The Mountain Research Initiative

Global Change Research in Mountain Regions

A Workshop Preceding the EGU General Assembly 2011

Saturday, 2 April 2011, 9–17:30
Modul Hotel
Peter-Jordan-Str. 78
1190 Vienna, Austria

Program and Catalog of Research Summaries

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Global Change Research in Mountain Regions
A Workshop Preceding the EGU General Assembly 2011

Organizers

The event is organized by the Mountain Research Initiative (MRI) and the Institute for Mountain Research, Austrian Academy of Sciences (IGF-ÖAW).

Objectives

A one-day workshop to bring together active researchers from around the world working on global change in mountain regions to:
1) Present a brief overview of their research programs
2) Comment on fellow participants' research programs
2) Discover opportunities for new interdisciplinary research collaborations

Outcome

The principal outcome of the workshop will be a compilation of current research programs on global change in mountains.

Procedure and Tools

The workshop will achieve its outcome through:
a) Preparation of a Catalogue of Research Summaries prior to the workshop containing information on each participant's research activities and future plans
b) Short (5 min.) presentations by participants outlining their research programs plans for the future
c) A Mountain Research Market to stimulate interdisciplinary thinking and to give feedback and suggestions to the presenters about their research.

Participants

Active scientists from around the word interested in interdisciplinary dialogue potentially triggering new innovative ideas in the field of Global Change research in mountain regions. The workshop accommodates a maximum of 24 speakers, and few additional participants without presentations.

Program

9:00	**Opening & Introduction Part I** *Astrid Björnsen Gurung, MRI*			20’
9:20	**Introduction participants**			25’
9:45	**Round 1: Panel and Working Groups**			
	A1 **Rory Cowie**	B1 **Thomas Dax**	C1 **Viacheslav Dovbenko**	3 x 5’
	Simon Gaberell Jacek Kozak Markus Leitner Christian Maurer	Sven Herzog DP Poudel Sulejman Redzic Iztok Sinjur Michael van der Valk	Alia Khan Matej Ogrin Irene Schicker Eva Streberova Vladimir Vladimirov	45’
10:45	**Round 2: Panel and Working Groups**			
	A2 **Simon Gaberell**	B2 **Sven Herzog**	C2 **Alia Khan**	3 x 5’
	Thomas Dax Irene Schicker Iztok Sinjur Eva Streberova	Viacheslav Dovbenko Jacek Kozak Markus Leitner Sulejman Redzic Vladimir Vladimirov	Rory Cowie Christian Maurer Matej Ogrin DP Poudel Michael van der Valk	45’
11:45	**Round 3: Panel and Working Groups**			
	A3 **Jacek Kozak**	B3 **Markus Leitner**	C3 **Christian Maurer**	3 x 5’
	Rory Cowie Thomas Dax Viacheslav Dovenko Matej Ogrin Eva Streberova	Simon Gaberell Sulejman Redzic Michael van der Valk Vladimir Vladimirov	Sven Herzog Alia Khan DP Poudel Irene Schicker Iztok Sinjur	45’
12:45	Lunch offered by MRI			45’
13:30	BOKU Sightseeing Tour			45’
14:15	**Round 4: Panel and Working Groups**			
	A4 **Matej Orgin, Iztok Sinjur**	B4 **Irene Schicker**	C4 **Eva Streberova**	3 x 5’
	Simon Gaberell Jacek Kozak Markus Leitner Christian Maurer	Rory Cowie Sven Herzog Michael van der Valk Vladimir Vladimirov	Thomas Dax Viacheslav Dovbenko Alia Khan DP Poudel Sulejman Redzic	45’
15:15	**Round 5: Panel and Working Groups**			
	A5 **Dilli Prasad Poudel**	B5 **Sulejman Redzic**	C5 **Vladimir Vladimirov**	3 x 5’
	Viacheslav Dovbenko Simon Gaberell Alia Khan Jacek Kozak Irene Schicker	Rory Cowie Sven Herzog Christian Maurer Matej Orgin	Thomas Dax Markus Leitner Iztok Sinjur Eva Streberova Michael van der Valk	45’
16:15	Break			15’
16:30	**Introduction Part II**			10’
16:40	**Part II: Research Carousel** a) How can the presented research be improved? (what) b) Which other discipline/approach/methodology? (how) c) Which individuals/research groups/project consortia should be consulted? (who)			40’
17:20	**Closing remarks and evaluation**			10’
17:30	**Closing**			

Venue

Hotel Modul der Wirtschaftskammer Wien (blue pin on below map)
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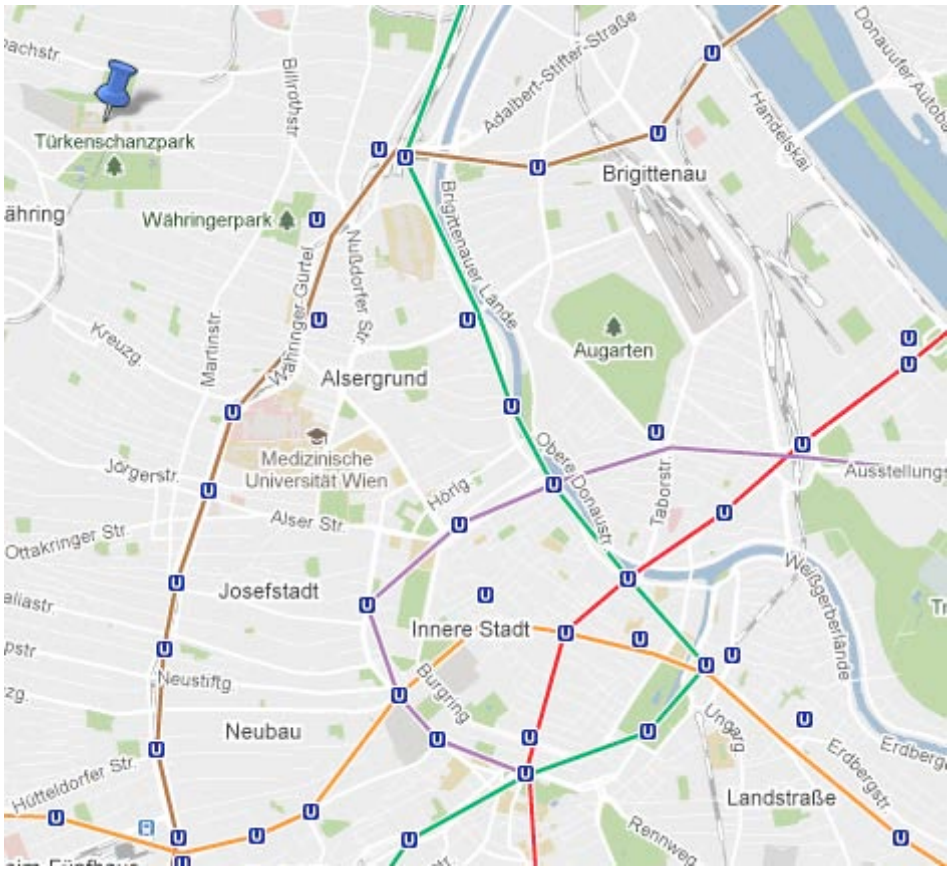
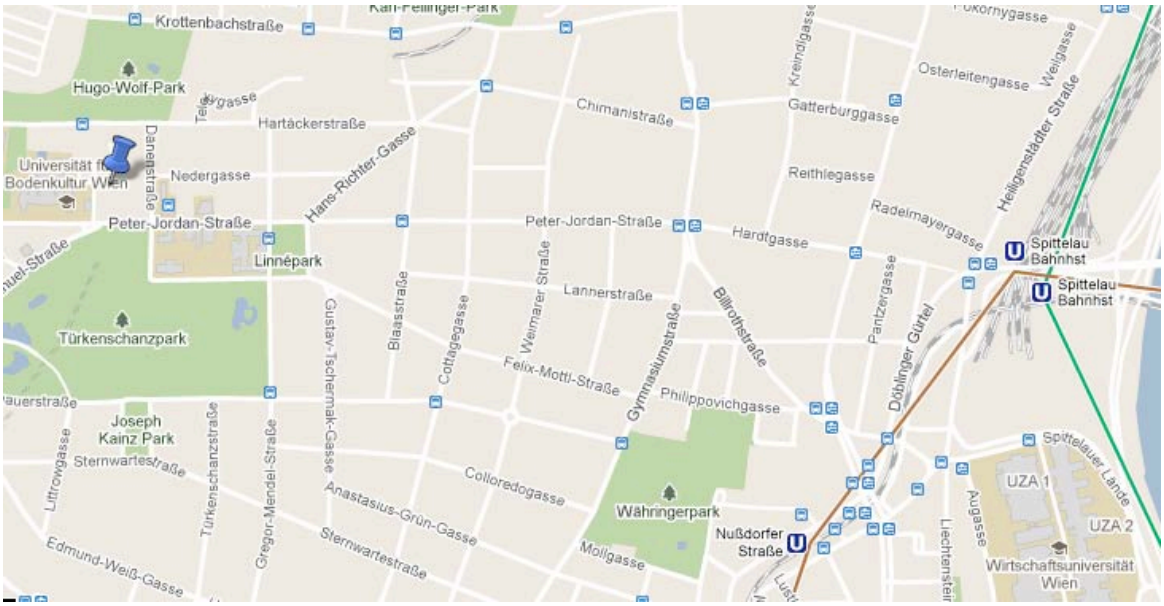
How to reach Hotel Modul?

Download a PDF-map
Bus stop 10A or 40A Dänenstrasse





Post-Workshop Dinner 19:00

Wine tavern 10er Marie, costs covered by participants (about 20 Euro).
10er-Marie is the oldest Heurigen tavern in Vienna located at Ottakringerstr. 22-224, 1160 Vienna (near terminal station U3):

http://www.fuhrgassl-huber.at/piv_d/archive.php?c=m_main&w=&t=m_front.html

To get there from Modul Hotel:
Take bus 10A from Dänenstrasse to direction Niederhofstrasse. Get off at Ottakringerstrasse and follow the Ottakringerstrasse until you find the tavern to the left.

Contact

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Annex I: Summary Table of Expertise

		Climate/ Paleo	Cryosphere	Hydrology	Lakes/ Aquatic ecology	Hazards	Biodiversity	Forests/Ecology	Land Use/ Rural&urban	Economy/ Tourism	Culture/ Institution/ Governance	Methods
Cowie	Rory											
Dax	Thomas											
Dovbenko	Viacheslav											
Gaberell	Simon											
Herzog	Sven											
Khan	Alia											
Kozak	Jacek											
Leitner	Markus											
Maurer	Christian											
Ogrin	Matej											
Schicker	Irene											
Streberova	Eva											
Poudel	Dilli Prasad											
Redzic	Sulejman											
Sinjur	Iztok											
Van der Valk	Michael											
Vladimirov	Vladimir											

Annex II. Instruction to Work Group Leaders

Role of the Chair

- Introduce your research ideas that would profit from an interdisciplinary approach
- Facilitate a focused discussion

Role of the Rapporteur

- Support the chair by taking notes, writing down/drawing ideas on the flip chart
- Watch the time and remind 5' before the end to wrap up

Material for Working Groups

- Flip Charts or table with Flip Chart paper
- White cards 1/3 of A4 (ca. 20 x 10cm)
- Markers, different colors

Technical Framework

Ideally, working groups sit around a table with paper on it or a flip chart.

1) The chair briefly introduces a project idea or raises a question he/she likes to discuss.
2) The rapporteur writes the working group number (e.g. B3) and a short heading on the flip chart and uses it as a mind map documenting the discussion and ideas (unfiltered!). The Chairs can use the mind map(s) for Part II.
3) The discussion is structured around three fields:

   a. **How could the presented research be improved?**
      (free brainstorming, focus on "what?")
   b. **Which other discipline/approach/methodology would shed new light on the proposed research?**
      (focus on "how?")
   c. **Which individuals/research groups/project consortia have worked or are working in a related field and should be consulted?**
      (focus on "who?")

   These three questions should be kept in mind throughout the entire workshop. In Part II, participants have the opportunity to comment on project ideas, on which they could not comment in the course of the 5 working groups.
4) The Chair wraps up the discussion identifying the most important elements/insights that could improve his/her research project.

Please note:

- Every idea counts!
- Silent work can be productive, too.
- Giving a few minutes to think and take notes can be a good stimulant and achieve high participation!

If you work with cards:

- One idea per card
- Max. three lines per card
- No CAPITAL letters

INDEX OF THE WORKSHOP PARTICIPANTS

	Name	Affiliation
1	**Rory Cowie**	Department of Geography University of Colorado at Boulder, USA Rory.cowie@colorado.edu
2	**Thomas Dax**	Federal Institute for Mountainous & Less-Favoured Areas Vienna, Austria thomas.dax@babf.bmlfuw.gv.at
3	**Viacheslav Dovbenko**	Institute of Economy and Management L'viv National Polytechnic University L'viv, Ukraine vodol@litech.net
4	**Simon Gaberell**	Department of Geography University of Geneva, Switzerland simon.gaberell@unige.ch
5	**Michael Hantel**	Department of Meteorology and Geophysics University of Vienna, Austria michael.hantel@univie.ac.at
6	**Sven Herzog**	Dresden University of Technology Tharandt, Germany herzog@forst.tu-dresden.de
7	**Alia Khan**	Institute of Alpine and Arctic Research University of Colorado, USA alialauren@gmail.com
8	**Jacek Kozak**	Institute of Geography and Spatial Management Jagiellonian University, Poland jkozak@gis.geo.uj.edu.pl
9	**Markus Leitner**	Environmental Impact Assessment & Climate Change Unit Environment Agency Austria (EAA) Vienna, Austria markus.leitner@umweltbundesamt.at
10	**Christian Maurer**	Department of Meteorology and Geophysics University of Vienna, Austria christian.maurer@univie.ac.at
11	**Matej Ogrin**	Dept. of Geography, Faculty of Arts University of Ljubljana, Slovenia matej.ogrin@siol.ne
12	**Dilli Prasad Poudel**	Nepal Development Research Institute Lalitpur, Nepal dilli.poudel@gmail.com
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14	**Irene Schicker**	Institute of Meteorology University of Natural Resources and Life Sciences Vienna, Austria Irene.Schicker@boku.ac.at
15	**Iztok Sinjur**	Slovenian Forestry Institute Ljubljana, Slovenia iztok.sinjur@gozdis.si
16	**Eva Streberova**	Department of Landscape Ecology, Faculty of Natural Sciences Comenius University Bratislava, Slovakia streberova@fns.uniba.sk
17	**Michael van der Valk**	The Netherlands National Committee IHP-HWRP info@hydrology.nl
18	**Vladimir Vladimirov**	Institute of Biodiversity and Ecosystem Research Bulgarian Academy of Sciences Sofia, Bulgaria vdvlad@bio.bas.bg

Rory Cowie

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University of Colorado at Boulder
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Keywords: Snow hydrology, Water Isotopes, biogeochemistry, Surface and Groundwater Interaction

1. What are your central research objectives?

Understand the hydrology and biogeochemistry of seasonally-snow covered mountain catchments.

a. On what phenomena do you take data?

Precipitation, snow cover, discharge, soil processes.

b. What are you attempting to predict or characterize using those data?

Surface/groundwater interactions are one of my biggest challenges. I attempt to use a combination of isotopic and biogeochemical measurements to understand the processes controlling the spatial and temporal movement of water in mountainous environments.

2. What is the geographic scope of your research?

Seasonally snow-covered mountain catchments at mid-latitudes.

a. Where do you gather data?

Colorado Front Range, USA.

b. Over what geographic domain do your conclusions hold?

Alpine and sub-alpine areas (elevation: 1800- 3800 m).

3. What agencies and foundations fund your research?

Primary funding is supplied by the National Science foundation, but also from the Environmental Protection Agency, United States Forest Service, National Park Service, and the State of Colorado.

a. What are the time horizons for your funding?

The Niwot Ridge LTER project was recently renewed until 2016. The Boulder Creek Critical Zone Observatory is funded through 2013 with projected five-year renewal.

b. What kinds of resources does your funding provide for you?

The funding supports undergraduate students, graduate students, post-doctoral students, field instrumentation and technicians, laboratory facilities at the Institute of Arctic and Alpine Research.

4. How you would like to see your research program evolve over the next 5-10 years?

a. New methodologies for data acquisition?

We hope to utilize remote sensing devices such as Lidar to better quantify spatial and temporal extend of snow cover. Additionally, we strive to increase the coupling of in-situ measurement devices to centralized data loggers and real-time transmission of data to appropriate data storage locations.

b. New methodologies for data analysis?

We expect to see growth in analytical precision of laboratory instruments and progress towards field deployment of high precision instruments such as water and gas isotopic analyzers.

c. Incorporation of new disciplines into your program?

We believe that interdisciplinary collaboration is necessary to enhance understanding of hydrologic processes in mountain regions, especially when coupled with studies of critical zone evolution.

d. Expansion to new geographic areas?

We hope to expand research collaboration to other snow-dominated mountain environments where climate change influences water resources. Additionally, we are prepared to add additional local research sites to enhance our understanding of disturbances such as wildfire on watershed hydrology and biogeochemistry.

Thomas Dax

Federal Institute for Mountainous and Less-Favoured Areas
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Keywords: Mountain farming, rural development, mountain policy assessment, regional policy, territorial cohesion.

1. What are your central research objectives?

The Federal Institute for Mountainous and Less-Favoured Areas (BABF) is an interdisciplinary research center in the fields of mountain farming, land use, regional development and aspects of sustainable resource management in mountain environments and other areas with production difficulties. Its main objectives are the spatial analysis and distributional issues of agricultural and regional policies in mountain and less-favored areas. The regional perspective is carried out by researchers from different socio-economic disciplines, particularly emphasizing aspects of rural development, mountain area dynamics, rural sociology and agro-environmental concern, analyzed against regional, national and international contexts.

The analysis of the following fields of competence and data sets is focused on its relevance for mountains and less-favored areas or generally its spatial impacts on these types of areas:

- research on structures of agriculture, regional economy, demographic development and service provision;
- a particular focus on drivers of and challenges for rural development and emerging trends in rural regions;
- aspects of employment trends and farm income changes, as well as more general quality of life issues;
- and impact assessment of sector policies and territorial cohesion.

The use of respective socio-economic indicators aims at assessing the opportunities for shaping of macro trends in a mountain context, at analyzing the respective policy environment (with the aim of contributing to coordination of sector policies) for mountain societies, at providing impact assessment studies on mountain (relevant) studies, and at elaborating policy instruments and programs that enhance local actors empowerment and involvement.

2. What is the geographic scope of your research?

In general, the research activities focus either on a national or the European context. Within research projects a specific selection of case studies is quite common, so that exemplary regional studies are available. The main thrust of

findings, however, is on the national context of Austria, comparative studies of the Alpine mountain regions and, through several EU-projects, on a comparison of mountain ranges of the European Union.

3. What agencies and foundations fund your research?

The Institute is affiliated to the Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) and disposes of yearly funds provided within the Federal budget. In addition, a rising portion of the financial resources has to be generated through project grants. In most cases these are FP7 or other projects commissioned by the European Commission (thematic tenders etc.). Involvement in international cooperation within the Alpine Convention, Mountain Partnership and Working Groups of International Organizations, like OECD, FAO, UNEP add to the international orientation of the research.

Usually projects have a time horizon between 1 and 3 years and involve permanent staff, with small resources available for short-term external tasks, mainly for graduate students, e.g. to carry out case studies.

4. How you would like to see your research program evolve over the next 5-10 years?

BABF has committed itself to shape the research profile towards a more thorough investigation of mountain areas challenges and opportunities. The research priorities will remain focused on the socio-economic trends of mountain and less-favored areas also in the future. Cooperation with respective research institutes at the international level to improve acquisition of socio-economic regional data of mountains will be intensified. In a medium-term perspective the relevance and understanding of public goods provisions in mountain areas for lowlands (and in a more global consideration) should be supported increasingly by addressing issues of interrelations between mountains and lowland areas.

A better integration of policy impact assessment research, including socio-economic aspects of climate change adaptation activities, public services provision, activities for making use of rural amenities and migration studies should enlarge the scope of research and address major emerging challenges of mountain regions. This would also require a stronger emphasis on inter- and trans- disciplinary research.

Trends in mountain areas of other European mountain ranges would have to be included and stressed increasingly in comparative work. More attention will be given particularly to developments in Carpathians and Balkan mountains.

Viacheslav Dovbenko

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Keywords: potential of development, socio-ecological mechanisms, estimation of environment change and new opportunities of its protection in Carpatian mountains region

1. What are your central research objectives?

The central purposes of my research are formation the balanced potential of Carpatian mountains region development in view of ecological priorities.

a. On what phenomena do you take data?

Socio-economical and ecological parameters which characterize sustainable development of the territory.

b. What are you attempting to predict or characterize using those data?

With the help of construction of region development scenarios events with use of modeling tools.

2. What is the geographic scope of your research?

a. Where do you gather data?

The statistical data, materials of printed editions, Internet - resources, the accounting data of the enterprises and the organizations in Ukrainian Carpathian mountains region.

b. Over what geographic domain do your conclusions hold?

On the trend analysis the social and ecological conditions changes in the Ukrainian Carpathian mountains.

3. What agencies and foundations fund your research?

Researches I spend independently. There is no financing on the part of agencies and foundations fund.

a. What are the time horizons for your funding?

In connection with absence of financing are not present and precisely certain horizons of time for funding my research.

b. What kinds of resources does your funding provide for you?

In part I involve post-graduate students and post-docs.

4. How you would like to see your research program evolve over the next 5-10 years?

Social and economic, climatic and ecological conditions changes in the modern world occur extremely quickly and consequently demand duly and desirable anticipatory reaction. Therefore the subjects of potential of sustainable territories development formation is the actual attraction and demands the continuation in the perspective period.

a. New methodologies for data acquisition?

New methods of data acquisition with the help of more perfect technologies will expand opportunities of the duly prevention of cataclysms in nature and reactions to critical deviations of ecological parameters of an environment.

b. New methodologies for data analysis?

It is important to improve existing and to develop new progressive methods of the analysis of the data, allowing providing increase of objectivity and accuracy of forecasts of territories development. Researches should promote formation of necessary conditions for consideration the components of potential of the appropriate territory.

c. Incorporation of new disciplines into your program?

Stronger emphasis on partnership on mountain research.

d. Expansion to new geographic areas?

Other parts of the Carpathians and also other mountain regions.

e. Other?

Adjustment of cooperation with the organizations supporting applied social and economic researches in mountain regions.

Simon Gaberell

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University of Geneva, Switzerland

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Keywords: Regional environmental governance, international institutions, trans-boundary region-building, mountain ranges, Carpathian region

1. What are your central research objectives?

The department of Geography of the University of Geneva has recently launched an important research project on the regionalization of environmental policies in Central Europe: *Glo-Rete - Globalization and re-territorialization of environmental initiatives in Central Europe: stakeholders, narratives, images*.

This project relates to the study of the issues and modalities of the territorialization of environmental initiatives within the contemporary context of globalization. It builds on the contention that, in this field as in others globalization does not imply that actions at the national, regional and local scales have become any less pertinent. On the contrary, since the Stockholm Conference in 1972 a growing number of environmental issues tend to be addressed at the global level as well as through emerging regional entities often of transnational nature. The 1992 Convention on Biological Diversity (CBD) endorsed the ecosystem approach as the primary framework for actions, which has been since then widely promoted as the new paradigm for applying environmental policies on the ground. Regional environmental entities usually follow more or less bioregional units such as mountain ranges or river basins. New forms of institutional arrangements have been created to manage these entities. Transnational Framework Conventions like the Alpine or the Carpathian Convention, widely known as the first international environmental conventions on mountain ranges, are increasingly recognized as the most relevant tools to implement regional environmental policies by international institutions.

Our research will focus specifically on the work of the international institutions active in the environmental field and will present an in-depth analysis of the political construction of such regional entities. Three international institutions have been identified in this purpose: The World Conservation Union (UICN), the World Wildlife Fund (WWF), and the United Nations Environment Programme (UNEP). For each of these organizations, we will examine what arguments are putting forward to justify working within these geographical entities, by examining the discursive and figurative representations that these actors draw on.

2. What is the geographic scope of your research?

The research project specifically focuses on what is taking place in Central and South-Eastern Europe - from the Alps to the Balkans - where a number of mountain regions and river basins have been proposed as entities representing an appropriate scale for environmental initiatives.

A field research has been carried out in the United Nations Environmental Programme Vienna Office (UNEP Vienna Office), which operates as the Interim Secretariat of the Carpathian Convention (ISCC). Our enquiry was based on three types of materials: (1) Participatory observations of the ordinary activities of the UNEP-ISCC, (2) Semi-structured interviews with representatives of the ISCC and leaders of the UNEP-Regional Office for Europe (UNEP-ROE),(3) Textual and iconographic publications of the office including reports, scientific expertises and promotional documents.

3. What agencies and foundations fund your research?

a. What are the time horizons for your funding?

The research project is funded by the Swiss National Fund for a period of three years (December 2009-2012).

b. What kinds of resources does your funding provide for you?

Two PhD students and one Post-Doc are funded by the Swiss National Fund.

4. How you would like to see your research program evolve over the next 5-10 years?

In many mountainous regions a number of transboundary regional initiatives are under way and we are willing to use our previous experiences in the Alpine, the Balkans and the Carpathians regions, to follow these new projects of regional environmental governance around mountainous areas.

Sven Herzog

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Keywords: biodiversity, forest ecosystems, ungulates, large predators, long-term adaptability

1. What are your central research objectives?

We are focusing on biodiversity research in forest ecosystems (wild animals and forest trees) under changing environmental conditions.
Whereas classical conservation concepts are primarily focused on the concept of maintaining adaptedness, our approach is directed to long-term adaptability concept.

2. What is the geographic scope of your research?

We are mainly focusing on forest ecosystems under temperate conditions.

3. What agencies and foundations fund your research?

Funding horizons should be decades. However, actually used funding sources are restricted to horizons of two or three years. This requires well elaborated research concepts combining different sources subsequently.

Funding includes mainly PhD students, postdocs and lab equipment (in nearly equal parts).

4. How you would like to see your research program evolve over the next 5-10 years?

Actually, we are focusing mainly on genetic (molecular) methods. In addition, spatial and temporal behavior of selected animal species (ungulates, predators) is to be studied by GPS telemetry. Abundance monitoring is actually performed by classical (snow tracking, pellet counts) methods. For the future, innovative methods such as UAS (unmanned aircraft systems) with IR camera will be tested.
Thus, we are tending to enlarge the spectrum of scientific targets and scientific methods in order to provide a more interdisciplinary approach.
Geographically, our intention is to include alpine regions into our research program.

Alia Khan

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University of Colorado Boulder
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Keywords: Aquatic ecology, alpine lakes, climate impacts, FluidImaging FlowCam

1. What are your central research objectives?

I am a Masters student looking at the evaluation of the relationship between dissolved organic material (DOM), chlorophyll-a, and algal species in lakes and drinking water reservoirs throughout the state of Colorado. I am also excited to start thinking about PhD research (I am planning to apply to programs this fall) to be focused on climate impacts on water quality in mountain regions.

a. On what phenomena do you take data?

I currently look at, inter alia, algal groups in annual phytoplankton blooms, DOM, and chlorophyll-a (as an indicator of algal biomass).

b. What are you attempting to predict or characterize using those data?

Previous research suggests nonhumic DOM production can be related to chlorophyll-a concentrations. Recent increases in DOC concentrations in surface waters have been documented in northern temperate regions. This affect on aquatic ecosystems is not yet fully understood.
In the Green Lakes Valley of the Colorado Rocky Mountains, yearly monitoring has shown a pulse of terrestrially derived aromatic humic DOM in lakes during snowmelt, characterized by a low fluorescence index (FI) and high specific ultraviolet absorbance (SUVA). In late summer, during annual phytoplankton blooms, microbial sources contribute DOM with a high FI and low SUVA. The aim of our work is to identify whether similar activity can be found in other lakes across Colorado. Chlorophyll-a, an indicator of algal biomass, was measured and algal species were identified using a Fluid Imaging Technologies FlowCam. 10 lakes were sampled biweekly from May through September 2010 and an additional 30 lakes were sampled during July and August. Preliminary results show diatoms and cyanobacteria are the most abundant algal groups present. DOC and chlorophyll-a levels in the 10 lakes showed a seasonal common trend. DOC levels ranged from 2 to 8 mg/L and chlorophyll-a levels ranged from 0 to 10ug/L. DOC levels in the 30 lakes ranged from 2 to 7mg/L and chlorophyll-a levels ranged from 2 to 84ug/L. The relationship between DOC and chlorophyll-a levels in the lakes varied, with some showing a correlation.

2. What is the geographic scope of your research?

Specifically, the Green Lakes Valley of the Colorado Rocky Mountains, and more widely lakes throughout Colorado. I also work on the Long Term Ecological Research (LTER) sites at Niwot Ridge (Front Range of the Rocky Mountains) and this coming austral summer 2011-2012 will work on the Stream Team for the McMurdo Dry Valleys LTER. I hope to pursue field work in the Himalayas for my doctoral work.

3. What agencies and foundations fund your research?

My current project was funded by the Colorado Department of Public Health and Environment to characterize the relationship between DOM and potentially carcinogenic disinfection byproducts. The LTER sites (Niwot and McMurdo) are funded by the National Science Foundation. For my PhD work, I have a three year graduate research fellowship (GRFP) from the US National Science Foundation which is on reserve until Fall 2012. Thus, it will be used from 2012-2015 and will cover tuition and salary for my PhD work.

4. How you would like to see your research program evolve over the next 5-10 years?

I hope to combine my background in public health and water quality, to alpine mountain communities for my doctoral work.

Jacek Kozak

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Keywords: land cover change; forest transition; remote sensing, GIS

1. What are your central research objectives?

Land use and land cover change in the mountain areas.

a. On what phenomena do you take data?

Predominantly satellite / aerial imagery, historical maps showing various types of land cover; ancillary socio-economic data for administrative units allowing to explain the changes in the land cover via changes in the socio-economic drivers.

b. What are you attempting to predict or characterize using those data?

Land use and land cover changes in the past and future scenarios of land cover change.

2. What is the geographic scope of your research?

The Carpathians.

a. Where do you gather data?
b. Over what geographic domain do your conclusions hold?

Mountain regions of temperate regions, especially with a long land use tradition (Alps, Caucasus, etc.).

3. What agencies and foundations fund your research?

Polish state funding; international research programs (e.g., EU-, NASA funded research).

a. What are the time horizons for your funding?

Depending on the source, however relatively uncertain.

b. What kinds of resources does your funding provide for you?

Mostly data and data processing; partially graduate students.

4. How you would like to see your research program evolve over the next 5-10 years?

a,b. New methodologies for data acquisition & analysis?

Yes, this is the main concern related to the huge data flows expected in the near future.

d. Expansion to new geographic areas?

Yes, in particular mountain areas of southern / central Europe.

Markus Leitner

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1. What are your central research objectives?

Projects on the European level: EU FP6/7 (CIRCLE, CIRCLE-2), ETC/Interreg Programmes (CLISP, AlpWaterScarce, ClimChAlp), EEA (GPs for good adaptation - Guiding principles for good practice in adaptation) and DG Climate Action („Climate Proofing of key EU-Policies") activities.
CIRCLE coordinated by EAA (Climate Impact Research Coordination for a Larger Europe, 2005-2009) created a network of research funders & managers across Europe. CIRCLE-2 (Climate Impact Research & Response Coordination for a Larger Europe, 2010-2014, www.circle-era.eu) EAA as WP leader will develop a transnational research agenda, serving as the basis for upcoming calls for research proposals.
EAA currently leads CLISP (Climate Change Adaptation by Spatial Planning in the Alpine Space, ETC Alpine Space Project, 2008-2011, www.clisp.eu). CLISP aims at "climate-proofing" spatial planning in order to prevent, reduce & mitigate climate-change related spatial conflicts, vulnerability of spatial development to adverse climate change impacts & consequential damages & costs.
On the national level, we provide technical; policy & process support to the development of a National Adaptation Strategy - *NAS* (Participatory process for the development of the NAS, Policy Paper – studies to the development of a NAS) an information platform www.klimawandelanpassung.at & a database for adaptation activities. Additionally, several national projects (Klim-Datz – Concept for an Austrian Climate Data Center, RIVAS - Regional Integrated Vulnerability Assessment for Austria, ÖBB-KWA - Adaptation Measures for the Austrian railway infrastructure to a changing climate, Go-Adapt - Governance of Adaptation to Climate Change, FAMOUS - Factory for Adaptation Measures Operated by Users at different Scales, SALDO - The social costs of Adaptation: Approaches for an Evaluation of Adaptation costs) on vulnerability assessments & climate change adaptation, are conducted.

a. On what phenomena do you take data?

CLISP: regional climate scenarios & existing data sets on the status quo, the climate sensitivity & adaptive capacity of various sectors & systems relevant to spatial development in 10 model regions across the Alpine arc are used to assess the vulnerability of regional spatial systems to climate change. Both, quantitative (e.g. impact models) & qualitative methods of analysis as being used.

b. What are you attempting to predict or characterize using those data?

Information on the vulnerabilities of regional climate-sensitive sectors & systems relevant to spatial planning shall provide a knowledge base for the evaluation of the "climate change fitness" of spatial planning systems, for the performance analysis of existing risk governance systems, for stakeholder interactions in the model regions, for the exploration of adaptation options, & for recommendations & new "climate-proof" spatial planning strategies.

2. What is the geographic scope of your research?

Within CIRCLE, involved institutions launched three joint calls (Mediterranean, Nordic) for proposals; the MOUNTAIN call (funding pledge € 2,1 MIO, funders from A, Fr, GR, H, SP, SW & T) financed four transnational projects, namely ARNICA, EURAS-CLIMPACT, ChangingRISKS and CAMELEON - http://www.circleera.eu/np4/235.html and are running in the frame of CIRCLE-2.
CLISP covers all Alpine Space countries (except France). One or more model regions are investigated in-depth in each of the participating countries.

a. Where do you gather data?

Within CLISP, data mentioned under 1.a. are gathered primarily in the following model regions: Pinzgau-Pongau, Liezen, Federal State Territory of Upper Austria (all A), entire canton Graubünden (CH), entire country Lichtenstein (FL), Comunita Montana Suol d'Aleramo e Alta val Lemme e Alto Ovadese, Autonomous Province Bolzano South Tyrol (IT), Berchtesgadener Land, Miesbach (GE) & Gorenjska (SL).

b. Over what geographic domain do your conclusions hold?

CLISP: data-based assessments (vulnerability) are expected to be mainly valid for the respective regions; concepts & methodologies for the assessment of vulnerability should, be transferable to other (mountain) regions. Possibilities for up-scaling methodologies to coarser scales shall be tested & evaluated. A number of final outputs (e.g. "climate change fitness" self-evaluation tool for regions & municipalities, risk governance manual for spatial planners) & conclusions on adaptation needs & options for spatial planning instruments & for the governance of climate-related risks will be drawn for the model region, state / provincial, national & transnational level.

3. What agencies and foundations fund your research?

a. What are the time horizons for your funding?

Usually projects between 1 & 4 years.

b. What kinds of resources does your funding provide for you?

CIRCLE & CIRCLE-2 were/are funded by the EC & CLISP by the ETC Alpine Space Program. National research is funded by diverse national programs.

4. How you would like to see your research program evolve over the next 5-10 years?

c. Incorporation of new disciplines into your program?

Better integration with social sciences & policy research (cc governance, risk governance, adaptation processes) & stronger emphasis on transdisciplinary (participatory) research.

d. Expansion to new geographic areas?

Stronger emphasis on transnational research approaches (besides transdisciplinary dimension / stakeholder involvement).

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Keywords: summer snow cover duration, alpine-nival ecotone, GLORIA master site Mt. Schrankogel, median snowline, micro-topographical descriptors

1. What are your central research objectives?

My central research objective is the link between summerly snow cover duration and the position of the “alpine-nival ecotone” known as the transition zone between alpine and nival vegetation. Apart from that our group studies the dynamics of the so called “median snowline”, i.e. the location where there is a 50% probability to encounter snow of a specified depth in a given season and in a given year, under the influence of climatic fluctuations.

a. On what phenomena do you take data?

I am using snow depth data as well as local vegetation cover data and local snow cover data deduced from soil temperature measurements.

b. What are you attempting to predict or characterize using those data?

We try to demonstrate how summerly snow cover influences the position of the alpine-nival ecotone. Therefore, with regard to a larger scale, we showed that the average line of snow cover duration equal to 50 % in the summer season (JJA) in the Alps and the average line of the alpine nival ecotone (i.e. the line for which the area average of alpine and nival plants equals 50 %) at the GLORIA master site Mt. Schrankogel (Tyrol, Austria) coincide at about 2900m. The concept of the “median snowline” was originally designed for the winter snow cover duration and for quantitatively demonstrating the influence of climatic fluctuations on it. Further, with regard to a smaller scale, we model local snow cover duration with the help of micro-topographical descriptors, in order to understand the interaction between snow and vegetation.

2. What is the geographic scope of your research?

a. Where do you gather data?

Snow depth data stem from routine climate stations in the European Alps, local vegetation data and local snow cover data deduced from soil temperature

measurements are from the GLORIA master site Mt. Schrankogel (located in Tyrol, Austria).

b. Over what geographic domain do your conclusions hold?

As the ecological results are about an example mountain in the Alps they are limited to this single mountain at the moment. The conclusions for the concept of the median snow line on the other hand hold over the entire Alps.

3. What agencies and foundations fund your research?

The project was funded by the University of Vienna within its research platform program.

a. What are the time horizons for your funding?

The platform was funded until the end of 2010.

b. What kinds of resources does your funding provide for you? (graduate students, post-doc, lab facilities)

The funding provided the employment of two PhD-students, rooms, IT-resources and travel money for participating in conferences.

4. How you would like to see your research program evolve over the next 5-10 years?

A prolongation of the project would be desirable, especially because it is an inter-disciplinary co-operation between the fields of climatology and life sciences. Additional staff and time for the application of the newly developed theory to other geographic regions would be necessary. A corresponding proposal (second attempt) has been submitted in January.

a. New methodologies for data acquisition?

b. New methodologies for data analysis?

c. Incorporation of new disciplines into your program?

d. Expansion to new geographic areas?

An expansion to new geographic areas, like the Rocky Mountains, is already planned.

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Keywords: Sustainable development, topoclimate, mobility, Alpine Convention

1. What are your central research objectives?

a. On what phenomena do you take data?

1.) Climate changes in the mountains, topoclimate in the mountains, snow conditions in the mountains.

2) Transport problems in the Alps.

b. What are you attempting to predict or characterize using those data?

1). Our aim is to get more precise picture of diversity of topoclimates in the mountainous regions to understand the ecological and geomorphological processes better.

2.) To provide a knowledge of sustainable transportation in the Alps, such as calming of transport in tourist areas.

2. What is the geographic scope of your research?

1. Mostly in the Slovenian Alps and Dinaric mountains (Montenegro).

2. Slovenian Alps.

a. Where do you gather data?

1. We get data with our own measurements and from other relevant sources, such as meteorological services or informal research contacts.

2. With our own measurements and from transport and tourism related services, local communities.

b. Over what geographic domain do your conclusions hold?

1. The Slovenian Alps and the parts of the Dinaric mountains (Montenegro).

2. Slovenian Alps.

3. What agencies and foundations fund your research?

1. University of Ljubljana and private sources.

2. Local authorities and some international organizations.

a. What are the time horizons for your funding?

1. No special limitation.

2. No special limitation.

b. What kinds of resources does your funding provide for you?

1. Graduate students, equipment.

2. Travel expenses, fieldwork.

4. How you would like to see your research program evolve over the next 5-10 years?

a. New methodologies for data acquisition?

1. To develop a network of monitoring stations in Alps and Dinaric mountains and to develop a unique methodology of monitoring topoclimates.

2. No special new methodology except integrating more stakeholders.

c. Incorporation of new disciplines into your program?

1. Might be interesting for archeology (in terms of land use in the past) and other, such as biological/ecological sciences.

2. Economy and environmental sciences for internalization of transport costs.

d. Expansion to new geographic areas?

1. Yes, to expand the work in Dinaric mountains and other pars of the Alps.

2. Other Alpine regions.

Dilli Prasad Poudel

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1. What are your central research objectives?

a. On what phenomena do you take data?

Trans-Himalaya and Himalaya region of Nepal, extreme mountain weather, indigenous people, Tibetan culture, resource scarcity.

b. What are you attempting to predict or characterize using those data?

How Trans-Himalayan and Himalayan dwellers of Nepal are adapting to make a living in the context of extreme weather and resource scarcity, focusing on the forest.

2. What is the geographic scope of your research?

a. Where do you gather data?

Trans-Himalayan and Himalayan region of Nepal, and people and place bordering with Tibet.

b. Over what geographic domain do your conclusions hold?

The conclusions help to reasoning about making a living of indigenous mountain cultured people of Nepalese Himalaya and Tibet in the context of extreme weather.

3. What agencies and foundations fund your research?

The research was conducted during my M. Phil. Fieldwork, which I have completed from Department of Geography of University of Bergen, Norway. The expenses were covered by University Scholarship. The second phase of research was conducted through self-expenses. Since, presently, I am working as a Research Associate in Nepal Development Research Institute (NDRI); all future expenses for researches will be funded by NDRI.

4. How you would like to see your research program evolve over the next 5-10 years?

a. New methodologies for data acquisition?

More participatory and indigenous culture friendly Field Conversation Tool (FCT)

b. New methodologies for data analysis?

New institutional (in-between of formal and indigenous institution) and more participatory (multi-ethnic) methods.

c. Incorporation of new disciplines into your program?

Watershed management and Climate Change.

d. Expansion to new geographic areas?

People and Place of European and South American Mountains.

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Keywords: Mountain research, Biodiversity, Vegetation ecology, Karts area, Climate changes and biodiversity, Human ecology

1. What are your central research objectives?

The study of structure and dynamics of vegetation, biodiversity of high mountain karst areas, evaluation endemic development centers, ecological conservation and sustainable management of ecosystems and human ecology based on ethno biological experiences. A special interest is the study of biodiversity in global changes and development models in assessing the intensity and nature of climate change on vegetation and high mountain ecosystems.

a. On what phenomena do you take data?

Vegetation diversity (structure, dynamics including syngenesis and mapping in space and different time), biodiversity (plant diversity, endemism, adaptation, endangered of wildlife, ethnobotany and biodiversity in human use), sustainable management (development of ecological models and monitoring of climate changes).

b. What are you attempting to predict or characterize using those data?

Changes in the structure and dynamics of vegetation cover in different time periods as a result of anthropogenic impacts and global changes, to determine the degree of endemism and vulnerability of biodiversity, to identify the ecological and mathematical models for predicting changes in the future (using GIS), and evaluate the possibilities of high mountain ecosystems in the sustainable development of local community.

2. What is the geographic scope of your research?

European mountains, SE European mountains, Eastern and Central Asia mountains.

a. Where do you gather data?

SE European mountains, Balkan mountains, Dinaric Alpes mountains (BiH, Croatia, Montenegro, Serbia, Albania, Kosovo, Macedonia).

b. Over what geographic domain do your conclusions hold?

Europe, W & C Asia.

3. What agencies and foundations fund your research?

Still there is no defined fund for financing. Certain funds are obtained through the Ministry of Education and Science of FBiH through the specific topics, or through public tenders. Administrative support provided by the Academy of Sciences and Arts of Bosnia and Herzegovina in Sarajevo.

a. What are the time horizons for your funding?

There is administrative support by the Academy of Sciences and Arts of Bosnia and Herzegovina. There is no other stationary source for funding this activity.

b. What kinds of resources does your funding provide for you?

Graduate students, post-doc, lab facilities, researchers, volunteers and people in the field.

4. How you would like to see your research program evolve over the next 5-10 years?

a. New methodologies for data acquisition?

New methodology for evaluation of vegetation succession, new numerical methodologies in the evaluation of climate change on biodiversity, new methods for evaluating the natural and social values of high mountain areas, molecular-biological methods for biodiversity evaluation and changes.

b. New methodologies for data analysis?

Software for analysis of vegetation data (JUICE, TURBOVEG etc.), software for mapping vegetation and changes in the ecosystem (GIS, GABECO).

c. Incorporation of new disciplines into your program?

Both current and past work has been strictly interdisciplinary, but it could include new disciplines (Eco-Climatology, Eco-Geology. Eco-Carstology, etc.).

d. Expansion to new geographic areas?

All regions of SE Europe and Western and Central Asia.

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Keywords: Climate and regional meteorological modeling, mesoscale and local flows, glaciology

1. What are your central research objectives?

High resolution meteorological modeling in complex terrain, climate modeling, prediction of icing on wind turbines and related transport of the ice parts, glaciology.

a. On what phenomena do you take data?

Mesoscale flows and air pollution.

b. What are you attempting to predict or characterize using those data?

Local processes like cold air pools at valley floors, frontal passes, air pollution episodes, regional climate changes, icing on wind turbines, turbulent flows.

2. What is the geographic scope of your research?

Focus lies on mountainous areas, mainly Europe but also outside Europe.

a. Where do you gather data?

Greater Alpine Region, Black Forest.

b. Over what geographic domain do your conclusions hold?

Mountainous areas.

3. What agencies and foundations fund your research?

International research projects (EU) and national funds like the Austrian Klima- und Energiefonds, FWF ...

a. What are the time horizons for your funding?

Depending on the projects, normally 2–4 years.

b. What kinds of resources does your funding provide for you?

Computer facilities.

4. How you would like to see your research program evolve over the next 5-10 years?

Concentrate on high resolution modeling (meteorology, climate, air pollution, maybe also cryosphere) in complex topographical areas worldwide, start new international collaborations, and deepen the already existing international collaborations.

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Keywords: Forest, meteorology, mountains, low temperature

1. What are your central research objectives?

a. On what phenomena do you take data?

Different ecological measurements in connection with meteorology, hydrology and forestry. Work on official meteorological stations for national weather service. Field work with automatic weather stations of the Slovenian Forestry Institute and private weather station network in the Alps and Dinaric mountains.

b. What are you attempting to predict or characterize using those data?

Microclimate analyses in connection with ecosystem responses to extreme climate conditions (e.g. low temperatures, abundant precipitation). Researching of extreme low temperatures appearing and potential global climate change impacts on this kind of micro environment.

2. What is the geographic scope of your research?

a. Where do you gather data?

Research plots of the Slovenian Forestry Institute in different parts of Slovenia. Collaboration with national weather service (ARSO). Private weather stations in remote mountainous sites.

b. Over what geographic domain do your conclusions hold?

Slovenian forests, microlocations in the Slovenian Alps (many plots are within the Triglav National Park) and along the ridge of Dinaric mountains.

3. What agencies and foundations fund your research?

a. What are the time horizons for your funding?

If we consider that implementation is based on different national end international research activities (EC (Life+), COST actions, various Slovenian basic and applied scientific projects, bilateral cooperations, cooperations with domestic and foreign institutions …) and with possible private contribution, the monitoring activities should be continuous.

b. What kinds of resources does your funding provide for you?

Monitoring equipment, lab facilities, graduate students, network activities.

4. How you would like to see your research program evolve over the next 5-10 years?

a. New methodologies for data acquisition?

Remote access to all the weather stations in the field and automated (GPRS or more advanced) data collection directly to the database within the office.

b. New methodologies for data analysis?

In collaboration with colleague researchers we are constantly searching for and evolving new models and applications as well as our own prototype measuring equipment.

c. Incorporation of new disciplines into your program?

A better collaboration with other disciplines, e.g. climatology, plant physiology, botany, pedology etc.

d. Expansion to new geographic areas?

Other Alpine and cold climate regions.

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Keyword: sustainable tourism, protected areas, collective action, social capital, economic development.

1. What are your central research objectives?

a. On what phenomena do you take data?

Two management regimes of protected areas (Polish and Slovak side of the Tatra Mountains) will be compared to determine drivers and factors of sustainable tourism, particularly in terms of social capital that affords better collective environmental protection using a multi-method approach. In social science, the concept of social capital is considered one of the cornerstones of effective participation and cooperation for reaching common goals and securing mutual benefit. It improves people ´s trust and ability to manage natural resources sustainably through generating appropriate norms. Empirical studies on collective action of the commons have proven that rather than centralized top-down approach, effective management of large protected areas is heavily influenced by existence of well established and matured informal norms and rules which are respected by local actors. The general assumption is that higher social capital affords better environmental action and thus could contribute to a more sustainable use of mountain regions.

b. What are you attempting to predict or characterize using those data?

The research hypothesis is that the intensity of social capital plays a crucial role in developing adaptive management strategies for sustainable tourism development in the High Tatra region.

2. What is the geographic scope of your research?

a. Where do you gather data?

The data will be to be collected at both sides of the High Tatra Mountain range – the Slovak High Tatras region and the Polish Zakopane region. Primary resources for data collection are going to be the local respondents chosen for interviewing – public and private stakeholders from the local tourism industry, regional development, nature conservation (entrepreneurs, non profit

organizations, peoples´ organizations, non governmental organizations etc.), representatives of governmental authorities and municipalities. In addition, I will gather qualitative information and quantitative data from secondary data resources (existing case studies, cross-sectoral strategic documents and other relevant documents and information sources, etc.). Finally, consultations with experts from the field are going to be valuable contribution to my work.

b. Over what geographic domain do your conclusions hold?

The geographical scope of research are the High Tatra mountains, one fifth is to be found in Poland, the rest in Slovakia. The topic is focused on tourism and nature conservation management and social capital regarding two Tatra national parks - the Slovak TANAP and Polish Tatrzanski park narodowy-TPN. The gateway at the Slovak side is the city of High Tatras is administrating 15 separate city districts, previously separate local municipalities, located in three cadastral territories of High Tatras - Tatranská Lomnica, Štrbské pleso and Starý Smokovec. The city of Zakopane is the gateway to the TPN, neighboring with Kościelisko and Poronin villages.
From the historical, geographic, environmental and socio-economic point of view, the High Tatra region and the Zakopane region are the most adequate study areas for this topic, also in terms of crossborder cooperation (Tatra biosphere reserve).

3. What agencies and foundations fund your research?

I am involved in the project : *Socio-ecological factors of strategic planning and landscape management under the democracy and market economy* – funded by the Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Academy of Sciences, a joint proposal of three partners of the SPECTRA+ (the Centre for Trans-disciplinary Study of Institutions, Evolution and Policies (CETIP) at the Institute for Forecasting of the Slovak Academy of Sciences; Comenius University, Slovak Technical University. The project provides additional sources of funding for PhD students - co-workers involved (e.g. travel cost related re-imbursements to the/and within/ the study areas). Duration of above mentioned Project *(horizons for your funding)* is 01/2011-12/2014.

4. How would you like to see your research program evolve over the next 5-10 years?

a. New methodologies for data acquisition?

Focus groups, structured and semistructured interviews, behavioral experiments.

b. New methodologies for data analysis?

Multi-method approach (meta-analysis, small N-case studies, strategic environmental analysis).

c. Incorporation of new disciplines into your program?

Interdisciplinary approach combining environmental, social and political disciplines—political ecology, landscape ecology, environmental management, spatial planning.

d. Expansion to new geographic areas?

Central European Countries (national parks in Poland, Czech Republic, cross-border cooperation).

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Keywords (max. 5 terms): Plant diversity, Plant conservation, Alien plants, Biosphere Reserves

1. What are your central research objectives?

a. On what phenomena do you take data?

Impact of global change on plant diversity, especially of alpine plants and glacial relics.

b. What are you attempting to predict or characterize using those data?

Assessment of the risk of extinction of the rare plant species; explanation of the observed current distribution patterns of these plants.

2. What is the geographic scope of your research?

a. Where do you gather data?

Bulgarian Mountains.

b. Over what geographic domain do your conclusions hold?

Mountains of Bulgaria and South-East Europe.

3. What agencies and foundations fund your research?

Bulgarian National Science Fund, Ministry of Environment and Water of Bulgaria, EU funds.

a. What are the time horizons for your funding?

Pilot project on this topic for 2010-(mid-)2011.

b. What kinds of resources does your funding provide for you?

Lab equipment and consumables, field work.

4. How you would like to see your research program evolve over the next 5-10 years?

a. New methodologies for data acquisition?

Collaboration with other specialists (e.g. geologists, climatologists and hydrologists) in order to collect very precise data for the microtopographic and microclimatic conditions of selected endangered alpine plants.

b. New methodologies for data analysis?

Collaboration with specialists in computer modeling for predicting the impact of global change on alpine plant diversity using different scenarios of change.

c. Incorporation of new disciplines into your program?
d. Expansion to new geographic areas?

I would like to expand my studies to other high mountains of Balkan Peninsula and Asia Minor (Turkey) cooperating with relevant (and interested) specialists from the respective countries.

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