

Sediment connectivity in proglacial environments: spatio-temporal patterns of sediment delivery from hillslopes to alluvial plains



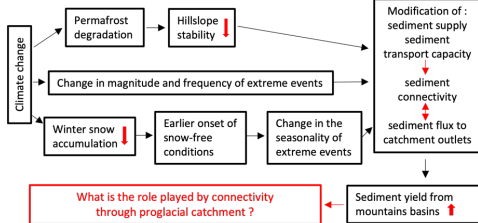
Bayens M.*¹, Lane SN.¹, Dietze M.^{2,3}

¹Institute of Earth Surface and Dynamics, University of Lausanne, ²University of Göttingen ³GFZ Potsdam

*bayens.mathilde@unil.ch

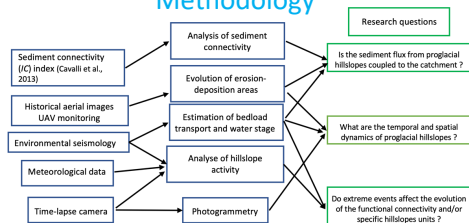


Introduction



- ✓ Proglacial regions and processes are particularly affected by contemporary climate change
- ✓ Proglacial describes cold glaciated environments characterized by frost action (French, 2015)
- ✓ Connectivity describes the degree to which a system facilitates/ impedes the movement of matter and energy through itself

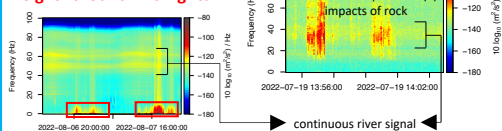
Methodology



Results

Seismograph (1) and spectrogram (2) of the vertical component of geophone OTM6b during the simulated rock falls just after installation

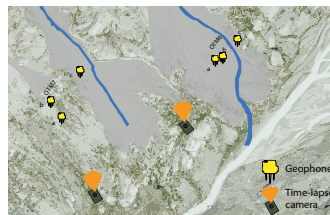
Strange low frequency signal around midnight?



Fieldwork design

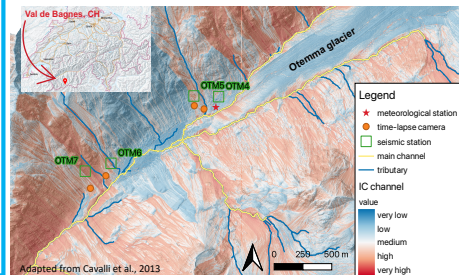
Environmental seismology is a new promising tool for improving the spatio-temporal understanding of geomorphic processes in steep hillslopes

Seismic stations with triangular network of 3 geophones



Study area

Sediment connectivity index



Next steps

- Create time series of:
- process activity for hillslope activity (rockfalls),
 - steep channel activity (debris flows),
 - proglacial stream activity (sediment mobilisation)
- Location and tracking of the seismic sources
Connectivity analysis

References:

Cavalli, M., Trevisani, S., Comiti, F., & Marchi, L. (2013). Geomorphometric assessment of spatial sediment connectivity in small Alpine catchments. *Geomorphology*, 188, 31–41. <https://doi.org/10.1016/j.geomorph.2012.05.007>
 French, H. (2015). *Proglacial Environments* (pp. 9780199363445–0038). Oxford University Press. <https://doi.org/10.1093/obo/9780199363445-0038>