



## Biological traits in relation to elevation and climate change

### Context:

In the framework of GLORIA project ([www.gloria.ac.at](http://www.gloria.ac.at)), plant species have regularly been inventoried since 2001 on 12 summits in Switzerland, to monitor climate change impact on alpine plant species. A complete resurvey is planned in 2022. Up to now, the presence and cover of the species was recorded, but plant functional traits (FT) in relation to elevation, aspect or cover changes were not assessed. Besides, FT particularly relevant for GLORIA are currently under investigation (master project Isabelle Arnold). The new inventories thus provide a good opportunity to measure selected species FT on the GLORIA summits.

### Aim of the study:

This project aims to measure FT in most of the plant species established on the GLORIA summits to investigate community means, inter-specific and intra-specific variations in relation to geographic region, site elevation, aspect and climate change impact. Classical FT (plant height, specific leaf area, ...) as well as some more specific (seed mass, foliage compacity, morpho-anatomical plant and root traits, ...), as pinpointed by current research will be considered, according to candidate interests.

### Requested skills:

A good fitness to climb on mountain summits (up to 1000 m of ascending elevation) and to work in exposed locations. Basic knowledges in botany are welcome. Ability for precise measurements in the field and at the laboratory. High availability in July and August for field work.

### Collaboration:

Field work in collaboration with the GLORIA teams in Valais (Christophe Randin and Jean-Paul Theurillat, Centre alpin de phytogéographie) and in Graubünden (Sonja Wipf, Swiss National Parc; Christian Rixen, WSL Davos). Functional traits in collaboration with Pierre Vollenweider (WSL, Birmensdorf).

**Keywords:** climate change, elevation, functional traits, GLORIA, vascular plants.

**Working place:** field work in Valais (Val de Bagnes, Val d'Entremont) and Graubünden (Swiss national parc and surroundings), laboratory partly in Birmensdorf/ZH.

### References:

- Pauli, H., Gottfried, M., Dullinger, S., Abdaladze, O., Akhalkatsi, M., ... & Grabherr, G. (2012). Recent plant diversity changes on Europe's mountain summits. *Science*, 336, 353-355.
- Pellissier, L., Fournier, B., Guisan, A., & Vittoz, P. (2010). Plant traits co-vary with altitude in grasslands and forests in the European Alps. *Plant Ecology*, 211, 351-365.
- Venn, S., Pickering, C., & Green, K. (2014). Spatial and temporal functional changes in alpine summit vegetation are driven by increases in shrubs and graminoids. *Aob Plants*, 6, Article plu008.
- Vittoz, P., Dussex, N., Wassef, J., & Guisan, A. (2009). Diaspore traits discriminate good from weak colonisers on high-elevation summits. *Basic and Applied Ecology*, 10, 508-515.
- Winkler, M., Lamprecht, A., Steinbauer, K., Hülber, K., Theurillat, J.-P., ... & Pauli, H. (2016). The rich sides of mountain summits - a pan-European view on aspect preferences of alpine plants. *Journal of Biogeography*, 43, 2261-2273.

### Contact:

Pascal Vittoz, Université de Lausanne, IDYST, [pascal.vittoz@unil.ch](mailto:pascal.vittoz@unil.ch); 021 692 43 67

Pierre Vollenweider, WSL, [vollenwe@wsl.ch](mailto:vollenwe@wsl.ch), 044 739 24 35 (<https://www.wsl.ch/en/employees/vollenwe.html>)