

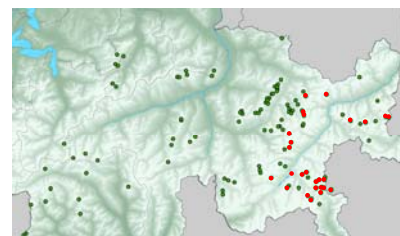
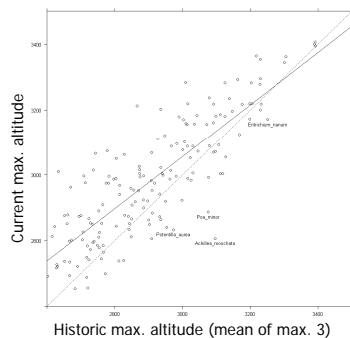
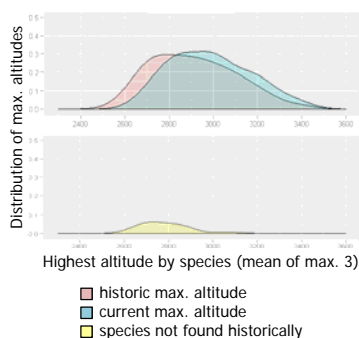


Long-term changes in summit plant richness and its drivers

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Botanists with mountaineering skills climbed many high summits in the Alps centuries ago to study the altitudinal limits of plant life. Their data sets have been used as a basis for long-term biodiversity and vegetation monitoring since the 1980ies. We revisited 120 summits in the SE Swiss Alps that had been botanized ~100 years ago, and 26 that had at least once been revisited since between 1983 and 1993. This gives us the possibility to analyse the dynamics of diversity change over time and its potential drivers, as summits differ in altitude, geology, visitor and wildlife frequencies.

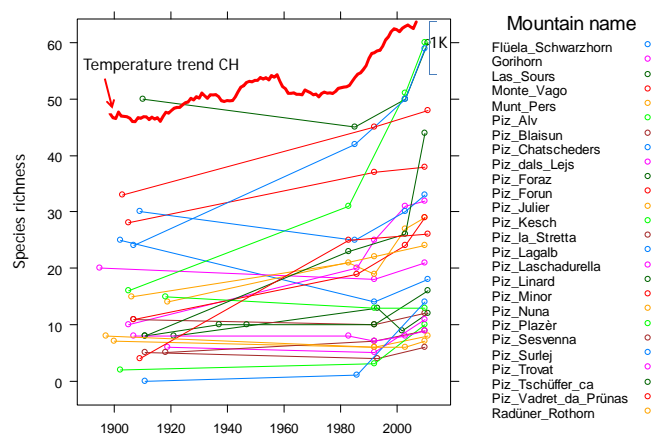
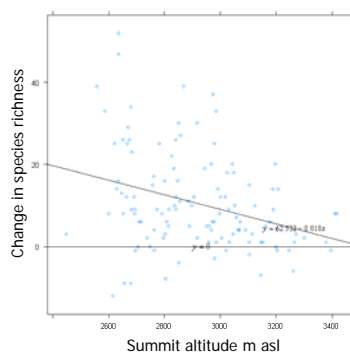
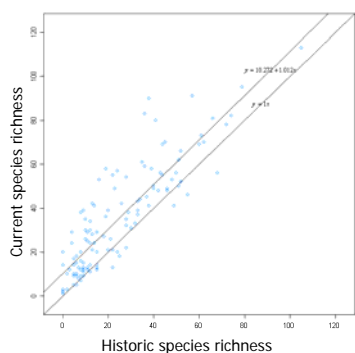


↑ Species enrichment on 26 summits already resampled earlier (red dots) ...

↓ ... became more rapid since the 1980/90ies, concurrent with increasing warming rates in CH

↑ An upwards shift in species maximum altitudes of approximately 80 m in 100 years ...

↓ ... resulted in a general enrichment of summit floras, especially on lower summits.



Conclusions

- Species were **shifting upwards**, leading to an enrichment of the summit flora of SE Switzerland.
- Species **enrichment** was greatest on **lower** summits. Summit altitude is the main explanatory variable; other potential drivers (geology, wildlife, visitor frequencies) are secondary.
- Species **enrichment** became **faster** since the 1980/90ies, concurrent with climate warming.
- Most species became **more frequent**, no signs that high-alpine species are particularly vulnerable.