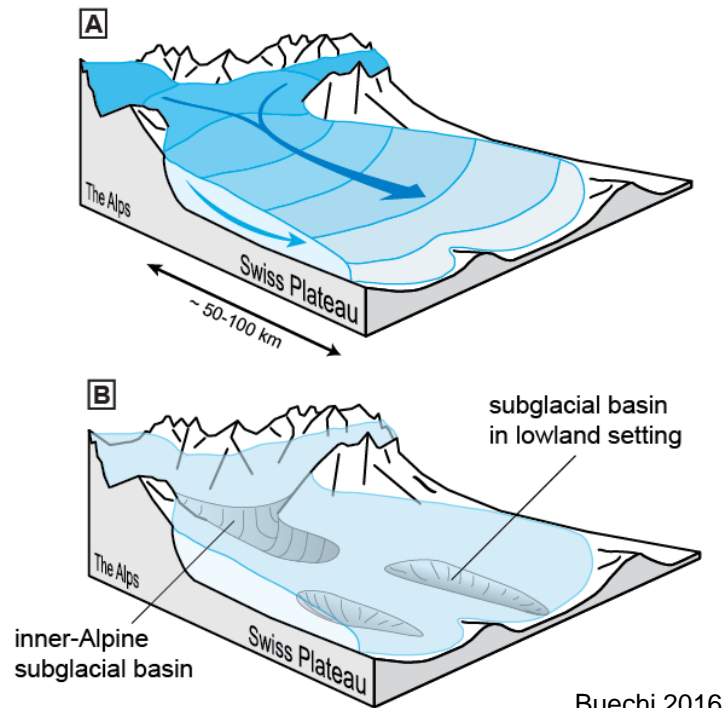
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Glacial overdeepenings in the Alps

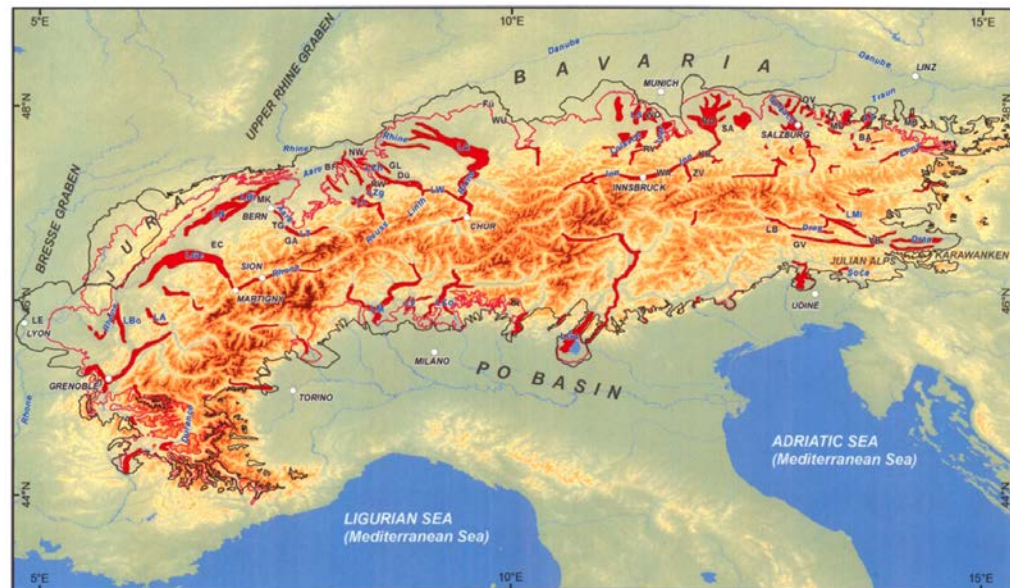
Overdeepened glacial basins in typical Alpine foreland settings



Buechi 2016

Schematic representation of spatial arrangement

Major overdeepenings in the Alps (red areas)



Preusser et al. 2011

- Common large-scale glacial features in many inner-Alpine and foreland settings
- The infills of most basins remain underexplored as challenging drilling operations are required

Research project on overdeepened glacial basins «QBO»

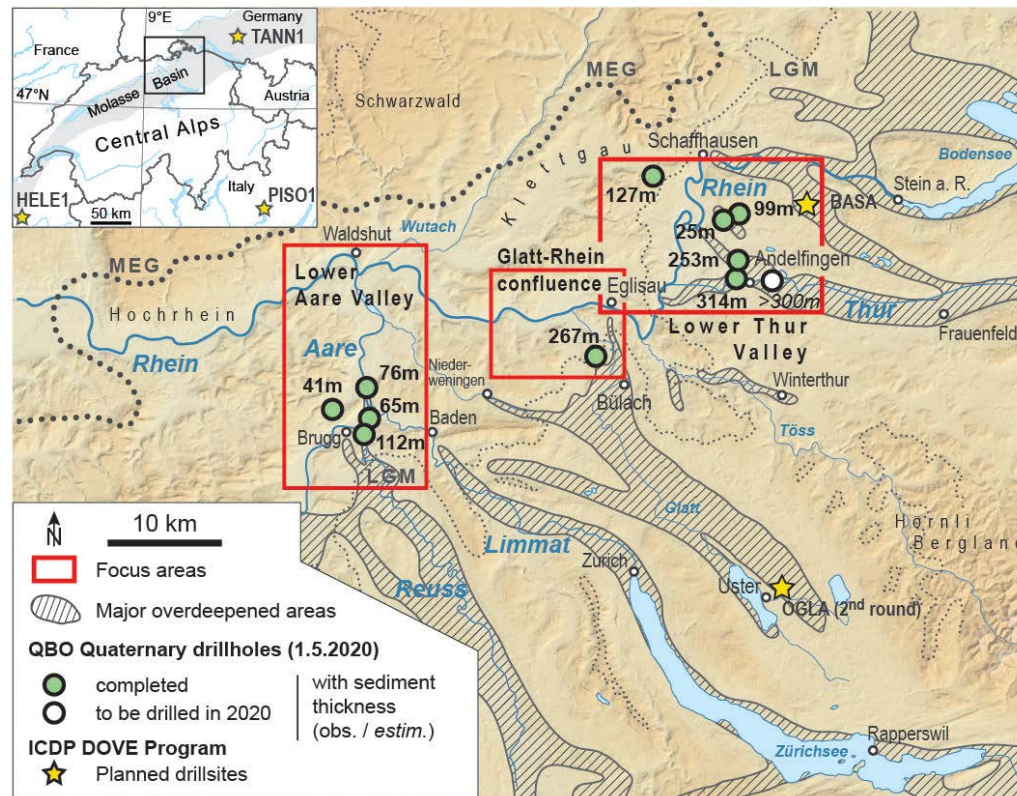
Motivation

The sedimentary infills of overdeepenings remain largely unexplored but potentially contain important geological data to constrain past glaciations and landscape evolution of the Alps

Research goals

- Extract and refine the glaciation history and landscape evolution (focus area N Switzerland)
- Investigate overdeepening subglacial erosion by characterizing former ice-contacts in the basin fills

Drilling campaign (2018-2020)

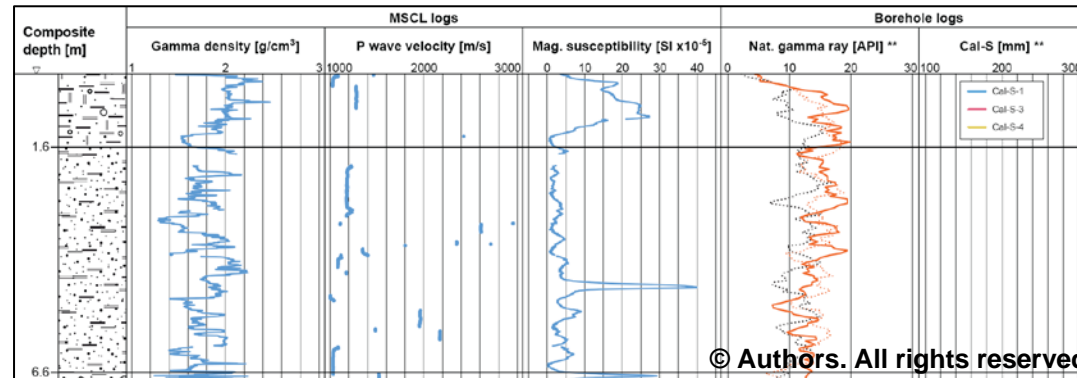


Core imaging and analysis

- Challenging age range ($\sim 10^5$ ka) and depositional setting
- Multiple methods tested and applied (including luminescence, cosmogenic nuclide and porewater dating)



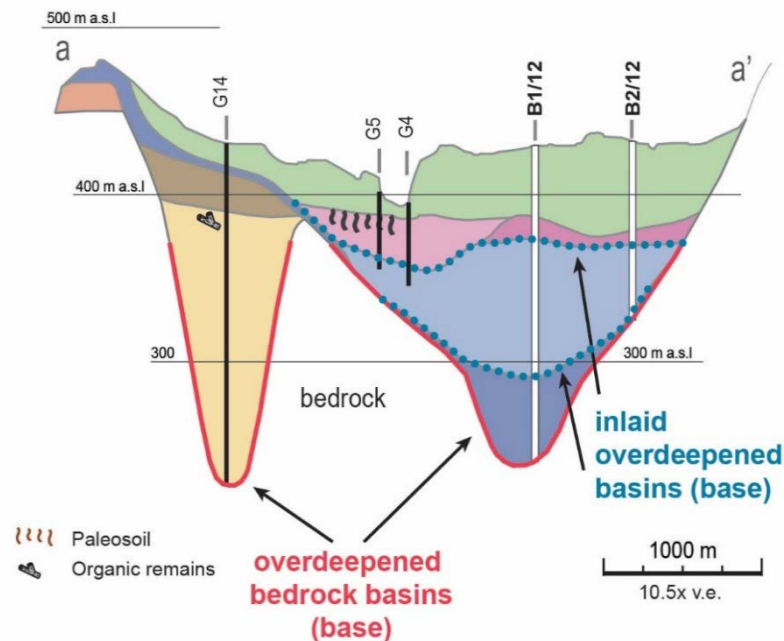
Petro- and geophysical logging (cores & borehole measurements)



Drilling operations (2018-2020)



First results are available...



Stratigraphic summary of an overdeepened system with multiple erosion and infilling cycles (colors) providing evidence for up to ~ 7 regional foreland glaciation (Buechi et al. 2018)

Check out the display by Lukas Gegg et al. (D1141 | EGU2020-7501):

<https://meetingorganizer.copernicus.org/EGU2020/EGU2020-7501.html>

... and stay tuned for more. Thank you!

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References

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- Nagra 2018. 2D Reflection Seismic Exploration and Provisory Interpretation of Overdeepened Quaternary Valleys around the Nagra Siting Regions Zürich Nordost and Nördlich Lägern. Technical report, Arbeitsbericht NAB 18-22. Nagra, Wettingen.
- Preusser, F. et al. 2010. Distribution, geometry, age and origin of overdeepened valleys and basins in the Alps and their foreland. *Swiss Journal of Geosciences*. <https://doi.org/10.1007/s00015-010-0044-y>