Global Mountain Biodiversity Assessment

Supporting Long-Term Research in Mountain ecosystems

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BACKGROUND
What: “infrastructure” project of the Swiss Academies of Sciences & Global Research Project of Future Earth

When: 2000 –

Where: University of Bern, Switzerland

International Project Office: Markus Fischer (PI), Eva Spehn, Davnah Payne, Mark Snethlage

Scientific Steering Committee: incl. Susanna Venn, Christian Körner, Laszlo Nagy, Harald Pauli, Nigel Yoccoz
Mission and goals

> Support mountain biodiversity community
  — Research & collaboration
  — Access to resources (experts, data, etc)
  — Interaction with stakeholders & policy makers
  — Contribution to sustainable development
Network

Countries: ~80    Organisations: ~850    Experts: ~1000
Products

Mountain Portal
  — Mountain definition
  — Treeline algorithm
  — Bioclimatic belts
  — Mountain inventory
Instruments

> Working groups
  — Platform for research
  — Facilitates intellectual exchange among small teams of scientists, stakeholders, and other members of the mountain biodiversity and sustainability science community
  — Outputs: scientific publications, research tools, and project proposals

> Workshops and Conferences
GMBA & LTER

Past
Sites & Workshops

> LTER working group

> Core sites

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<th>Tyrolean High Alps (Austria)</th>
<th>Valle d'Aosta (Italy)</th>
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<td>Sierra Nevada (Spain)</td>
<td>Collelongo - Selva Piana (Italy)</td>
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<td>Aigüestortes &amp; Redon (Spain)</td>
<td>Furka Region (Switzerland)</td>
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<td>Ordesa y Monte Perdido / Huesca ES (Spain)</td>
<td>Pyramid Lakes (Nepal)</td>
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<td>Niwot Ridge (USA)</td>
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> Workshops 2011-2013

— Col du Lautaret (2011): use of common protocols to ensure comparability of data
— Aosta Valley (2013): procedure for testing common protocols to ensure comparability of data
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Past

Present
Comparative, long-term ecosystem monitoring across the Alps: Austrian Hohe Tauern National Park, South-Tyrol (Italy) and the Swiss central Alps (Körner, Tappeiner, Newesely)

- Topography
- Snow beds
LTER across the Alps (2)

Vertebrates
Insects & spiders
Flowering plants
Mosses, lichens, fungi
Soil organisms
Soil & climate

Variable X vs. Time (yrs)
Long Term Ecological Research site in Campos de Jordao, Serra da Mantiqueira, Brazil (Laszlo Nagy)
GMBA & LTER

Past

Present

Future
Working group on - and network of model-based monitoring programs for supporting management decisions

“What should we begin measuring now that can help society better understand and manage natural resources by 2050 (and beyond) and, in turn, guide human societies through a likely transition to a less bountiful world?”

“A new dialogue needs to emerge that emphasizes the importance of implementing appropriately stratified ecosystem specific, site-based monitoring that can detect change and explain the drivers of that change”
Monitoring: why, what, how (1)

> Why to monitor?
(1) Focus on learning & developing an understanding of the behaviour and dynamics of the monitored system
(2) Focus on providing information that is useful in making informed management decisions

> What to monitor?
— Decisions about which variable to monitor determined by objectives of the program (i.e., answer to question why)

(1) State variables + associated rate parameters important to a priori hypothesis of system behaviour
(2) State + other variables included in objective function + variables needed to model managed state variables
Monitoring: why, what, how (2)

> How to monitor: based on hypotheses / models

— Outline known or assumed functioning of ecological systems
— Define adequate monitoring targets and their inter-relations
— Predict the state of monitoring targets when subjected to drivers of change
— Model-based sampling design
  - Sampling intensity
  - Temporal & Spatial resolutions and extents
Model-based LTER in Mountain Areas (2)

- Working group on - and network of **model-based monitoring** programs for **supporting management decisions**
  - Context-specific hypotheses & predictions in mountain ecosystems + development of monitoring targets
  - Protocols & models
  - Shared understanding of drivers and responses

- GMBA network of experts to advise on specific mountain systems & management requirements
> Facilitate integration of results and knowledge along spatial scale

> Support syntheses of outcomes for policy-relevant recommendations
  — Support information management architecture to achieve, analyze, and reuse the data at appropriate scale
  — Outreach and communication