



LTER in the alpine-subnival zone of the Tyrolean Central Alps

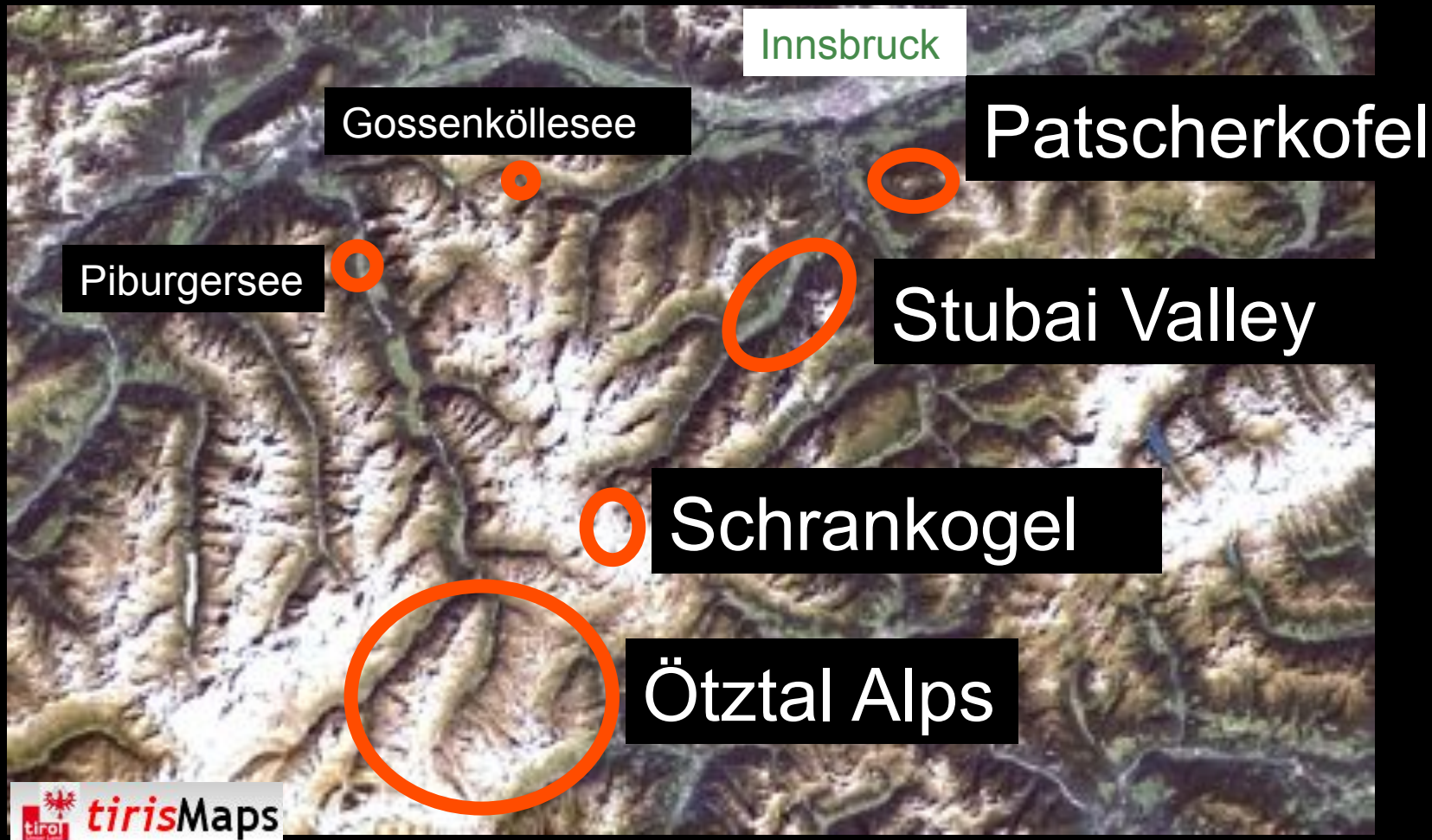
Brigitta Erschbamer & Eva-Maria Koch

Institute of Botany
Alpine Research Centre Obergurgl
University of Innsbruck

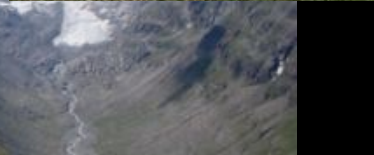


LTER Austria

Platform Tyrolean Central Alps



Obergurgl



LTER Obergurgl

Rock glacier.....since 1938

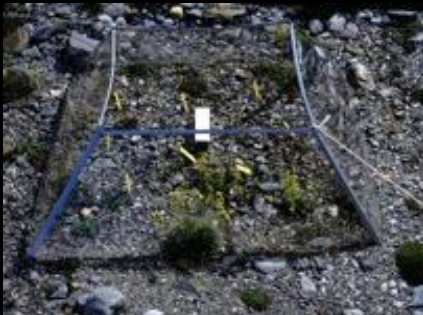
Glacierssince 1953

MaB Obergurgl.....1973-1979

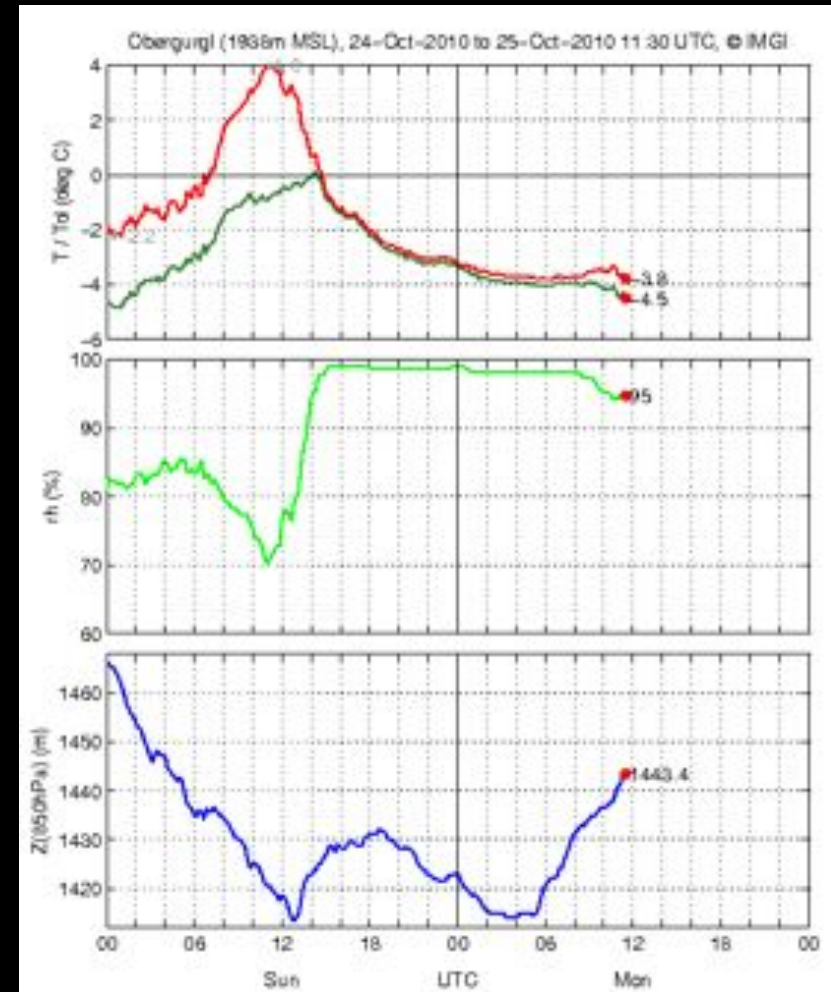
Colonization.....since 1995

Climate change.....1996-2006

Grazing effects.....since 2000



Obergurgl: meteorological station since 1953



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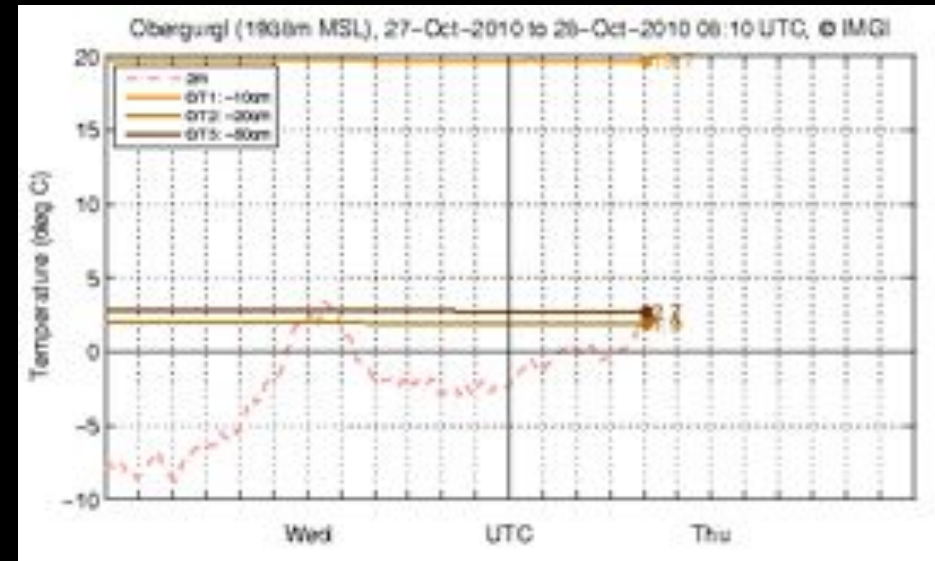
<http://www.uibk.ac.at/afo/>



Obergurgl: meteorological station since 1953



<http://www.uibk.ac.at/afo/>



<http://imgi.uibk.ac.at/main/obergurgl>

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Ecological research in Obergurgl

1) Monitoring program

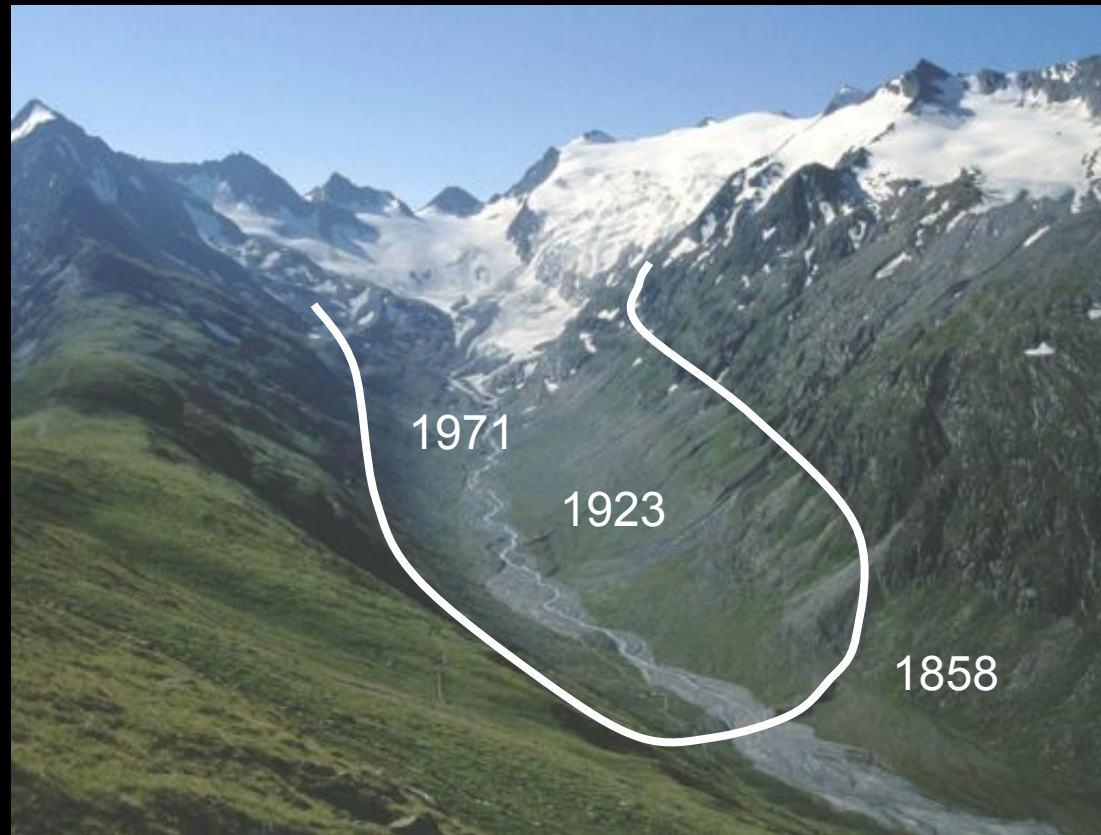
Effects of grazing exclusion from the subalpine to the upper alpine zone

Long-term changes in traditionally grazed communities from the subalpine to the subnival zone



Ecological research in Obergurgl

2) Colonization on the glacier foreland of the Rotmoosferner



2300-2450 m a.s.l.; length 2 km; width 0.6 km

Case studies: glacier foreland

Terrestrial

- Seed rain and seed bank
- Seedling recruitment
- Population dynamics
- Seed persistence
- Climate change effects

- Invertebrates
- Food webs
- Herbivore effects

- Mycobionts
- Rhizosphere microbes and enzyme activity

Aquatic

- Fauna of running water
- Physico-chemistry
- Dietary and stable isotopes
- Benthic algae

Baseline data

- Weather stations: glacier foreland
- Soil classification, grain size, pH, nutrients

Species diversity

175 Vascular plant species (Nagl & Erschbamer)

222 Fungi (Peintner & Kuhnert)

75 Lichens (Türk & Erschbamer)

Mosses ?

65 Algae (Rott et al.)

30 Benthic fauna - species (Füreder)

519 Terrestrial invertebrates (! Numbers for the whole catchment, Kaufmann & Koch)

Vertebrates ?



Koch & Erschbamer 2010

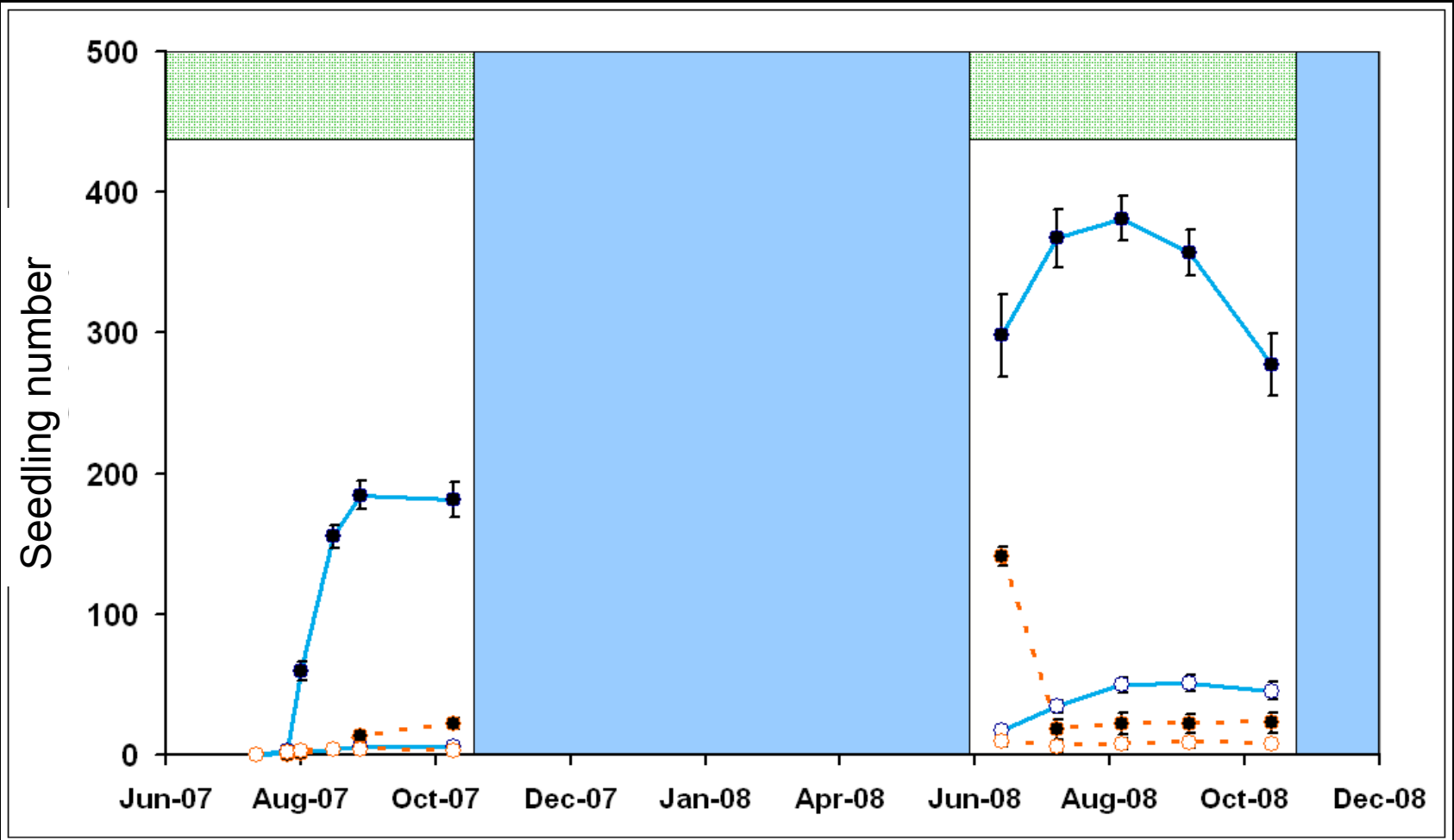
Case studies: colonization

- Where are the colonizers (pioneers) coming from?
Genetic study (FWF 14811-BIO)
- Which factors govern the colonization?
Experiments (FWF 19090-B16, ÖNB)
- How does population development occur?
Demography (FWF 16615-B06)
- How long are the pioneers dominating?
Monitoring (no funding)

Abiotic and biotic drivers of colonization (FWF P19090)



3 factorial design: irrigation, seed addition, safe sites



Erich Schwienbacher, unpubl.

- with irrigation
- without irrigation
- with seed addition
- without seed addition

Monitoring



25 x 25 cm

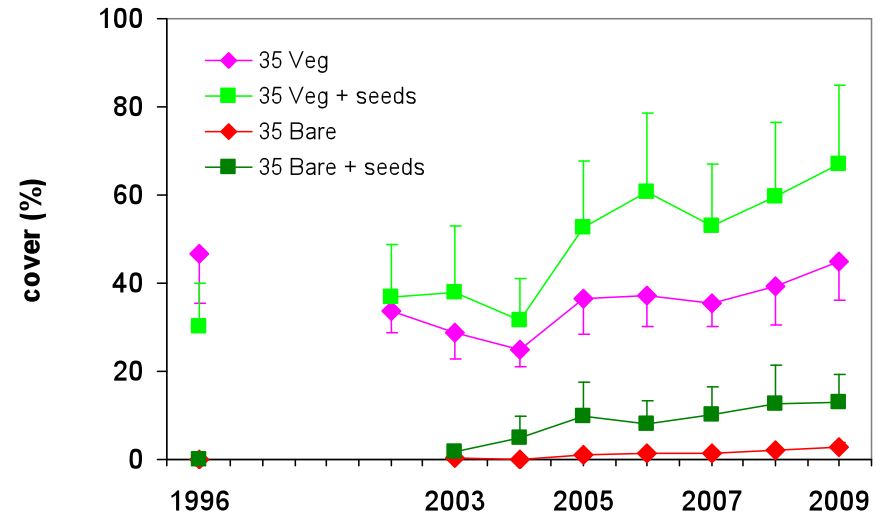
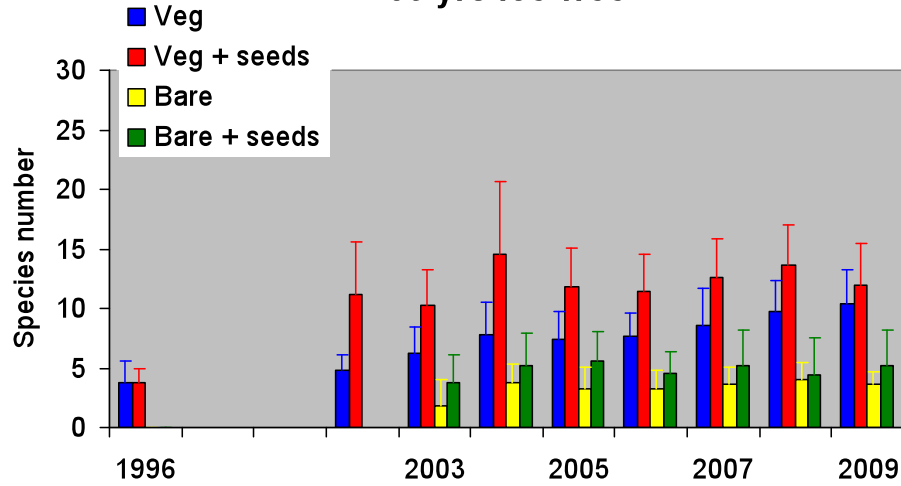


40 permanent plots

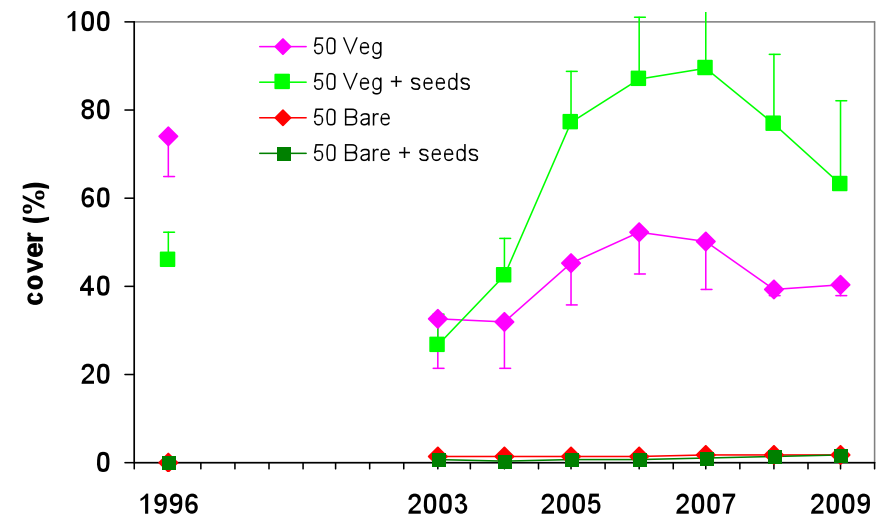
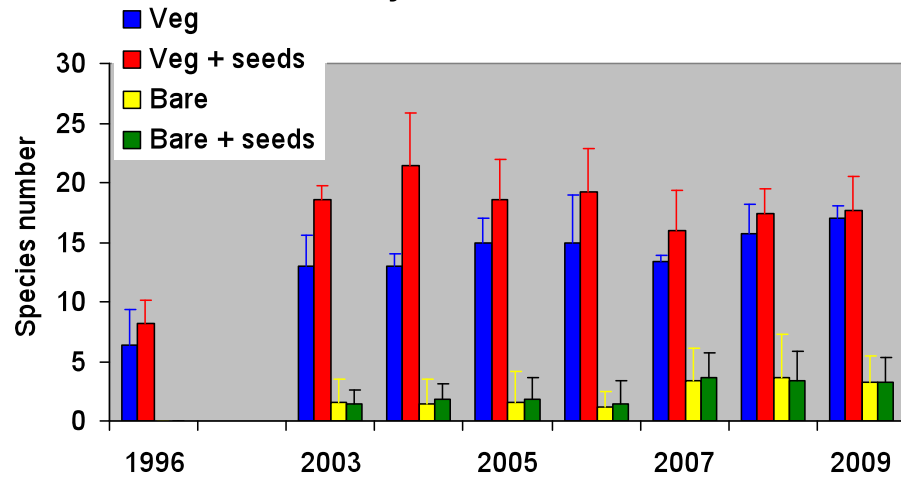
- BAREGROUND vs. VEGETATED
- SEED ADDITION vs. CONTROL
- moraine 1971 vs moraine 1956/57

Erschbamer et al. 2008

39 yrs ice-free



63 yrs ice-free



Outlook: LTER Obergurgl

- Continuation of the monitoring program
- Case studies
- Coordination with the other alpine sites
- Databases
- Funding

Acknowledgements

- Austrian National Bank (ÖNB)
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- University of Innsbruck
- Club Allegra, Munich
- Glacier foreland team

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Thank you for your attention

