

No. 8 (2013-2014)

Mountain *MeRI*dian





Gokyo Lake and Cholatse in the distance by D. Fagre

Keep in touch!

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Thore, Nepal by D. Fagre

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A Word from the Editor..

Dear Readers,

Welcome to MRI's newly christened "Mountain Meridian"! Apart from its rather convenient spelling, the word "meridian" has a lot of meaning for MRI. Geographically speaking, a meridian is a line that runs north-south, connecting geographic poles. This is a function MRI is working hard to live up to. With a new and energetic coordinator at the helm, the AfroMont network is gaining momentum toward defining pan-African collaborative research goals. Similarly, the TCA network is building basic research capacity and strengthening links between regional governing bodies and academia. You can read more about these efforts in the Regional Highlights section.

A meridian is also, according to traditional Chinese medicine, a path through which the life energy "qi" flows. While it would be rather bold to claim that MRI serves such a function in the mountain research community, it is very much a clearinghouse for mountain research related information. As such, it's important to distinguish between the news of the moment and the stories that bind this research community together. In this sense, the phrase "Mountain Meridian" is rather appropriate because of its focus on MRI members and the passion and adventure that fuels their research.

This "newsletter" is very much a product of the MRI community and reflects the great diversity of its members and their research. In "MRI's New PIs", we welcome Adrienne Grêt-Regamey and Emmanuel Reynard onboard as members of the MRI steering committee. In "Scientist Spotlight", we introduce four early-career scientists in short interviews that focus less on their science than what drives their curiosity.

Edwin Hubble, the man who discovered that the universe is expanding, famously stated that, "equipped with his five senses, man explores the universe around him and calls the adventure Science". MRI researchers are probably better equipped to understand that statement in its literal sense than anyone else! In "Science Stories", we bring you three tales where the line between science and adventure is truly blurred.

"Research Horizons" is equally adventurous, if in a more classic scientific fashion. Read about the practically undiscovered (to science, at least) Great Escarpment in southern Africa, human-climate impacts in northern Mongolia, snowbed vegetation monitoring in the Pyrenees and conservation co-management in China.

As always, Regional Highlights sums up the activities of MRI's regional networks over the past year. At the end of the section, MRI Director Greg Greenwood provides a broad overview of where MRI has been and where it is headed. Finally, the last pages are dedicated to short notes from the MRI community about ongoing projects, and to announcements about various opportunities that may be of interest to the broader community.

Happy reading!



Erin Gleeson
MRI Guest Editor
www.sciencedit.ch



Meet the MRI Office Coordination Team! Director Greg Greenwood, Guest Editor Erin Gleeson, Communications Assistant Regula Mülchi, MRI Europe Coordinator Astrid Björnson-Gurung and Communications Director Claudia Drexler.

Upcoming Events



Global Fair and Workshop on Long-Term Observatories of Mountain Social-Ecological Systems

July 16-19, 2014



Reno, Nevada

What, why, and how do you monitor?

MRI and the University of Nevada at Reno will convene the Global Fair and Workshop on Long-Term Observatories of Mountain Social-Ecological Systems with the goal of moving toward a more comprehensive, global mountain observation network by strengthening the ties between existing observation systems.

The Fair and Workshop is for all who gather data on mountain social, biological or abiotic systems and who want to discuss practical and strategic issues of their work. Participants will describe their work, explore the phenomena driving observations, explain and discuss sensors, protocols and data management, visit exemplary transects and observatories, and create new collaborations.

The underlying logic of this event is that a more comprehensive mountain observing system will arise through the interplay of both bottom-up activities, in which those managing current observing systems expand those systems through collaboration with others, and top-down activities, by which researchers lay out the requirements of comprehensive mountain observing systems.

MRI believes that in order to provide quality, long-term, evidence-based datasets, the mountain research community must synthesize a macroscopic observing system using existing regional networks and individual sites as building blocks.

And the best way to do that is to come together to exchange ideas, see what other networks offer, develop common programs, assess priority locations, and develop creative financing options.

<http://mri.scnatweb.ch/fair-and-workshop-on-mountain-observatories/home>

Upcoming CIRMOUNT Conference: MtnClim 2014

September 15-18, 2014  Midway, Utah, USA



Mt Timpanogos. Photo: B. Temper

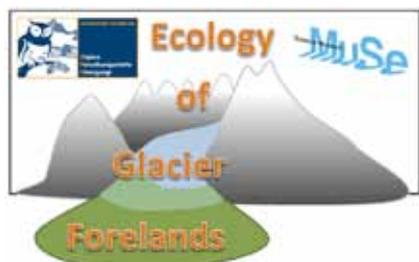
MtnClim 2014, the biennial climate conference sponsored by the Consortium for Integrated Climate Research in Western Mountains (CIRMOUNT), will convene Sept 15-18, 2014 in the lovely Wasatch Mountains. The program includes invited sessions on mountain refugia, micro-climate processes, and climate adaptation; coupled human-social systems; and early career scientists' research. Invited talks will feature a 10-year retrospective and prospective of research accomplishments and needs in mountain-climate science and management; a national perspective on the role of mountain climate- and response science in emerging policy for climate adaptation; and an overview of Great Basin forest ecosystems and their interaction with climate change and bark beetles. Contributed talks and posters are encouraged. Planned also is a field trip to the Uinta Mountains and a post-conference resource managers' workshop, both to focus on regional forest health and climate issues. Deadline for registration, abstracts, and lodging is July 15, 2014. Early registration is encouraged, as attendance is limited to 120 participants!

Website: www.fs.fed.us/psw/mtnclim

Contact: Connie Millar, USDA Forest Service, cmillar@fs.fed.us

Announcement and Call for Contributions: Ecology of Glacier Forelands Workshop

September 17-21, 2014  Alpine Research Centre, Obergurgl Austria



As a follow-up of the Obergurgl workshop on glacier forelands in 2008, we want to bring together people working in foreland glacier ecology research. Investigators studying the interactions of organisms and their abiotic environments in deglaciated terrain are invited to join the workshop.

The workshop is organized jointly by the Alpine Research Centre Obergurgl (University of Innsbruck, Austria) and MUSE - Museo delle Scienze (Trento, Italy)

Website: www.uibk.ac.at/afo/workshop-ecology-of-glacier-forelands

XX Latin American Congress of Soil Science

November 9-15, 2014  Cuzco, Peru

EDUCATE to PRESERVE the soil and to conserve life on Earth!



Special guests include Dr. Pedro Sanchez (Earth Institute; 2002 World Food Prize recipient), Dr. Rattan Lal (Ohio University), Dr. Rainer Horn (president elect of IUSS), Dr. Ronald Vargas (FAO-Rome), Dr. Cheryl Palm (Columbia University), Dr. Eddie Schrevens (Leuven University), Dr. Patrick Lavelle (Paris University), and Dr. Carmen Felipe-Morales (UNALM University, Peru).

All are welcome to participate and to learn more our Inca culture!

Website: www.xxcongresolatinoamericanodesuelosperu.org

Contact: clacs2014@xxcongresolatinoamericanodesuelosperu.org

MRI's New PIs...

Emmanuel Reynard

How long have you been involved in the MRI network?

I've known MRI for several years and read the newsletters and reports, but not really participated in the activities organized by MRI until now.

What motivated you to become a PI for the MRI?

I've been working on mountain issues for several years, especially in the Alps, but also in the Carpathians and in the Moroccan Atlas. I was interested in contributing to mountain research in a more institutional framework. I would in particular like to work on linking research in the Alps and with research in mountains in developing countries.

What are your central research objectives and/or central contribution to global change research in mountains?

I work mainly on water resource management in mountains and geomorphological research in mountains, in particular on mountain geoheritage. "Geoheritage" is a term that describes unique landforms and geological structures with significant scientific, educational, cultural or aesthetic value. Such emblematic sites are especially worth protecting for future generations, and are places where educational initiatives about environmental changes should be developed.

Where do you work, primarily? How do the results from your research in this region apply elsewhere?

I work primarily in the Alps. Some results (e.g., regarding water management) also apply to other mountain areas, whereas other results (e.g., about mountain geoheritage) are certainly less important, at least at the moment, for other mountain areas.

Who do you work with? Who are the main types of people and organizations that you collect data from/with, and to whom are your results directed?

I work principally with public administrations, such as the Cantonal administrations in Switzerland and the Water Basin Agencies in Morocco. This work is particularly challenging because of the necessity to translate scientific results into understandable language and operational documents. However, working with public authorities gives scientists a valuable opportunity to apply theoretical results and reflections.



What do you see as the key questions in global change research in mountains?

Cryospheric processes in high mountains, water-related erosion, adaptation of mountain population to globalization.

How would you like to see the mountain research community evolve over the 5-10 years?

To develop interdisciplinary research. I think that a real dialogue between the natural and social sciences has to be improved; for that, common work (and not only multidisciplinary research) has to be developed.

What sort of "product" should the mountain research community as a whole be working toward producing over the next 5-10 years?

To propose "guidelines" for stakeholders. For that, we need to give again a certain importance to papers published in regional journals, in technical publications, etc. (and not only give the privilege to top journals).

In your field, what are your greatest concerns, and why?

Adaptation to climate change and globalization in mountains in developing countries. I am convinced that industrial countries have sufficient resources to face the challenges related to adapting to climatic changes, and equally sure that the challenges are much greater in developing countries. In developing countries, mountain regions are at risk of being left aside unless proactive policies designed to promote their development are created.

In your field, what are you most optimistic about? What changes for the better do you feel are most possible and most likely to take place?

Community based cooperation for the management of water resources (e.g., irrigation) that should be promoted by public authorities in the future. I am convinced that if people are more involved in their own strategic development decisions now, they will better take care of their resources in the future.



Emmanuel Reynard is a Professor of physical geography at the University of Lausanne and Director of the Institute of Geography and Sustainability (IGD).

MRI's New PIs...

Adrienne Grêt-Regamey

How long have you been involved in the MRI network, and what motivated you to become an MRI PI?

The first time I came into contact with MRI was in 2009 during a workshop on Ecosystem Services in the Alps and the Carpathians. The discussions at the interdisciplinary consortium were very inspiring and fruitful for developing innovative ideas for research and action in mountainous regions.

What are your central research objectives with regard to global change research in mountains?

Our research concentrates on integrating the goals of sustainable development, economic viability, and good governance into landscape planning. Currently, we develop approaches to define strategies reconciling the long-term goals of a sustainable development of mountainous regions with rather short-term individual and collective actions.

The approaches link future desirable landscape development situations, which we visualize in 3D, with management and policy options that are necessary to secure the provision of desired ecosystem services. This backcasting approach can play a key role in shaping the rate and direction of the socio-economic transitions. It also prevents us from transferring our current problems to the future and therefore legitimizes the mobilization of scientific, financial, institutional and political resources to support and maintain functioning mountain ecosystems.

Where do you work? How can the results of your research be applied elsewhere?

We work in different urban and mountainous sites in Switzerland and in Europe that differ in their specific sensitivities to climate and socio-economic

changes. Many of our studies include the involvement of local stakeholders. We then investigate the transfer of our models and approaches to larger regions, or even the globe, to better understand the relevance of our results for decision-making across scales.



Who do you work with, and to whom are your results directed?

We work closely with local actors and particularly with administrations. As many of our research results feed into spatial and landscape planning, we have strong ties with public authorities at different levels. Knowledge is also often transferred to other countries through research consortia, and results also feed directly into teaching at the master and doctorate levels.

What do you see as the key questions in global change research in mountains?

Mountainous regions are highly sensitive to socio-economic and climate changes. Understanding the vulnerability and adaptive capacity of the coupled natural and human systems, while accounting for local to regional contexts and contingencies, is key to addressing mountain sustainability issues.

How would you like to see the mountain research community evolve over the 5-10 years?

1. Develop cross-regional communication among the broad international community involved in mountain sustainability issues.
2. Increase the diversity of scientists trained in cross-regional, transdisciplinary mountain-oriented research, from students to senior scientists, and
3. Increase the diversity of scientists and stakeholders (e.g., resource users, policy-makers, NGOs) who employ a modeling framework to address mountain sustainability issues.

What sort of "product" should the mountain research community as a whole work toward producing over the next 5-10 years?

We need to work on generating examples and "lessons learned" across mountain case studies where a transdisciplinary process was employed. We should also synthesize and compare case studies in which science has successfully informed policies and practices in different mountain system contexts. Finally, we need to actively develop and propose cross-regional, transdisciplinary projects on mountain sustainability that link science with action.

In your field, what are your greatest concerns, and why? What are you most optimistic about?

On the one hand, the loss of identity and cultural services in mountainous areas is a serious concern. On the other, however, awareness of the importance of mountainous areas for providing life supporting ecosystem services to downstream areas is increasing.



Adrienne Grêt-Regamey is an Associate Professor of Planning of Landscape and Urban Systems at ETH Zürich.



Research

An aerial photograph of a vast, layered mountain range. The landscape is characterized by numerous ridges and valleys, creating a complex, textured appearance. The colors range from vibrant green in the foreground to deep blue and purple in the distance, suggesting a high-altitude or alpine environment. The sky is a pale, hazy blue, and the overall scene conveys a sense of immense scale and natural beauty.

orizons

The Great Escarpment Biodiversity Programme: Endless research horizons in southern Africa



Photo: V.R. Clark

By Vincent Ralph Clark

The 5,000 km long southern African Great Escarpment forms a semi-continuous mountain chain that represents a passive post-Gondwana margin, the sub-region's version of the Western Ghats in India, the Serra do Mar in Brazil, and the eastern upland spine in Madagascar. The Great Escarpment is a horseshoe-shaped linear montane system that stretches southward from Angola in the northwest through Namibia, and curves through South Africa, Lesotho and Swaziland back north to the Zimbabwe-Mozambique border.

Over the 20° latitude disparity between north and south, the Great Escarpment's geology covers a broad spectrum, including most of the sub-region's major rock formations. These, plus strong moisture gradients, strongly influence vegetation patterns, from the hyper-arid to the hu-

mid tropical montane. Orographic effects based on altitude, and proximity to two very different oceans (one cold and one warm) further add to the complexity of the region.

Accordingly, vegetation varies dramatically along the length of the Great Escarpment, ranging from tropical upland evergreen forests to semi-desert succulent shrublands. While not as rich as South Africa's celebrated Cape Floristic Region, the Great Escarpment is one of the principal foci of narrow endemism in southern Africa: potentially 17% of the estimated 8,600 plant taxa present on the Great Escarpment are strict endemics (>1400 taxa), representing 5% of the sub-continent's flora.

Endemism is also mirrored in the fauna, with 126 vertebrate species confined to this montane system. The better-watered portions of the Great Escarpment

and adjacent upland plateaux are also southern Africa's 'water-works', producing most of the region's fresh water. This vital ecological service is under increasing pressure from commercial forestry, mining, overgrazing, dense population pressure, invasive species, and climate change.

Despite its prominent physical presence and biological and economic importance, the Great Escarpment is only patchily known to biodiversity scientists. In fact, numerous "new" (but locally common!) taxa have come to light in recent years. Nevertheless, the vast extent of the Great Escarpment, its relative remoteness, and political and economic instability in parts of the sub-region, have discouraged focused research efforts in the past.

To address these research deficiencies, the Great Escarpment Biodiversity

Programme (GEBP) was established at Rhodes University in 2005 and has grown into a multi-disciplinary collaboration of researchers from numerous institutions both in Africa and abroad. The GEBP's goal is to answer regionally significant biogeographical and biodiversity questions through well-funded research projects that emphasise rigorous fieldwork as the basis for accurate data collection in poorly studied areas. The key objective of the GEBP is to determine how the Great Escarpment secured its rich endemism and how it may respond to future pressures.

The aims of GEBP are:

- To contribute rigorous, multi-disciplinary scientific research focused on addressing key Afromontane biogeographical questions (e.g. explanations for the presence of Cape Fynbos and Euro-temperate elements in the moister African mountains).
- To fill gaps in biodiversity knowledge for conservation policy purposes and to improve Great Escarpment representation in local databases.
- To get more 'feet on the bergs' and away from computers, thereby instilling an appreciation for rigorous fieldwork and exploration in a new generation of biodiversity and ecological researchers.

In 2012 the GEBP began collaborating with the Instituto Superior de Ciências de Educação da Huíla (ISCED) in Lubango, Angola, and the Institut für Systematische Botanik, Universität Zürich, Switzerland, on the poorly studied Angolan Escarpment. In 2013, the Manica Highlands Initiative – launched by AfroMont and the GEBP – came together as an initiative to encourage research on the Zimbabwe-Mozambique borderlands.

Research opportunities are blooming on an 'endless' research horizon in some of Africa's most spectacular mountain lands.



For further information on the GEBP, expressions of interest in collaborating, or for copies of papers, please contact:

Prof. Nigel Barker
n.barker@ru.ac.za

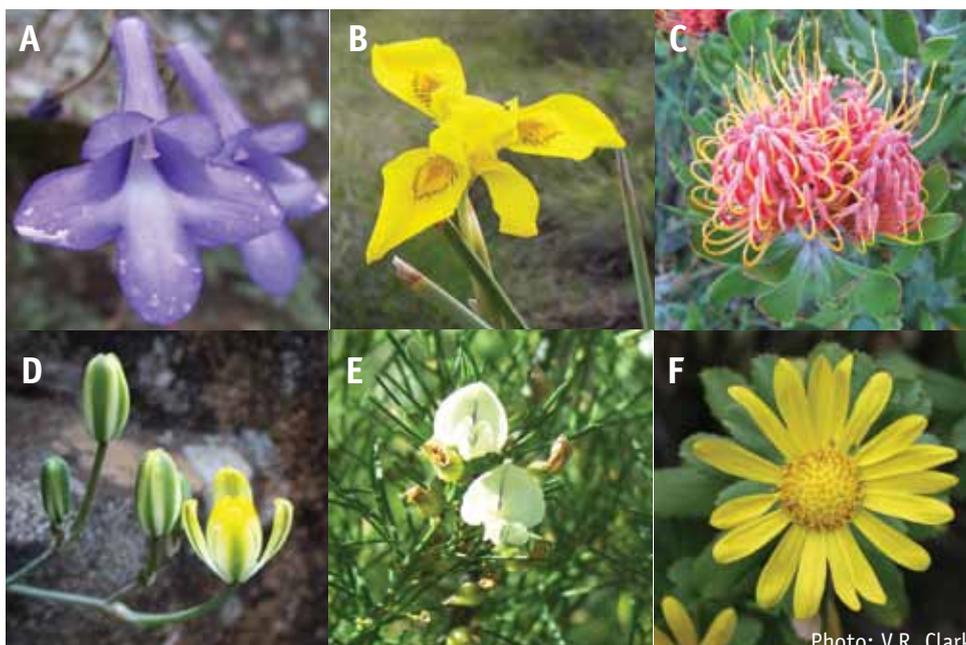
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Photo: V.R. Clark



Some plants endemic to the Great Escarpment: (A) Streptocarpus michelmorei – endemic to the Manica Highlands (Zimbabwe, Mozambique); (B) Moraea spathulata – endemic to the eastern Great Escarpment (South Africa, Lesotho, Swaziland); (C) Leucospermum saxosum – a biogeographical puzzle endemic to the Chimanimani Mountains (Manica Highlands) and the Wolkberg (South Africa), 400 km apart; (D) Albuca tenuifolia – for over a century only known from the description, without a type, but recently found to be common on the southern Great Escarpment; (E) Psoralea margaretiflora and (F) Euryops proteoides are both showy, common Sneeuberg endemics only discovered in 2005/2006. (Photos: VR Clark).

Photo: V.R. Clark

Eco-hydrological investigations in the Khentii Mountains, Northern Mongolia

By Lucas Menzel

Like other countries in Central Asia, Mongolia is facing a strong warming trend, with a 1.7 °C increase in mean annual air temperature since the 1940s. While precipitation typically shows strong variability in this region, severe droughts have occurred in recent years that heavily affect the social and economic development of this semi-arid country. At the same time that the demand for water is growing, the availability of safe drinking water is becoming increasingly uncertain. The infrastructure and political framework for ensuring the appropriate distribution and protection of water is lacking, and environmental information is scarce.

Since 2010, the Climate and Hydrology Group at Heidelberg University has conducted a monitoring programme in northern Mongolia that aims to improve the understanding of how climate change and human impacts are influencing water resources in a semi-arid environment. The study region, Sugnugur valley, is located about 100 km north of Ulaanbaatar and includes the transition belt between the steppe, the



The upper Sugnugur valley shows clear evidence of recent forest fires.

Photo: L. Menzel

boreal zone and the alpine tundra of the Khentii Mountains. This massif stretches from Siberia into Mongolia and peaks at about 2800 m a.s.l. Its western slopes are part of the Selenga-Baikal drainage system and act as the major freshwater generating areas of the region.

The remote Sugnugur valley was selected as a research site because it encompasses a variety of hydro-environmental relationships relevant to Mongolian hydrological regimes, including snow

storage, permafrost and forest cover. Parts of the region represent a pristine boreal and alpine environment. However, there is increasing evidence of human impacts on the ecosystem, namely forest fires. One of the key goals over the past three years has been to understand the dynamics of these burnt watersheds.

First results from environmental monitoring along transects which stretch across the Sugnugur river valley indicate that the environmental conditions show drastic changes after forest fire, with reduced water retention in the headwaters and thus decreasing water availability in the dry steppe forelands of the Khentii.

After a forest fire, higher radiation input rates drive soil warming, which appears to lead to increasing active layer depths of the permafrost beneath burned trees. This leads to changing runoff processes above the permafrost table, where water drains rapidly along preferential flow paths. This eventually leads to faster runoff responses during and after summer rainfall. As the active layer depth increases, the soil water storage capacity decreases, which may adversely impact forest regeneration.



Installation of a precipitation gauge in the alpine tundra of the Khentii. Photo: L. Menzel

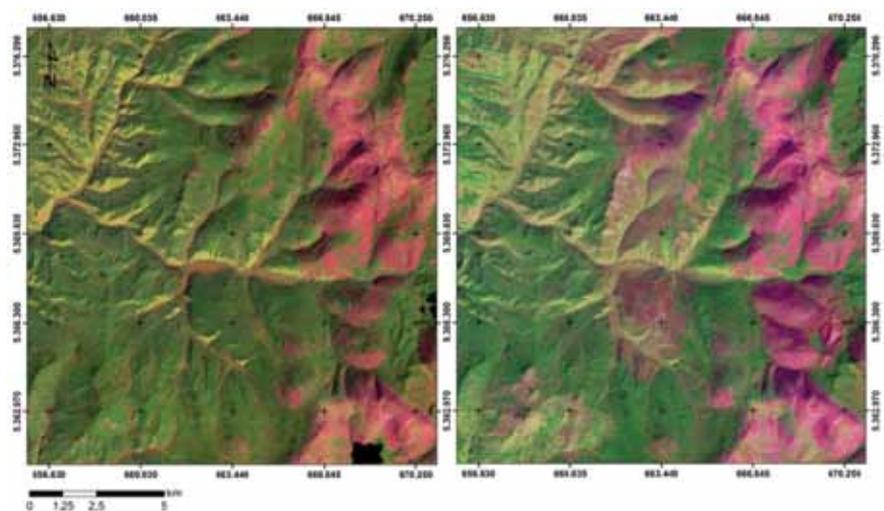
The sensitive balance between climatic conditions, permafrost occurrence, hydrology and vegetation is leaving a number of challenging research questions. Similarly, there is a clear and urgent need to develop a safe water supply for the local population, to whom this project wants to make a significant contribution. To properly resolve these challenges, a suite of research methods and an interdisciplinary approach is required. New collaborations are welcome!



For more information, contact:

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Forest cover in the upper Sugnugur valley, Khentii Mountains, 1990 (left image; 10 September 1990, Landsat 5 TM) and 2013 (right image; 1 September 2013, Landsat 7 ETM+). Green tones represent forest cover (dark green) and natural mountain meadows (light green). The purple tones in the left image represent non-vegetated surfaces, mostly alpine tundra in the highest elevations. In contrast, the purple tones in the right image include burned forest. While no impact from forest fire is detectable in the 1990 image, there is clear evidence of recent, widespread forest fires in the 2013 image.

Further reading:

Karthe, D., Malsy, M., Kopp, B.J., Minderlein, S. & Hülsmann, L. (2013): Assessing water availability and its drivers in the context of an Integrated Water Resources Management (IWRM): A case study from the Kharaa river basin, Mongolia. *Geoöko*, Vol. XXXIV, 5-26

Kopp, B.J., Minderlein, S. & Menzel, L.: Soil moisture dynamics in a mountainous headwater area in the discontinuous permafrost zone of northern Mongolia. *Arctic, Antarctic and Alpine Research* (in press)

Minderlein, S. & Menzel, L.: Evapotranspiration and energy balance dynamics of a semi arid mountainous steppe and shrubland site in northern Mongolia. *Environmental Earth Sciences* (accepted for publication)

Törnros, T. & Menzel, L. (2010): Heading for knowledge in a data scarce river basin: Kharaa, Mongolia. In: Herrmann, A. & Schumann, S. (Eds.): *Status and Perspectives of Hydrology in Small Basins*. IAHS Publication 336, Wallingford, 270–275

Pristine forest at the headwaters of the Sugnugur river. Photo: L. Menzel



Monitoring protocol for vegetation in the Pyrenees snowfields

By Benjamin Komac and Ludovic Olicard

The Pyrenees snowbed vegetation monitoring study began in 2012 with funding support from the POCTEFA project of the European Regional Development Fund (ERDF). Following the objectives defined by the Pyrenees Climate Change Observatory (www.opcc-ctp.org), the study aims to use changes in snowbed vegetation to detect the effects of climate change in mountain regions. As snowbed vegetation is strongly conditioned by snow cover factors and can therefore be very sensitive to climate change, the study of snowbed vegetation allows researchers to track the effects of climate change on alpine vegetation.

The main objective of the project was to develop a monitoring protocol for snowbed vegetation along a latitudinal transect. In this study, 14 snowbeds distributed throughout the Pyrenees were identified and monitored as they melted over the summer. As accessing snowbeds can be a challenging and time-consuming process, the monitoring protocol was developed to ensure that the time invested in monitoring each snowbed was limited to a few hours (including the time needed to reach the site and collect the data), thereby maximizing the data collected.

To monitor vegetation development as the snowbeds melt, surveys were conducted four times between the first week of July and the second week of September (every three weeks). Due to differences in the locations of the different snowbeds along the Pyrenean chain and the great disparity in snowmelt between sites, four visits were needed to obtain comparable data.

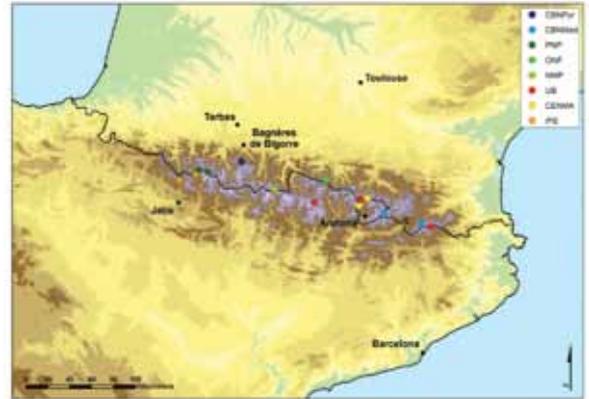
Plots with a total area of 3 x 1 m were divided into 12 subplots of 0.5 x 0.5 m or 0.1 x 0.1 m, depending on the objective of each monitoring task (detecting

changes in phenology or in vegetation cover due to earlier snow melting, respectively). The number of plots in each snowbed depended on the size of the snowbed and all plots were positioned along the melting gradient.

Throughout the year, the state of the snow cover was checked measured using temperature sensors. Similarly, observations of the floristic composition and phenology of the snowbed vegetation (6 states were defined based on *Salix* and *Polytrichum* taxa) were made during every visit.

In addition to the regular measurements, an evaluation of the relative contribution of the different syntaxonomical classes is performed every five years. Examples of syntaxonomical classes are *Salicion herbaceae* and *Nardion strictae*. For larger snowbeds, a complete transect along the snow melting gradient is also performed once every five years.

We hope that this program can improve our understanding of how climate change affects alpine vegetation and can help us protect these habitats. An understanding of the relationship between alpine communities and their physical environment is essential for forecasting the impacts environmental changes will have on the vulnerable high-mountain habitats of the Pyrenees.



Map: Planned locations of the 14 snowbeds used for monitoring snowbed vegetation. The organizations responsible for monitoring each snowbed are indicated by the colored dots. CBNPyr: French Pyrenean Botanical Conservatory; CBNMed: French Mediterranean Botanical Conservatory; PNP: French Pyrenees National Park; ONF: French National Forest Office; NMP: association Nature Midi-Pyrénées; UB: geobotany and vegetation mapping group from the University of Barcelona; CENMA: Snow and Mountain Research Center of Andorra; and IPE: Pyrenean Institute of Ecology.

The following centers took part in this study: the French Pyrenean Botanical Conservatory (Bagnères de Bigorre), the Snow and Mountain Research Center of Andorra, the geobotany and vegetation mapping group at the University of Barcelona, the French Mediterranean Botanical Conservatory (Montpellier), the French Pyrenees National Park (Tarbes), the French National Forest Office, the Pyrenean Institute of Ecology (Jaca) and the association Nature Midi-Pyrénées (Toulouse).

To learn more about this project and to see the results from the 2013 field season, visit: www.opcc-ctp.org.





*1x1 m plot for surveying plant cover and phenology at the Arbella snowbeds in Andorra.
Photo B. Komac*



Snowbeds at Cataperdris in Andorra, located at 2500 m a.s.l. Photo B. Komac



Salix herbacea is an arctic-alpine plant that reaches its southern limit in the Pyrenees and depends on snow cover. Photo M. Domenech

Advancing biodiversity conservation and community development in Qinghai Province, China

By Marc Foggin

The UNDP/GEF Qinghai Biodiversity Conservation Project was successfully launched by the Qinghai Forestry Department in January 2013 with support and co-financing from the provincial government. Most of the province is situated over 4000 m above sea level – including the Qilian, Kunlun, Tanggula and other high mountain ranges. A spectacular suite of globally endangered wildlife is still present in these highlands, including Tibetan antelope, wild yak, white lipped deer, argali, snow leopard, black necked crane, saker falcon, etc.

Traditionally, nomadic pastoralists grazed yak and sheep on these vast lands following their customary land tenure and livestock management practices, but presently many local herders are facing for the first time new aspects of globalization such as an increasing dependence on a cash economy, integration with national development



Photo: J. Marc Foggin

programmes and policies, and the need to share local resources with a host of stakeholders previously unknown in the region.

Through the development of co-management approaches, the project seeks to further refine collaborative conservation trials in the source areas of the Yangtze and Yellow Rivers, then to expand (scale-up) these approaches

to the regional level. With protected areas (PAs) already covering one-third of the province (thereby providing formal protection to 251,665 km² of land), it is important now to strengthen the PA system by mainstreaming biodiversity concerns into multiple government sectors, by developing a comprehensive training programme for future PA staff and other conservation partners, and by developing practical and context-specific management plans for selected, ecologically sensitive areas based on principles of genuine collaboration with communities and the sustainable utilization of natural resources.

Beyond the three major project components outlined above, this 5-year initiative also aims to integrate climate change scenarios into a revised PA system plan and to develop community-beneficial ecotourism and other potential sources of revenue to help both the provincial PA system and local co-management partners attain greater



Photo: J. Marc Foggin

financial sustainability. Lessons learned elsewhere in China and globally, particularly in mountain areas, will help to guide the project. Likewise, the project may contribute to the global experience of collaborative conservation.

From a regional development planning perspective, the establishment and/or refining of a PA system will help mitigate some of the impacts of climate change by reducing the likelihood of species loss due to their distributional shifts (in response to climatic change) leading them out of current protection zones. This can be done by increasing the level of connectivity between PAs through rearranging existing PA boundaries or encouraging different livelihood options or forms of resource use within PAs and their internal management zones. It will be equally important to raise awareness of environmental issues both in and outside nature reserves, in order to promote landscape and ecosystem level conservation. Another way to minimize the impact of climate change on local communities is to decrease their dependence on livestock, particularly through a diversification of local herders' sources of income. It is expected that such diversification will lead to enhanced resilience in both local economies (with decreased risk) and ecosystems (with decreased grazing pressures). Increasing desiccation of the land and loss of permafrost, now clearly observed in the region, necessitate such approaches.

One of the financing options that is available for PAs and local communities, which is being considered by the project, is the development of community ecotourism. Based on a marketing of biodiversity as well as cultural landscapes, it is critical that such tourism include not only nature-based experiences but also contributions to conservation action and clear benefits to community members. Access to the benefits arising from the use of biodiversity – such as through ecotourism – should be shared equitably amongst stakeholders, particularly with local partners whose livelihoods are most directly connected to the land. In developing local governance



Photo: J. Marc Foggin

and entrepreneurial skills for community tourism, a variety of capacities will be developed to effectively manage potential future eco-compensation funds, thereby enhancing broad partnerships and increasing the effective workforce for conservation in the country.

Input from a wide range of national and international specialists is welcome, particularly with submission of practical 'lessons learned' and 'key recommendations' from disciplines such as environmental planning, development studies, policy analysis and sociology.



For more information, contact Dr. Marc Foggin, Chief Technical Advisor, UNDP/GEF Qinghai Biodiversity Conservation Project at qhgefmarc@163.com or marc.foggin@gmail.com

This project is funded by Global Environment Facility (GEF) and supported by United Nations Development Programme (UNDP). GEF provides grants for projects related to biodiversity, climate change, land degradation and other environmental matters, with as primary strategy to provide for the incremental costs necessary for national institutions to move from 'business as usual' toward greater environmental and fiscal sustainability.

For more information about the GEF strategy, visit:

www.thegef.org/gef/whatisgef.

More information about the project itself can be found on the UNDP in China website at:

<http://tinyurl.com/k4pzd9r>.

Science





Stories

EnCOWnters: Mountaineering with the American Climber Science Program

By Carrie-Ann Bracco

After two weeks in an isolated valley in the Andes, you become quite familiar with the local livestock, especially when you've been tasked with surveying livestock populations and behavior for an overgrazing study. So when cows start to multiply unexpectedly, you become a bit suspicious.

A volunteer for the American Climber Science Program's 2013 Cordillera Blanca expedition, I was helping scientists collect data in the high reaches of the Andes. I had first heard about ACSP at my local climbing gym in Brooklyn, NY when the program director, John All, gave a talk about the science research the ACSP has been doing in the Cordillera Blanca region of Peru. Having once lived in Bolivia and being an enthusiastic sport climber, joining an ACSP expedition was immediately appealing. The trip would give me an opportunity to try an alpine climb with the comforts of an expedition base camp. I also liked the idea of pairing climbing with volunteer work since high altitude climbs require a lot of down time while acclimatizing. And finally, as a fine artist who makes paintings of remote and isolated landscapes, I was hopeful that the trip would provide me with material for a new series of paintings.

Which is how I found myself setting up camp at the foot of Maparaju (5325 m), a

peak I would shortly summit in the pursuit of science. My companions in this far outpost of Huascarán National Park were a group of about 20 people, including scientists, students and volunteers from all different professions. We were there for two, twinned reasons: to collect scientific data in a region typically out of reach to all but the most intrepid scientists, and to indulge our love of climbing.

When cows start to multiply unexpectedly, you become a bit suspicious.

– or no trails – straight up steep, grassy mountainsides to gather data. With so many scientists along, there were plenty of projects to work on, from water quality and glacier recession to vegetation change and overgrazing. Even the climbers themselves were studied: Peter Nilsson from Touro College of Medicine measured our heart rates and blood oxygenation levels every evening and during strenuous climbs to chart our acclimatization progress. With so many projects taking place simultaneously, we met each evening to review the project goals for the next few days and organize into groups to tackle the next day's work.



Photo: ACSP

From our thin-air base camp overlooking the Quilcayhuanca Valley, we scouted cow trails

vegetation. On our way up the valley, we documented grazing livestock...including the species, the GPS location, the time of day, the herd size, the presence of babies, the vegetation, the slope, water sources and a million other details. Now, this sounds straightforward enough, but it was occasionally quite challenging! Depending on how far away the animals were, we would discuss -is that a third cow or a rock? Is that the same group of sheep that we counted just before our lunch break? Should we count that group of horses as stationary or moving- they were galloping but now they've stopped to eat. And what about this vegetation? Does it count as tall grass or short grass?

During our last few days in the park, we encountered a new problem. We had walked over the high Cojup Pass and into the Cojup valley to exit the park. We began our counts again from the top of the pass, with each person having a different task so that we could collect data quickly. The data collection went smoothly and we made good progress, but about halfway through the valley on our final day, there seemed to be more cows. Cows we counted seemed to be following us. Cows ahead of us seemed to be coming towards us. After a brief break, there was no denying it: cows were coming out of the brush and down the slopes...to lick us!

My favorite project was recording the livestock in the valley, data that would be used in an ongoing study about high-altitude grazing impacts on





Photo: ACSP

Reflections and afterthoughts

Salt-starved cows and thin air aside, I came away from the trip with a sense of excitement that lasted for weeks. After leaving the Cojup Valley, I spent my last days in Huaraz attending the International Glacier Forum, an impressive series of talks about the impact of climate change on the especially vulnerable regions of Peru and throughout the world.

Well, its rated as 'easy', but the easy part of the mountain fell off....

For me, the Forum merely drove home a realization that had been building since I started up the Quilcayhuanca Valley: the Andes of today are not the Andes I remember from ten short years ago.

Visiting Huascaran National Park made me see that glacial retreat is everywhere, that the snowline is moving up the mountainside and leaving exposed, rocky, loose moraine in its place. And the changes are accelerating- in a few more decades the Cordillera Blanca will no longer be "Blanca". More than once, when we asked John for the difficulty rating of a mountain we were about to climb, he replied, "Well, its rated as 'easy', but the easy part of the mountain fell off...."

In retrospect, I see that statement as a metaphor for the global challenges in our future- they will all be greater now

because we were not better stewards of the environment in the past.

Seeing such rapid change in the Andes within my lifetime motivated me to begin taking classes in sustainability management when I returned to NY. I can't say for sure where this new avenue of study will lead me. But I do know that I'm learning alarming things about our planet and consumption that surpass even my most cynical assumptions about the future. I'm glad the expedition caused me to reconsider my sense of agency when faced with the overwhelming force of environmental degradation.

I'm proud to have been part of a smart, funny, supportive team that is gathering data to help us understand the current situation and our options going forward.

I'm looking forward to joining ACSP again next summer and to collecting data that will be needed to inform significant policy choices in the near future. In the meantime, I'm enjoying re-living the summit climb from the comfort of my studio while working on a new series of paintings depicting the various moods of Maparaju at dawn.



To learn more, visit:

<http://climberscience.wordpress.com>



Orange Rope Team, Maparaju, by Carrie-Ann Bracco. 24x36 inches, oil on canvas, 2013.

The Great Himalaya Trail– The road to sustainability?

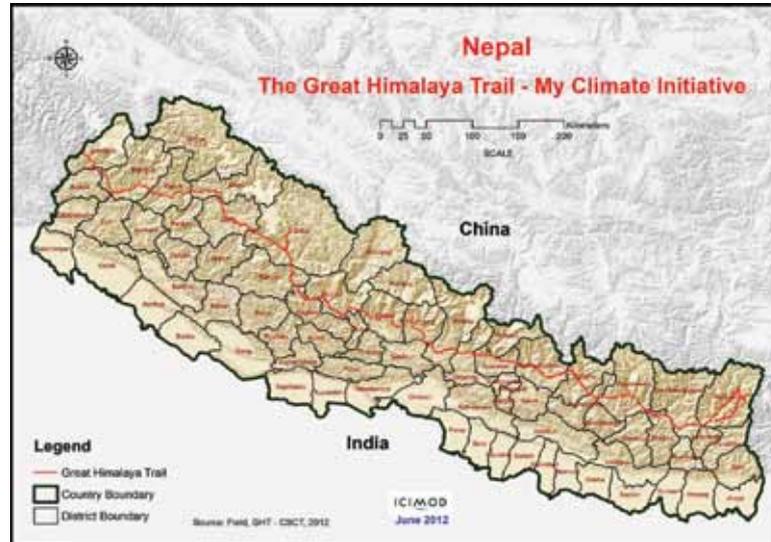
By Paribesh Pradhan

In the small village of Ghorepani (2887 m), as many as two hundred trekkers materialize in the predawn light, queuing up for the sunrise trek up to Poonhill (3177 m). From the top of Poonhill, one has an unparalleled view as the first rays of sunlight set the snowcapped peaks of the Dhaulagiri and Annapurna ranges alight. A daily ritual for tourists since the late 1960s, the sunrise from Poonhill represents a highlight in many tourists' Nepal experience, as well as an important source of income for the local population. For us, seasoned trekkers following the Great Himalaya Trail, it also represents hope.

And who are we? We are members of the Climate Smart Celebrity Trek, an expedition led by Apa Sherpa to promote tourism and highlight the effects of climate change in villages along the Great Himalaya Trail (GHT), which traverses some of the most remote regions of the Himalaya. I am also walking the trail as part of the "GHT – My Climate Initiative" project, funded by the Swiss Agency for Development and Cooperation, the Global Program Climate Change

and supported by the International Centre for Integrated Mountain Development and the United Nations Environment Programme.

These projects shared the common goal of enhancing climate change awareness in the Himalayas. The aim of my GHT – My Climate Initiative was to document stories of sustainable adaptation practices, vulnerabilities, and climate change impacts across the Great Himalaya Trail in Nepal. Over the course of my 98-day journey, I walked 1555 km and interviewed more than forty school teachers and farmers, committing to paper the memories, stories and anecdotes that document how people in remote Himalayan com-



munities have perceived and adapted to the challenges of a changing climate.

My interviews were governed by a single rule: the phrase "climate change" was off-limits. My job was simply to investi-

Even the mention of climate change can elicit a verbatim lecture from the most unlikely people.

gate how people have perceived the trajectory of time over the past several decades.

I was looking for unbiased, gut reactions, a tricky goal to achieve because many of these villagers have had plenty of exposure to scientists concerned about climate change in mountain regions. Here, even the mention of climate change can elicit a verbatim lecture from the most unlikely people, often in the most remote regions.

Not surprisingly, however, the symptoms of climate change were central themes of nearly every interview. From warmer winters and droughts to floods, landslides and new agricultural pests, the subsistence lifestyle of most villagers in the Himalaya means that deviations from "normal" climate are felt especially strongly here. Through the GHT – My Climate Initiative, I helped document these changes and peoples' reactions to



Photo: P. Pradhan

them. By promoting the GHT through the Celebrity Trek, we hoped to encourage the development of a tourism market that will in turn motivate communities living along the trail to develop sustainable livelihood alternatives. This is the ray of hope we saw from Poonhill, and the crack of light that is starting to appear in places like Lamsung.

Battles of the past and of the future

Lamsung is a three-day walk from Ghorepani and – currently – well removed from the tourist trail. It has not always been so well hidden, however. After a four-hour hike uphill through the rhododendron forests above Lamsung, the hiker is greeted with astounding panoramic views from the Jaljala Pass (3404 m). A Who's Who list of peaks reaches impassively toward the heavens in all directions, including Annapurna South.

Not so long ago, this pristine view was marred by bloodshed. In March 2004, Maoist rebels used Jaljala Pass as a base from which to launch an armed offensive against Beni, the Myagdi district headquarters. While the statistics vary, casualties were high, making this battle one of the bloodiest between the Maoist rebels and the government forces during the 10-year insurgency. Locals at Lamsung still remember the night of the invasion with horror. According to one villager, as many as 5000 insurgents camped at Jaljala Pass; it took hours for the line of guerrillas to pass through Lamsung on their way to Beni.

Today, the inhabitants of Lamsung face a new battle. Through my interviews, I learned that landslides and crop failures have plagued Lamsung over the

last years. Said one, "In the past, we had rain and snow during the right season. You don't find so many landslides during the rainy season like now. Perhaps it is because of the deforestation. The forests are shrinking in size even though we have community forests here." Another worried about the unpredictable rainfall patterns: "Sometimes, we don't get rain

In the past, we had rain and snow during the right season.

during the cultivating season and have drought. Other times, we have incessant rainfall. Like last year, for instance. There was less snowfall and it didn't rain during winter. The barley and wheat dried up and died."

Chasing Mao's ghost for a sustainable future

Tourism, unlike crops, only dries up and dies when political unrest reaches the flashpoint. "We used to have a lot of tourists before the Maoist insurgency, more than double the number we get now. The number of tourist coming to this region dwindled during the insurgency period because it was not easy for them to trek in this remote area," said one local guide. Again unlike crops, the history of unrest can cause tourism to rise again from the ashes. It is, in fact, the pull of the not-so-distant past and the region's spectacular scenery that may be the Myagdi district's ray of hope for a sustainable future.



Photo: P. Pradhan

Today, many trekking companies offer "Guerrilla Trail" expeditions, a name that was born over a Climate Smart Celebrity Trek campfire. What had started as a campfire debate over whether the same name that had caused tourism to wither could be repackaged and marketed anew as a tourist attraction took root as expedition members told and retold the Jaljala story. From this, we know our expedition goal has been met: as tourism spreads along the more remote stretches of the GHT, so does a smart adaptation measure that can help mountain communities meet the challenges of climate change sustainably.



For more information about the GHT - My Climate Initiative, contact Paribesh at paribesh.pradhan@gmail.com

<http://trek4education.org/about-my-climate-initiative>

www.annafound.org



Adventurers and Scientists for Conservation: On the trail of the Pacific marten

By Jordan Holsinger

We rolled into the driveway at the USFS house in Hoodspport, WA at about 10:30 AM on Friday, January 17th, vehicle loaded to the brim with food and gear and all our packs tied to the roof. The previous 24 hours consisted of furiously packing for the variable winter conditions in the Pacific Northwest, flying from Bozeman to Seattle, buying groceries and supplies for 30 hungry adventurers, getting a few hours of sleep at the home of a gracious ASC supporter and driving out to the Olympic Peninsula. We were finally ready to go look for the elusive coastal Pacific Marten (*Martes caurina*).

The truth is that the hard work started long before we left Bozeman. For years USFS researchers led by Betsy Howell have been searching for signs of marten in the Olympic National Forest (ONF). Though ONF is prime marten habitat, there is concern that the species has been extirpated from the region. The last confirmed record of marten on the ONF was the discovery of a dead juvenile

in 2008. But Betsy has continued looking for them. Last year ASC joined the effort and organized the first ASC-ONF marten survey project where 12 camera trap stations were established in 6 different drainages. This project yielded thousands of photos of dozens of different species, including the marten's cousin the fisher, but notably lacking was any sign of a marten. Last year's efforts led to the coastal Pacific Marten being listed as "critically imperiled" by NatureServe, but Betsy says:

"If martens still exist in greater numbers on the Olympic Peninsula, then they may be doing so in higher, isolated pockets of habitat. Getting to these areas can be challenging, particularly during the winter months, which are the most ideal for carnivore surveys. Having volunteers vetted through ASC who are extremely fit and extremely motivated would greatly add to the likelihood of success for such an effort."

This year we are back in the ONF with a larger team, more cameras and more funding thanks to a generous grant from the National Forest Foundation. We arrived on the Olympic Peninsula a few hours before our 24 volunteers showed up for the weekend, just enough time to set up a couple of camera stations and brush up on our skills.



ASC volunteer Angela Bohlke sets up a motion-sensor camera to look for martens deep in the ONF. Photo: E. Johnson.

Our Friday afternoon foray into the ONF brought us well above sea level and above the inversion that had socked in the lower elevations into the warm sunshine with incredible views of Mt. Rainier miles away. The Northwest has been experiencing an unusually warm and dry winter so far, which is not ideal for martens, but makes for very enjoyable fieldwork.

The volunteers come from all walks of life – from arborists to M.D.'s and engineers to retirees. They have also traveled from across the Pacific Northwest, some traveling from as far as Portland, OR. But they all share something in common: a love of the outdoors and a strong desire to participate in protecting it.

On Saturday we split up into groups and had a hands-on training session teaching volunteers how to set up the cameras and bait, and what the best marten habitat looks like. Afterward, we

Having volunteers vetted through ASC who are extremely fit and extremely motivated would greatly add to the likelihood of success for such an effort.

traveling from as far as Portland,



Volunteers hike up steep trails to set up camera stations. Photo: J. Holsinger

headed into the forest. Four of the six groups set out on an overnight trip to their camera locations while the rest of us made multiple day trips. The hikes in are often steep and sometimes rugged, climbing nearly 200 m per kilometer of trail. Once in the general vicinity, we had to bushwhack off trail to find ideal marten habitat – old growth forest with plenty of downed wood and cover on the ground – and two trees that were approximately 5 m apart and directly on a north-south line to set up the camera and bait.

Setting up camera traps is relatively simple, but extremely important to get correct. If you don't get the angle just right you'll miss what you're looking for, which makes for a fine line between success and failure. But at each spot everyone worked as a team, getting the

camera installed and the bait on the tree, testing and retesting everything to make sure we would collect the best data. Every two weeks our adventure volunteers will make the trek back to the same spots to dutifully check and maintain their cameras.

Now comes the hard part, as one volunteer pointed out. Now we just have to wait and see what we get.



This is the second year ASC has worked with the ONF on marten surveys. You can get more information about the project on our ONF marten project page and read last year's project report.

Visit www.adventureandscience.org to learn more!



ASC guide Abby examining animal signs in the ONF.
Photo: B. Agnew.

Olympic Peninsula local Ron Staggs secures bait to a tree.
Photo: E. Johnson.





A photograph of a snowy mountain range under a clear blue sky. The foreground is a blue-tinted, textured surface, possibly snow or ice. The text "Scientist Spotlight" is overlaid in white, italicized font.

Scientist Spotlight

Scientist Spotlight

Katharina Conradin



By way of introduction, can you outline the core objectives of your research?

I am looking at how World Natural Heritage sites influence

sustainable regional development processes. As large protected areas with an international importance and touristic appeal, Natural Heritage sites have the potential to nudge development in a certain direction. In my study, I compare the effects induced by World Natural Heritage status on a global scale - over 60% of the sites listed in 2011 have participated in my survey. The results are interesting – not only can conclusions be drawn regarding the effect of World Heritage status, but there are also considerable differences between the “Global North” and the “Global South”. Whereas World Heritage status is increasingly used as a promotional tool in the North, sites in the South have a larger focus on conservation.

What led to your interest in this field?

Sustainable development is something that has interested me for a long time; it is clear we cannot go on the way we do now. Protected areas can – to a certain extent – be model regions for reconciling tourism and sustainable development because they integrate

diverse disciplines and interests. Conservation, tourism (economic development) and social aspects such as community participation all play a role in achieving and maintaining World Heritage status.

How does your research address the challenges of reconciling tourism development with conservation concerns?

In protected areas, special rules apply. The responsible authorities have the right to define the “rules of the game”. You can understand protected areas as a policy tool, where what is possible and what is not can be negotiated, ideally in a broad and participatory way. What is clearly necessary in order to

meet conservation and development goals are clear guidelines about what is possible and what is not. If they are lacking, there is often a tendency to give more weight to economic interests than to ecological ones. But it is also clearly necessary that protected areas be integrated into regional development concepts from the very beginning, and that conservation zones and buffer zones are clearly defined with a focus on sustainable development.

Are you collaborating with other organizations in the course of your current investigations? Has a multidisciplinary approach been important to the success of the project?

Protected areas can...be model regions for reconciling tourism and sustainable development.

Yes, in fact. On the one hand, my research is closely linked to a project called “Benchmarking World Heritage & Tourism”, where the impacts of World Heritage sites on tourism are evaluated. Numerous institutions, such as the Universities of Western and Northwestern Switzerland and CETRAD in Kenya, are involved in this study. While the former are working on a benchmarking system to rate how World Heritage sites deal with tourism, CETRAD has been instrumental in organizing various local case studies – this involvement is a continuation of CETRAD’s long-standing involvement in research on World

Heritage sites. All involved researchers bring in their respective approaches

and have been able to fundamentally improve the research design. Furthermore, I collaborate with UNESCO, which will hopefully be able to use my data!

How can this research be applied directly to current policy challenges?

Indeed, I hope that it will be. The results have turned out to be highly relevant for policy makers. My data show that the “utilization” of World Heritage status has changed a lot since the 1970s, when the World Heritage status was created. Today, World Heritage status is used more and more to market sites, not just to conserve them. The World Heritage convention, however,



remains the same. Measures may therefore have to be taken to ensure that World Heritage status doesn't "degenerate" into a mere promotional tool. For instance, there should be a clearer differentiation between core zones and "sustainable development zones". While the former focus on conservation, the latter should foster sustainable approaches. With this approach, protected areas can influence the development of the regions around them, not just the protected area itself. UNESCO must also develop clearer guidelines for the management of tourism in World Heritage sites.

You work at Mountain Wilderness. How does this relate to your research?

Actually, this research is linked very closely to my work at Mountain Wilderness, a NGO lobbying for the conservation of the unexplored mountainous landscapes in Switzerland and abroad. However, Mountain Wilderness also promotes sustainable forms of mountain sports. My research gives me the opportunity to critically analyse current conservation approaches. However, it also makes me think beyond conservation. Many people, who have to make a living, live in or nearby protected areas. Thus, conservation cannot focus solely on the environment: sustainable conservation means involving the people who use the spaces we want to protect. In this sense, working at Mountain Wilderness really completes and broadens my view.



Katharina is a 4th year PhD at the Centre for Development and Environment, University of Berne. She is also the director of mountain wilderness, an NGO working for the protection of mountains around the world, and a board member of the International Commission for the Protection of the Alps (CIPRA). She can be contacted at:
katharina.conradin@mountainwilderness.ch

The Aletsch Glacier - the longest Glacier in Europe - forms the core of the Swiss-Alps Jungfrau Aletsch World Heritage site. Though the participation process in the World Heritage Site is considered exemplary, a dispute is now going on about increased hydropower generation.



Photo: Wallpaperfo.com

Mt Kilimanjaro is the highest mountain on the African continent. The contribution of tourism to regional economic development is considerable. It is an example where the poor also profit directly from the protected area, e.g by finding labour as porters or guides. Nevertheless, some sections of society feel disadvantaged by the recent enlargement of the protected area.



Photo: H. Dahlmo

Mt Kenya World Heritage Site is an important regional water tower. Through World Heritage status, conflicts about upstream-downstream water usage have been mitigated. Despite that, threats through illegal logging and poaching go on.



Photo: UNESCO

The Dolomites - a serial World Heritage property comprising 18 peaks that rise to above 3,000 meters. In the year 2011, World Heritage status played a fundamental role in reducing heliskiing on the Marmolada.

Scientist Spotlight

Jan Klimes



By way of introduction, can you outline the core objectives of your research?

I investigate slope stability conditions in high alpine and

periglacial environments, with a special focus on processes change due to precipitation and temperature variations. During a recent project, for example, we focused on an evaluation of the hazards related to glacial lake outburst floods, which are complex and potentially devastating events. I am primarily interested in the geomorphology of glacial valleys, which provides basic information about the potential for hazardous slope processes. A large slope failure above a lake may, for example, cause a sudden outburst flood.

Moraine dams are particularly interesting because one can find indications of their current stability, as well as evidence of past floods. This geomorphologic record is useful for setting boundary conditions for mathematical flood models and hazard assessments. This sort of hazard assessment model is the main “good” we try to sell to the local authorities, as well as to collaborating research organizations.

What led to your interest in this field?

I was never a high mountain enthusiast until I started working in the Cordillera Blanca, Peru during my PhD. There, I discovered the complexity of mountain environments, where people coexist with

powerful geomorphologic processes that continuously modify their surroundings. The challenge of ensuring the sustainable, long-term presence of humans in the often harsh conditions of the high mountains interests me a lot, and I hope to contribute my expertise to the long-term safety and responsible development of mountain settlements.

How is your research relevant to concerns about the changing mountain environment and human adaptation?

The processes I focus on – glacial lake outburst floods and landslides – continuously modify mountain environments. These processes may occur repeatedly at the same sites, a trend that can be documented for a variety of cases in Peru and elsewhere. At the same time, “unexpected” events at sites previously

considered “safe” can occur. Very little reliable data exist that can be used to determine if such occurrences are natural, or if they are caused by changing environmental conditions (e.g., temperature/precipitation variations). I try to approach this problem by searching

for geomorphologic evidence of past events, which is otherwise un-noted in historical documents. Interestingly, native topographic names for specific cases in the Andes may contain key information about the long-term evolution of the sites.

A large communication gap still exists between city-based scientists and rural inhabitants

Are you collaborating with other organizations in the course of your current investigations?

I was very fortunate to be introduced by my Ph.D. supervisor, Vit Vilimek, to a very reliable and highly professional Peruvian research unit based in Huaraz. Colleagues at the Autoridad Nacional de Agua (National Water Authority) not only provided us with invaluable monitoring data and fieldwork support, but also became close friends. To ensure that our research is high quality, relevant and applicable, we need to have a strong, multidisciplinary research team.

With respect to this, we lack social and/or environmental scientists in our team, and welcome such collaborations!

Despite the fact that you do not deal directly with local inhabitants, you have mentioned them several times. How do they react to your research activities in their “backyards”?

In general, we have very positive experiences with local people, which is

largely due to our collaboration with ANA experts who are well known in the region. Nevertheless, some negative experiences show that a large communication gap still exists between city-based scientists and rural inhabitants. In several cases the locals felt abused



Photo: J. Klimes

by our research, telling us that we are doing the research on their land and that don't profit from it. This attitude entirely neglects the fact that we spend a lot of "our" money to do the research and that the research results are provided to central agencies, which are responsible for their further dissemination.

However, this attitude is understandable considering the poor communication between the official research and policy entities and the local inhabitants. Obviously, it is the local inhabitants who are directly

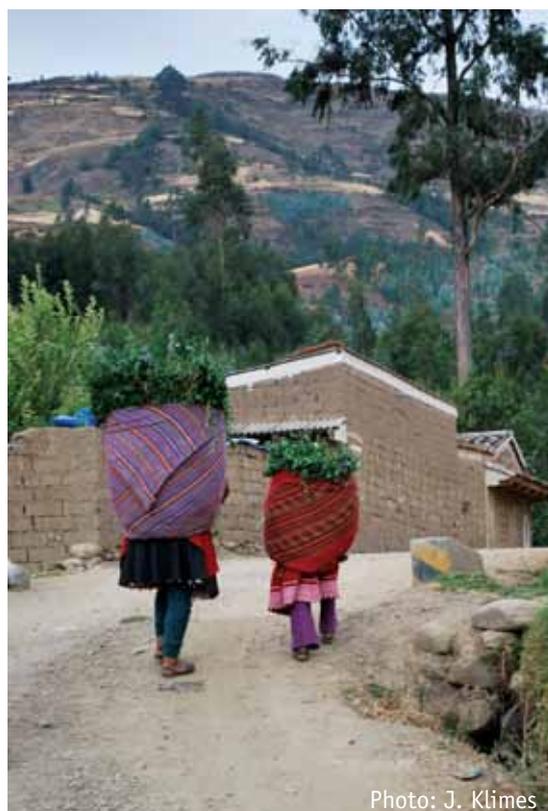


Photo: J. Klimes

endangered by hazardous processes, but they are often left with little or no information about the degree of hazard they are exposed to. We therefore try to translate our research results into short and understandable leaflets that can be distributed by local officials throughout the community.



Jan is research scientist at the Institute of Rock Structure and Mechanics, Academy of Sciences of Czech Republic and can be contacted at klimesjan@hotmail.com or go to: <http://irsm.academia.edu/JanKlimes>



Photo: J. Klimes

Scientist Spotlight

Marc Oliva



By way of introduction, can you outline the core objectives of your research?

At the moment I am working in different cold-climate environ-

ments, both in mountain areas (Sierra Nevada, Pyrenees, Picos de Europa) and in polar regions (Antarctica, Svalbard). My research is focused on present-day geomorphological processes as well as on the reconstruction of past climate. By understanding the geomorphological processes of the past and their relation to climate, we can better understand the geomorphological processes of the present. I use a wide range of sedimentary records (glacial, periglacial, lacustrine, peatlands, etc.) to build this understanding.

What led to your interest in this field?

I come from the Mediterranean, from the warm and sunny capital of Catalonia, Barcelona. We usually like what we don't have. That may be one of the reasons why I like cold climates. From Barcelona, I had two options to find the cold weather: go up in altitude or up in latitude.

I started working in the Sierra Nevada massif (Spain) in 2005, during my PhD. My research focused on the reconstruction of Holocene alpine environments and the associated climate variability using sedimentary records of the present-day periglacial belt. In 2010, I was awarded a postdoctoral fellowship to the University of Lisbon to study present and past geomorphological processes in polar regions (Antarctica, Arctic). Since then, I have conducted research activities in other Iberian mountain ranges: Picos de Europa, Pyrenees and Serra da Estrela.

How is your research relevant to concerns about warming mountain environments and human adaptation?

In the Sierra Nevada massif, the study area in my PhD research, the warming of the last decades is evident in the degradation of permafrost and fossil ice remains, a decrease in late-lying snow patches, changes in the distribution of vegetal species, etc. However, these changes are not yet significantly impacting human activities. These changes will continue to be monitored in greater detail through the Sierra Nevada Global Change Observatory, which my research group is part of.

My study sites in polar regions (Svalbard, Antarctic Peninsula) have recorded the strongest warming rates on Earth over the recent decades. Although this climate trend is causing significant and accelerated changes in the terrestrial ecosystems where I work, the impact on human societies is very limited here because of the scarce presence of human settlements and infrastructure.

How has collaboration been important to your work in such challenging and remote regions?

I am member of several international organizations (European Geosciences Union) and I am involved in associations of young researchers (.). My membership in organizations like the International Permafrost Association, the Permafrost Young Researchers Network and the Association of Polar Early Career Scien-

tists, has been crucial for my research career because it has allowed me to create a broad network of scientific collaborations.

I am used to working in a multidisciplinary, collaborative environment and am now coordinating the project HOLOANTAR (Holocene environmental change in the Maritime Antarctic: Interactions between permafrost and the lacustrine environment, <http://holoantar.weebly.com>). In this project there are geographers, geologists, geophysicists, biologists, remote sensing specialists, etc., which gives you idea about the importance I place on working with researchers from different disciplines.

How can this research be applied directly to current policy challenges?

In the case of the Sierra Nevada, we have been working on the implementation of a new landscape management scheme based on the geomorphological significance of many sites in the highlands of the massif. We are doing this in collaboration with local administrations.

Regarding my research in Antarctica,



Byers Peninsula (Livingston, Antarctica). View from the Rotch Dome glacier.

some of the research activities have been carried out in Antarctic Specially Protected Areas (ASPA), which are areas of scientific interest protected within the Antarctic Treaty. Our findings in these areas can provide further information about their environmental dynamics that may be included in the formulation and implementation of future Antarctica policies. Moreover, our scientific results will contribute to the overall comprehension of the role that this continent has on Earth's climate, and help improve future climate projections for this remote continent.



*Above: Picos de Europa in northern Spain.
Photo: M. Oliva*



Left: Solifluction landforms in the San Juan Valley. Sierra Nevada, southern Spain. Photo: M. Oliva

Below: Mulhacén peak and Rio Seco lakes. Sierra Nevada, southern Spain. Photo: M. Oliva



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To learn more, visit www.antecc.org or <http://holoantar.weebly.com>

Scientist Spotlight

Carolina Adler



By way of introduction, can you outline the core objectives of your research?

On a general level, my core objective is to help find ways

to tackle problems of societal and/or policy relevance, focusing on the effects and challenges of global change in society. For me, personally, it's important to embed my research in the actual challenges and issues that societies face rather than pursuing an intellectual curiosity in isolation. This decision to focus on applied research means I inevitably have to step outside of conventional scientific realms and engage with others to guide and conduct research that informs solutions.

More specifically, I try to find ways to reduce net losses and enhance resilience to climate change impacts. I do this by first co-jointly defining goals that serve a common interest and then studying conditions that hinder these desired goals. For example, the impact of weather-related extreme events on communities can reveal existing, unresolved vulnerabilities such as poverty, malfunctioning governance or socio-political issues. Finding and mobilising sustainable solutions that also address these 'other' problems, and are therefore congruent with what is valued in a given context, have a much better chance of being effective.

What led to your interest in this field?

After finishing my degrees in geography and environmental science, I entered the workforce as a consultant, where I assessed post-remediation works on previously contaminated land to determine if it was 'fit for use' in urban redevelopment

and construction works. It was very fulfilling at first, but with time I began to reflect on the role of science and scientific advice in decision-making processes. In fields like land remediation, politics and other 'human dimensions' are as important (if not more so) as scientific advice. I wanted to study this 'human dimension' in greater detail, so I eventually decided to re-enter university as a researcher and really immerse myself in critical thinking. The societal challenges of climate change made for a very useful case study for examining how to combine science and human concerns into actions and solutions.

How do you combine natural and social sciences to address sustainable development issues?

Addressing a sustainable development issue means we're addressing a complex real-world problem of policy and societal relevance. The art of combining and integrating natural and social sciences for applied outcomes comes down to first engaging with stakeholders to co-define a concrete, context-specific problem that mobilises researchers to find solutions. Sustainable development represents a desired goal for how we would like to see our societies function - now and in the future.

Problems or 'issues' arise when our own visions of that desired goal are not consistent with the sorts of trajectories of development we see taking place today. The "how" and "why" of this discrepancy can be very complex, requiring interdisciplinary expertise and multi-

stakeholder collaborations to resolve. I find "policy sciences" a very useful approach for structuring this complexity and at the same time understanding and resolving complex, real-world problems. For sustainable development issues, knowledge of the technical aspects of our physical environment and of people and their perspectives are crucial to

Sustainable development represents a desired goal for how we would like to see our societies function

finding tangible and realistic solutions.

Are you collaborating with other organizations in the course of your current investigations? Has a multidisciplinary approach been important to the success of the project?

Yes! Collaboration with multiple stakeholders, whether they are other scientists in other fields, practitioners or members of society, is absolutely integral to the work I do. I very rarely work in isolation these days. One project that really stands out for me is a collaboration I participated in with the "Yorta Yorta", a group of Indigenous people with deep connections to the Murray River in northern Victoria, Australia.

Let me give you an example of just how undervalued the deep knowledge that the Yorta Yorta have about environmental issues really is. Back in 1988, river authorities met with Yorta Yorta Elders to seek input on a planned removal of branches and logs from the river, then considered a navigation hazard for boats and other river users. The Elders advised



Photo: YYNAC

against it, as it would not only remove key habitats for local fauna but also enhance bank erosion. Despite this advice, the removal plan went ahead. Experiences with floods and other extreme events since the removal have shown the folly of this decision.

However, in 2006 Yorta Yorta Elders were invited to oversee a ceremony to launch a multi-million dollar project to re-introduce the vegetation, effectively 're-snagging' the river to previous conditions. It goes to show just how much trouble and resources could've been saved if only this sound and deep knowledge of the river and its ecological health had been taken seriously and incorporated into the river management policy.

How can this research be applied directly to current policy challenges?

There are many factors that can help towards direct application of this type of interdisciplinary and problem-oriented research to address policy challenges, but I will mention three here that I have found to be crucial.

First, it is very important to keep your 'finger on the pulse'. Staying up to date on current affairs, community and societal concerns, and major policy deliberations (from local to international!) is key to anticipating trends and identifying likely information needs. A good way to remain updated is to foster meaningful networks and maintain regular conversations with stakeholders and practitioners - it's been really surprising just how insightful and productive a casual cup of coffee with someone outside of academia can be!

Second, timing is everything. Being able to anticipate knowledge needs well in advance allows one to identify key windows of opportunity to either promote previous (and relevant!) research or to propose a new idea, precisely at a time when this information is needed. But

promoting previous research and/or new ideas need not be through scientific papers alone: social media is becoming a very effective way to spread ideas and information.

And finally, networking within one's own 'community of practice' via conferences, social media and other means allows you to stay up to date about the latest innovative work and to enrich your own repertoire of tools for practical application. Furthermore, these scholarly exchanges provide fertile ground for new ideas and collaborations, which is at the heart of problem-oriented research work.

What would you recommend to other early-career researchers who aspire towards the type of interdisciplinary work you do?

Channel your innate scientific curiosity to actively learn about other disciplinary perspectives and approaches. One effective way to do this is to embed yourself (or your work) within another discipline,

for example through a joint project. It is not a comforting experience to step out of your comfort zone like that, so you must remain open-minded and focused on the goals you are trying to achieve. However, I have found that showing that level of personal commitment and initiative is highly valued.

It also helps to partner with supportive and 'like-minded' colleagues who share your enthusiasm and pursuit of inter- and transdisciplinarity.

Also, don't forget to share your interdisciplinary experiences within your own discipline; brokering that knowledge across disciplinary boundaries is important for continued learning.



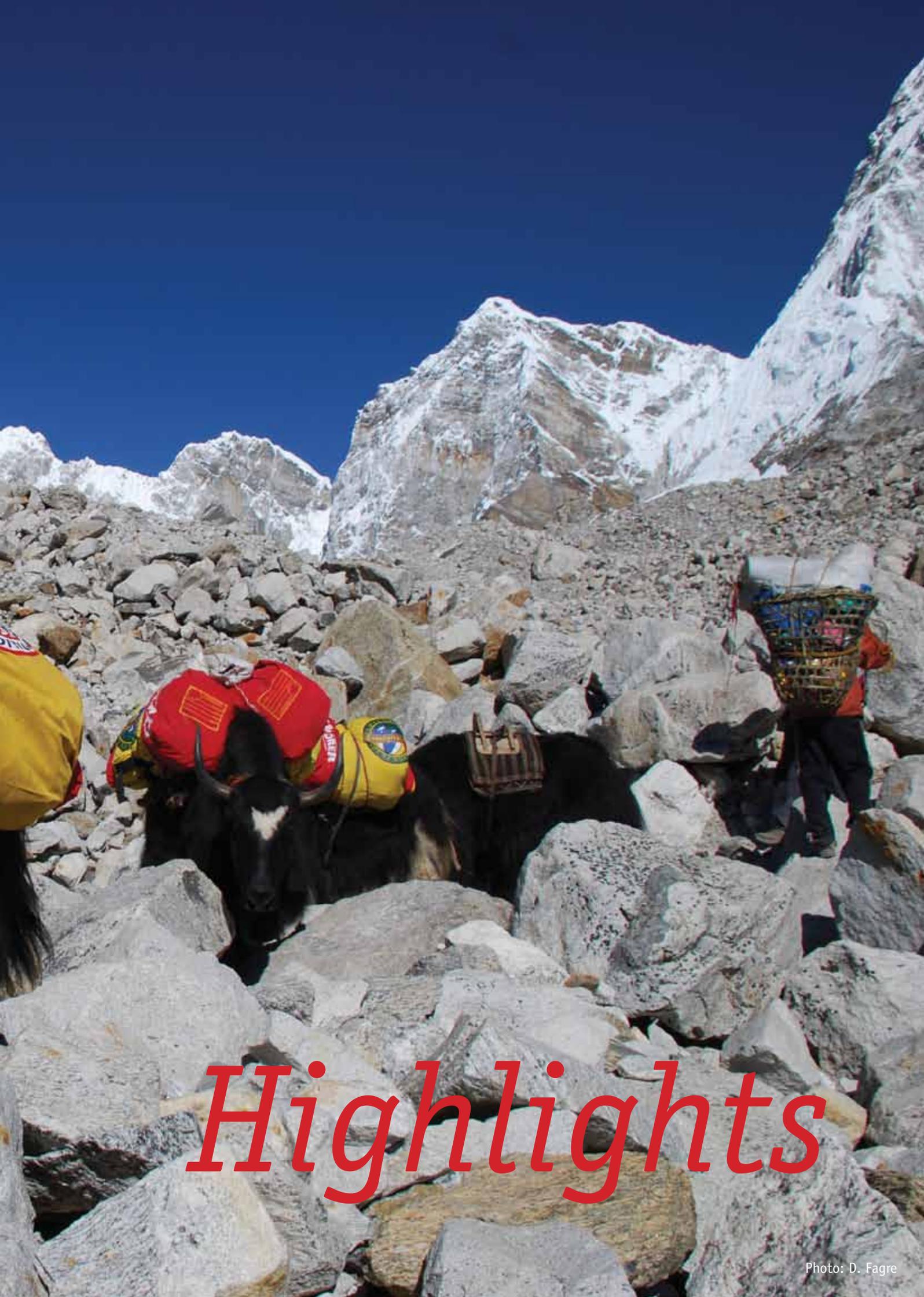
Carolina is a Research Fellow in the Environmental Philosophy Group at ETH Zürich. Contact her at carolina.adler@env.ethz.ch.



Courtesy: C. Adler

Regional





Highlights

Highlights from...

AfroMont

AfroMont collaborative venture to set the scene for long term monitoring and research in African mountains

The big challenge for Africa is to bring about true collaboration among the researchers studying mountain problems in Africa. This problem is largely due to the fact that most of these scientists have relatively few resources with which to perform their work. A couple of double-edged swords hang over African mountain research. Firstly, the countries with more resources (e.g. South Africa, Kenya) have scientists that investigate conservation and biodiversity issues in mountains, as well as the meteorology of climate change. On the other hand, mountain scientists in countries with fewer resources tend to focus on bread-and-butter issues: factors affecting livelihoods of communities in mountains and the factors that affect agricultural production. At first sight, this impedes collaboration among different countries because of the different foci of interest. However, this also creates the possibility of complementarity and team work of individuals with different strong skills in research and professional interest.

A similar divide exists between countries with many scientists that publish in the regular scientific literature that has a wide circulation, while individuals from other countries publish in local or regional journals with a more restricted circulation, making their findings less accessible. Part of the explanation lies in different traditions when comparing French-speaking and English-speaking countries. But this difference also creates the possibility that collaboration may have a profound effect on the way that scientists from these countries communicate their scientific results. Finally there is the irony that mountain research in Ethiopia and in Lesotho, the two truly montane countries in Africa, do not have well-developed local mountain research agendas or networks, with most of the research being led by teams from the northern hemisphere.

Against this backdrop, AfroMont has launched an initiative to bring African scientists closer together. A series of meetings over the past year and a half have revealed shared research priorities and collaboration potentials, as well as regional differences in outcome priorities. A meeting of southern African mountain scientists in Lesotho during August 2012, for example, indicated that while South African researchers focus strongly on biodiversity and climate change issues, scientists from other southern African countries concentrate on the more immediate, socially relevant issues of soil conservation, food production and health issues. By strengthening research collaborations and data exchange throughout Africa, AfroMont hopes to turn the possibility of complementarity and team work of individuals with different skills and professional interests into a reality.

Sue Taylor
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Keep reading for a brief round up of activities in the African region!

*Karimanzira Rungano
from the Zimbabwe
Meteorological Service
speaks at the Lesotho
2012 Workshop*



Courtesy: S. Taylor

Research priorities for Africa

In January 2013, a regional meeting for African countries north of Malawi was held in Dchang, Cameroon, with representation from Guinea-Conakry to Ethiopia. Remarkably, the north African delegates articulated very similar research priorities as those identified in Lesotho. As a result, a pan-African planning meeting was proposed with the goal of launching well-defined research initiatives that will have regional impacts, both in terms of our understanding of mountains and their resources, but also in terms of our understanding of sustainable livelihoods. This meeting took place a mere 9 months later in Nairobi, where representatives from across Africa defined three formal, collaborative projects of different levels of complexity.

Set of three projects established for AfroMont collaborative initiative

A first collaborative initiative was launched for performing a desktop study on the long term change of natural resources at five mountain sites: Mt Cameroon, Mt Elgon, Ethiopia, Mt Kilimanjaro and the Drakensberg Mountains in South Africa. This study focuses on land use patterns, indigenous vegetation and long term climate using existing resources and funding. A second research project investigates the provision and utilisation of water at five African mountain sites: Mt Oku (Cameroon), Mt Elgon, Mt Kilimanjaro, Ethiopia and the Drakensberg. In contrast with the first project, modest funds need to be sought to launch this initiative. A third, larger initiative incorporates a much larger array of how change in natural resources and their associated ecosystem services affect the resilience of mountain communities at twelve African mountain sites. This project will require substantial financial support.

A framework has been formed to support this fruitful collaboration. The outcome of the first project is important to give credibility to the ability of partner researchers to collaborate effectively, in terms of both knowledge and skill development in countries with skills



Mohale Lodge, Lesotho, where the Lesotho AfroMont meeting was held. There is still snow on the mountains!

weaknesses in particular areas. The test is now to prove that this collaboration can indeed deliver tangible results. We wish these African teams success in these endeavours, which will put African mountain research onto a new path for reaching a well-founded understanding of the resilience of resources and livelihoods in mountains.

Lost African archival datasets

With accelerating global change, the interest in long term ecological data has increased. In addition, there is a huge need to make data accessible to other researchers, as well as 'package' it for use in specific decision-support and policy situations. For effective detection of environmental trends, and to distinguish human impacts from natural patterns, data spanning forty years or more is needed. It is often not practical or affordable to set up a new project in African countries and wait a few decades for results. Thus, it is very exciting when historical datasets stored in libraries and research archives come to light for modern analysis. It is very important that such old datasets are preserved, digitised and made available – either freely or under a license agreement.

The time and resources needed for such a data retrieval task must not be underestimated, yet the variety of modern technologies of data rescue, digitisation, modelling and analysis can bring this data to life in a way the original researchers could never have imagined.

In South Africa, some recent examples of retrieving historic ecological datasets from forgotten archives make for interesting reading.

At the Lesotho 2012 workshop, the question of how to locate and preserve historic African ecological records came up, and remained an unresolved issue through 2013. Now that a new AfroMont Coordinator, Dr Sue Taylor, has been appointed, it will fall upon her to investigate this opportunity further. It is thought that there must surely be ecological data in African research institutes, perhaps even from colonial times, which may have been stored in offices and filing cabinets and forgotten. Such data could be given a new lease on life through digital means.

The AfroMont community would like to know more about such lost datasets, particularly those relating to African montane ecosystems, so that partnerships and funding can be secured to retrieve these datasets and make them more widely accessible. Admittedly, governance structures are needed to manage this process and to prevent 'data piracy'. Thus, one of the key priorities of the AfroMont community will be to develop a Data Policy to guide how access to such datasets would be managed and shared. Let's start the ball rolling to find these lost treasure troves of data – and make sure they benefit African scientists and their research!



Highlights from...

Transecto Cordillera Americana

Research priorities - not just questions of what, but who?

We often seem to talk of research priorities; I can think of several occasions over the last few months, discussing subnational priorities in the context of provincial development needs, regional priorities in the context of important conservation areas in the Tropical Andes, and thematic priorities as part of a recent online forum on agrobiodiversity. However, the question of who will, or can, implement the research is not always addressed. The issue of ensuring the enabling conditions for research in the medium to long-term should, at a minimum, be a part of the discussion. In this context, a recent report by CONCYTEC, the public body responsible for promoting science and technology in Peru, concluded that the country lacks some 15,000 PhD level researchers to improve the country's productivity, among other functions. Nowhere is this more felt than in provincial universities, subordinate to the centralization that dominates Peru, but seen throughout the Andean countries.

In a step towards addressing this issue, CONDESAN, as part of regional MRI activities, led a collaboration of organizations with strong interests in global change research in submitting a proposal to build basic research capacity and strengthen links between regional government bodies and academia in two regions of Peru, revolving around a fundamental research question for the region. One of the outcomes that the proposal seeks to achieve is that resources held by universities, acquired through mining and industry royalties, are better exploited. Much more investment in research is possible in these regions but with only 182 researchers per 1000 inhabitants, there is a lack of capacity to implement projects.

For research on global changes in the Andes to inform policy effectively, more biologists, economists, hydrologists, social scientists, to name but a few disciplines, must be encouraged to pursue research as a career option. For that we need to bring together curious people with a passion for asking questions, the skills to putting together coherent projects to address them, and the imagination to get them funded.

Looking ahead, 2014 holds to be a busy year in the Andes with two major events. First, Peru is hosting the UNFCCC COP 20 in December, and the region is already looking to make the most of this event with pre-COP activities planned throughout the year. This is a good time to draw attention to the vulnerability of mountains to climate change impacts. Second, a major event in its own right, but also an opportunity for the mountain community to close ranks before the COP, is the World Mountain Forum, to be held in Cuzco in May. The event, billed as a gathering space for scientists, policy makers and practitioners working in sustainable development in mountains, looks to discuss four key themes: food security, climate change, mountain cities and mountain communities. For researchers interested in how science and policy interact in the Andes, this issue promises to be at the forefront of both events.

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Keep reading for a brief round up of activities in the Andean region!

II Environmental Researchers Meeting organized by the Ministry of the Environment's Environmental Research Network



Courtesy: C. Devenish

Monitoring session at AGU Meeting of the Americas

CONDESAN and MRI organized a session at the AGU Meeting of the Americas, held in Cancún, Mexico, 14-17 May 2013, titled 'Networks for sustainable monitoring of global environmental change'. The session was based on case studies of ongoing monitoring in global environmental change, and showed how the role of networks has been important in its organization and how results have been applied to decision making. The networks presented included 'The Andean Forest Monitoring Network', the Andean Hydrological Monitoring Initiative, and the Andean node of the GLORIA network. In a reflection on the meeting, Bert de Bievre highlighted the bottom up nature of these networks, the importance of local partners, and the benefits of better decision-making for society.

Review of research in Andean agrobiodiversity

A major activity that began in 2013 is a review of research in Andean agrobiodiversity. This project will produce a review paper on the state of research, but, importantly, will also use these results to produce a series of policy recommendations in a separate publication, as part of CONDESAN's 'Propuestas Andinas' series. One of the first tasks of the consultant responsible for the review, Eliana Martínez (photo, center), was to organize a virtual workshop on agrobiodiversity. Over four days, from 26-29 November 2013, 56 people signed up to discuss three key topics:

- Current research in agrobiodiversity in the Andes
- Main threats to agrobiodiversity conservation
- Opportunities for agrobiodiversity through collective action and local markets.

Important conclusions from the workshop related to the actual definition of agrobiodiversity and the importance of local participation in defining research priorities. Furthermore, improvements to the format of the electronic workshop

itself were also noted as part of a continuous process to improve CONDESAN's virtual discussion platform. The full conclusions can be found online, at the forum website. The review on agrobiodiversity is expected to be published by mid 2014.



Eliana Martínez

MRI's elevation dependent warming campaign, aka $dT^{\circ}/dt = f(z)$

One of MRI's current efforts is to promote the 'Global Campaign on Accelerated Climate Warming at High Elevations' campaign, the continuation of a poster presented at the Mountain Pavilion during Rio+20 in Brazil (2012). This year, CONDESAN, through funds provided by the Swiss Cooperation (SDC), is supporting a Master's thesis comparing ground based temperature data with remote sensed sources, such as MODIS. Master's student Jaime Aguilar began his thesis in October 2013 and is based at the Universidad Nacional Mayor San Marcos.

On this same theme, CONDESAN has coordinated a new submission to the US National Science Foundation's PEER Awards, funded by USAID. The new proposal, 'Forging academic - public linkages for sustainable climate research, monitoring and policy support in the Andes', follows an unsuccessful attempt in 2012. While the proposal follows the same underlying research theme of warming at high altitudes as a vehicle for strengthening regional relationships

between academic and public institutions, the approach has been changed completely. The new project proposes to build research capacity at regional universities by bringing lecturers and recent graduates to study in Lima. At the same time, links will be strengthened between local universities and the regional offices of the Peruvian Meteorological and Hydrological Authority to ensure that research responds to regional needs.

Finally, CONDESAN is also collaborating on a related project proposal, submitted by Prof. James Miller at Rutgers University to NSF, titled "'Collaborative Research: Quantifying feedbacks Affecting High Altitude Climate Change', which, if successful, will support further studentships in the region, data sharing and other joint activities.

II Regional Environmental Researchers Meeting, Peru

CONDESAN was a member of the coordinating committee of the II Environmental Researchers Meeting, held in Arequipa from 3 - 5 July 2013. The event was hosted by the Universidad Nacional de San Agustín, one of the oldest regional state universities in Peru. This series of meetings aims to bring together researchers at universities and research institutes in Peru with state decision makers at a regional level. A new feature of this particular meeting was the invitation to local businesses to take part in discussions. Reflections on the outcome of the biodiversity roundtable and research - policy relations can be found at the TCA blog on MRI's website.

Preparations for the Global Fair on Monitoring of Social-Ecological Systems

Andean researchers and networks involved in long term monitoring are gearing up for this flagship MRI initiative. Planned sessions or talks include 'Implementing long-term monitoring platforms of coupled social-environmental dynamics in mountain ecosystems', 'Andean Forest Monitoring Network', and in-situ monitoring of agrobiodiversity.



Highlights from...

MRI Europe

MRI-Europe Progress Report 2013

Ten fingers, two hands, one head. Most of us are equipped with this limited set of “tools”, and usually we need to free our hands and our minds before we can embrace new tasks. Of course, gadgets such as backpacks and portable computers may allow us to enhance our personal carrying capacity and performance, yet time and funding usually set the limitations of what is possible.

This is the case with the MRI-Europe Program. In 2013, most resources were allocated to the recently founded Swiss-Austrian Alliance (CH-AT Alliance). In turn, regional network activities in the Carpathian and Balkan areas received considerably less input and were consequently primarily driven by their members.

The flood alarm for the northern side of the Alps in early June 2013 not only caused substantial costs and losses for Switzerland and Austria, but also added further weight to the undertaking of the CH-AT Alliance to intensify coordination and cooperation between mountain researchers of the two countries. The streets and mudflows had just been cleared when 142 researchers travelled to Mittersill, a picturesque mountain village in Austria, to discuss during the Mountain Days 2013 how forces could be joined (another means to expand our capacity and number of hands). Marking the official launch of the CH-AT Alliance, the Mountain Days aimed to promote information exchange about ongoing and planned research activities, foster existing contacts, set up new thematic networks, and identify themes for mountain research to champion at the national, Alpine, and European levels. It yielded 26 thematic – often interdisciplinary – working groups and a Final Commitment Paper to be used as a signpost for future research.

A few weeks later, the impetus of the Mittersill meeting was perpetuated at the European Forum Alpbach, an interdisciplinary platform for science, politics, business and culture dating back to 1945. On occasion of the Working Group on “The potential of the Alps”, a letter of intent was signed by Austria, Switzerland, Slovenia and South-Tyrol (Italy) to enhance research cooperation on sustainable resource use in mountain regions. Shortly after, the Austrian Academy of Sciences published the Earth System Science (ESS) Call promoting research situated in the context of interdisciplinary and long-term mountain research. The Call explicitly encouraged project proposals that contribute to bilateral agreements such as the CH-AT Alliance. All three efforts: Mountain Days, Forum Alpbach and the ESS Call, mutually reinforce the ideas of the CH-AT Alliance. As such, the CH-AT Alliance might not have caused a landslide, yet it mobilized lots of creative forces!

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Keep reading for a brief round up of activities in the European region!



Members of the Working Group on “Renewable Energy Sources” during the Mountain Days in Mittersill 2013. Photo: A. Björnsen Gurung.

The Swiss-Austrian Alliance

In October 2011, Switzerland and Austria committed to addressing sustainable mountain development in Europe through a joint effort: the Swiss-Austrian Alliance. The two countries have much in common: they have a long tradition in mountain research, rank highly in terms of scientific mountain publications and host numerous international scientific networks working on mountain issues. Despite these common strengths and interests, Switzerland and Austria did not maintain a tradition of bilateral collaboration in mountain research. With the signatures of the Swiss State Secretariat for Research and Innovation and the Austrian Federal Ministry for Science and Research, the two countries declared their intention to strengthen and expand bilateral activities in scientific research on mountain regions. The Mountain Research Initiative, the Institute for Interdisciplinary Mountain Research (IGF) at the Austrian Academy of Sciences administers the Alliance with the support of the Swiss Interacademic Commission for Alpine Studies (ICAS).

Mountain Days 2013

The Mountain Days in Mittersill, Austria (June 2013), marked the official launch of the Alliance. In the first instance, however, the event provided a market place to trade Swiss and Austrian expertise and experience in mountain research. It offered an opportunity to scientists to get equipped with new ideas and contacts for bilateral cooperations. The more than 70 proposals submitted for thematic sessions were clustered into 22 sessions with 1-2 organizers each. Those topics were again clustered in 8 thematic fields relevant for future research and development in the Alps, which are: Climate Change research; Alpine watersheds; Natural Hazards; Sustainable Regional Development; Tourism and Leisure; Energy Market; Perceptions of the Alps; and Digital Data. These research fields are explained in more detail in the Mittersill Commitment Paper (see Link) upon which the participants agreed. However, adopting a bottom-up approach, the Alliance relies strongly on

the active contributions of individual researchers willing to take lead for the above topics.

Forum Alpbach

The European Forum Alpbach offered the perfect setting to turn scientific insights into political decisions. On occasion of a meeting organized by the Austrian Ministry for Science and Research on 23 August 2013, a letter of intent on „The Enhancement of Multilateral Research Cooperation in Sustainable Use of Resources in Mountain Areas“ has been signed by four Alpine countries: Austria, Switzerland, Slovenia and South-Tyrol (Italy). The signatures of the Federal Minister of Science and Research of Austria (Prof. Dr. Karlheinz Töchterle), the State Secretary for Education, Research and Innovation of Switzerland (Dr. Mauro Dell'Ambroggio), the Minister of Education, Science and Sport of the Republic of Slovenia (Dr. Jernej Pikalo) and the Governor of the Autonomous Province of Bolzano-Bozen (Dr. Luis Durnwalder) express their interest in fostering research cooperation in the field of natural resource management in mountains. The letter of intent serves the extension of the Swiss-Austrian Alliance and will be valid for 3 years.

Mountain Research Advocacy in Europe

The Mittersill Commitment Paper is only one of many strategic documents outlining future research in mountain regions. A great challenge, however, lays in the communication and implementation of the desired activities. Therefore, first efforts were made to develop a network to transport the “mountain message” to funding programmes such as Horizon 2020. This could be done by developing a European Mountain Position Paper, an idea discussed in the frame of the Mountain Days in Mittersill. As a complementing measure, the development of a European Mountain Advocacy Network, i.e. a group of mountain researchers willing



In agreement on mountain research (from left to right): Jernej Pikalo (SI), Mauro Dell'Ambroggio (CH), Karlheinz Töchterle (A), and Luis Durnwalder (South-Tyrol) during the Alpbach Meeting 2013. Photo: A. Björnson Gurung.

to play an active role in advocating at the European scale, is seen as a priority and further pursued in 2014. Various pathways to influence European funding agencies have already been identified. Organizing a Mountain Day in Brussels in fall 2014 is only one of many options.

Science for the Carpathians: Forum Carpathicum 2014

S4C keeps growing and is becoming firmly rooted in the region. The preparations for the 3rd Forum Carpathicum: “Local Responses to Global Challenges” in Lviv, Ukraine (16-19 September 2014), have already started. In line with European priorities, the focus of the Forum is placed on four major challenges affecting the Carpathian ecoregion:

- Ecosystem services and land use change
- Climate change, water and extreme events
- Natural and cultural heritage
- Smart mountains

A profound change is expected also from the shift of the S4C communication, so far managed by the MRI Office, to Poland and thus, closer to the region. Supported by the Jagiellonian University and the Agricultural University in Krakow, Dr. Dominik Kaim will be the communication node for the next two years. All the best, S4C!



Highlights from...

The Director's Desk

MRI Focuses on "Concerted Efforts"

In MRI News N° 7, I described the Global Commission process that, back in March 2012 produced a set of nine "Concerted Efforts". Subsequent processes, not the least of which was the drafting on MRI's renewal proposal to the Swiss National Science Foundation, refined those nine into a shorter set of four Concerted Efforts. This smaller set nonetheless provides MRI with a lot to do over the next few years, in addition to regional networks, Key Contact Workshops, Synthesis Workshops and other activities.

The Yin and Yang of Observatories

A long-standing complaint of the mountain research community has been the dearth of observations in mountains. How could a place of such importance – for water, for wildlife, for recreation – be so poorly monitored? We are aghast and complain!

It turns out that complaining is not particularly effective as a strategy. However correct that statement might be, we needed a strategy, not an assertion, to fill the gap in observations. But what would be the best strategy? Is it better to focus on a specific question and design the optimal system for that question, or is it better to take the observing systems that we have now and see what we can do with them?

Rather than choose one strategy over the other, MRI is doing both!

The question-centric approach is embodied in MRI's effort to develop at Global Campaign to Assess Elevation Dependent Warming (EDW). The goal of that multi-year campaign is to

assess whether—and if so, where, to what extent, and why—mountains and other high-elevation regions are warming more rapidly than other parts of the planet. Public opinion to the contrary, this phenomenon has not been scientifically proven (Rangwala and Miller 2012), and it matters a great deal to downstream communities whether it is real. This campaign will involve a review of existing science but will certainly also require the collection of new data, as the paucity of high-elevation station data precludes definitive answers.

The goal is not to turn MRI into an observational network itself, but rather to present a convincing science case to funders and the research community so the necessary observations get built into current activities and new proposals to national and international agencies.

The MRI began developing the science case with a side event at the 2012 AGU meeting and the formation of an Executive Committee chaired by Ray Bradley of the University of Massachusetts and Tandong Yao of the Institute for Tibetan Plateau Research. These events were followed in 2013 with an AGU Session on the topic organized by Jim Miller, Imtiaz Rangwala and Ray Bradley, an organizational side event and the

development of three white papers. The first white paper, authored by Jim Miller of Rutgers and colleagues, examined the mechanisms proposed for EDW and the implications for more conclusive analyses and observing networks. The second white paper, authored by Nick Pepin at University of Portsmouth and colleagues, examined the conclusions possible from existing data with implications for the nature of data sets needed to assess more conclusively the existence of the phenomenon. The third white paper, authored by Michel Baraer at École de Technologie Supérieure and colleagues, provides a road map for translating the scientific conclusions into an implementation strategy.

These white papers form the basis for a three-day workshop in April 2014 just before the European Geophysical Union meeting in Vienna to develop the proposal and implementation plan. The products from the workshop will be a plan of the research needed to answer the question and a strategy for implementing that plan. A successful campaign would mean observations in high-elevation regions that could in the end support the assessment of much more than just EDW. Nonetheless the premise of the Campaign is that a single focused research question is essential to the creation of a network.

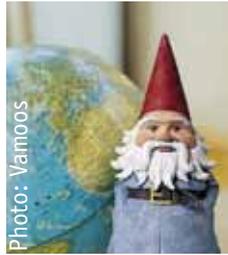
But what then about the rest of the mountain system? If the community were to list ten other important research questions, should it then set out to create ten more additional observation networks? And how could results from this highly-theoretic plethora of observing networks inform our understanding of mountains as coupled human-natural systems?



Photo: EwigLemender

Bottom-up and top-down

MRI's response to these challenges is to co-sponsor, with the University of Nevada (Reno), an event - Mountain Observatories: A Global Fair and Workshop on Social-Ecological Systems, scheduled for 16-19 July 2014 in Reno, NV, USA - that we hope will lead to a sustained effort to coordinate and expand existing observing systems. The premise of this event is that while a more comprehensive international system of mountain social and ecological observations is needed, there is neither a single set of motivating questions applicable globally, nor is there a single entity with the authority to organize it or the budget to fund it. Rather the system, or more likely, systems, must be built up from existing regional networks and sites. And the best way to do that is not "top down" by declaration but rather "bottom up" by convening researchers from those networks and sites to exchange ideas, see what other networks offer, develop common programs, assess priority locations, and develop creative financing options.



The subtitle "Fair and Workshop" signals a dual approach, with the Fair promoting open-ended interaction and the Workshop promoting more traditional focused presentations and discussion. The Fair is planned as an elaborate poster session/trade show in which different observing sites and networks can display their goals and methods, so that other researchers who may be interested in expanding their capabilities can learn what is available. The Fair will also facilitate side meetings where people can pursue more focused discussions or even negotiate agreements. The Workshop will provide an opportunity for participants to address themes or issues that go beyond their particular site. It will be composed of Sessions, in which participants offer Presentations to an audience much as they would at a scientific meeting, and Ateliers (a shop or studio), in which participants engage with others to discuss a particular topic.

The outcomes of the Fair and Workshop will certainly include not only greater understanding of the issues involved in observing systems but also new connections and collaborations between existing observation networks as well as, one hopes, some momentum toward a similar Fair and Workshop in Europe and in Asia in coming years.

Both of these efforts received a welcome boost by the announcement on 15 January 2014 at the Tenth Plenary Meeting of the Group on Earth Observations of the GEO-Global Network of Observations and Information on Mountain Environments, or GEO-GNOME. The creation of an observational effort focused on mountains at the global level provides a target for both the EDW and the Mountain Observatories efforts: we can fill the "data space" created by this GEO declaration.

Governance in mountain regions

As much as the community of mountain researchers agrees that human dimensions are important, a rigorous scientific approach to studying not just human ecology (as if our species were just another species of wildlife) but also the cognitive and political dimensions of human behavior in mountains has been conspicuous in its absence (Björnsen Gurung et al. 2012). And literature flagged as "social" is frequently advocacy, based on polemics and unstated assumptions, rather than true research based on data.

Such research does exist, but it is seldom flagged as mountain research, because it focuses on social rather than geographic constructs. Human behavior and institutions in mountains may not differ fundamentally from those in other environments, but that in no way reduces the importance of understanding social systems if we are to understand the entire coupled human-natural system, in mountains or elsewhere.

This third Concerted Effort seeks to

bring together social scientists working in mountain regions to define a more systematic and synthetic approach to the structure, function and evolution of governance in mountain regions through a series of discourses organized at major meetings and culminating more than likely in a Synthesis Workshop. The four events are all scheduled in 2014 and include the following.

1) Global Land Project Open Science Conference, 19-21 March 2014, Berlin, Germany

MRI has a Round Table discussion at the GLP: The role of governance in adaptation to global change in mountain regions. During this session we hope to address descriptive governance studies - what are the institutions that govern behavior and lead, among other things, to the management of land resources - but then proceeds to the more specific questions of how the highly dynamic nature of the physical environment, the historical diversity of mountain cultures, and the on-going modernization of these regions affect governance arrangements.

2) International Symposium for Society and Resource Management, 8-13 June 2014, Hannover, Germany

MRI will participate in a roundtable to scope a theoretically robust synthesis from research in and on mountain regions and to define a research agenda that situates social dynamics and governance in mountain regions in the broader context of regional sustainable development cooperation.



3) Global Fair and Workshop on Long-Term Observatories of Mountain Social-Ecological Systems, 16-19 July 2014, Reno, NV, USA

The Fair and Workshop will provide an unprecedented opportunity for those interested in mountains social systems

to convene in one place, to portray the state of the art in observing social systems and to frame the more systematic approach to the structure, function and evolution of governance in mountain regions called for at the start of this message.

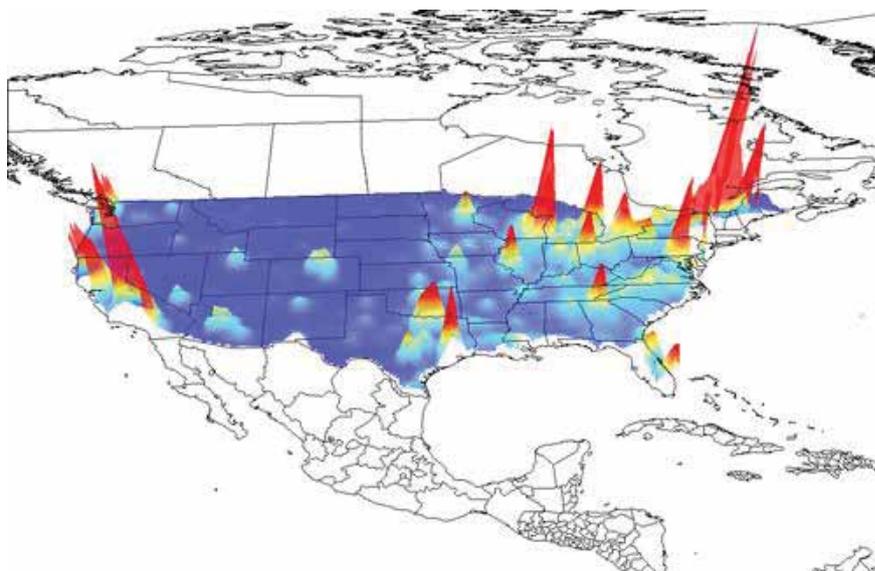
4) The Machida Session, MtnClim Conference, 15-18 September 2014, Midway, UT, USA

The Machida Session is a half-day discussion within this larger conference on global change in the mountains of Western USA that focuses on understanding human-environment interactions through the Institutional Analysis and the SES framework of Ostrom, the relationship of this theoretical framework to empirical studies, and the relevance of social science to management and policy.

MRI will record and post as many presentations as possible on its website in order to inform and, we hope, engage as many social scientists as possible in these deliberations.

Addressing the gap in quantitative data on mountain regions

The fourth Concerted Effort is a comprehensive quantitative global assessment of environmental, social, and economic capital (aka “the three pillars of sustainable development”) in mountain regions. To MRI’s knowledge there have been only two attempts to generate quantitative statements with respect to mountain regions globally, one by the Food and Agriculture Organization (Huddleston et al. 2003) and one by the United Nations Environment Programme (UNEP-WCMC 2002). Both reports cobbled together statements that could be supported with data available at the time, but provided only snapshots of current conditions and stopped well short of a comprehensive assessment of the state of sustainable development.



Economic contour map for the USA, G-Econ project, Yale University

The potential for a more comprehensive assessment is great. Both the technology and the data have changed quite a bit in the past decade. GIS has improved and new data sets containing comparable data as different times have become available. In addition alternative definitions of mountains and new coverages of mountain extent have appeared (Koerner et al. 2011).

A first step has been taken as the Food and Agriculture Organization appears poised to redo the Huddleston et al. (2003) report with the technical support of the Centre for Development and Environment at the University of Bern. While this update falls short of a comprehensive assessment of sustainable development it nonetheless creates a basis for such an assessment by updating the basic layers on mountain extent, population and land cover. Moreover, its publication can be used as a goad toward a more complete assessment.

What might a more complete assessment address? It certainly must address environmental capital including the condition and trends of ecosystems, species and key abiotic features such as water and geomorphology. Given the long history of remote sensing of and policy inter-

est in the environment, environmental capital is probably the easiest of the three kinds of capital to assess. Social capital presents more problems. While spatially disaggregated data on population is available, data on other aspects of social capital (e.g., education, health, governance, etc.) is much less available. Data on economic capital might be the most difficult to obtain.

While there have been attempts to create spatially disaggregated data on gross product (see <http://gecon.yale.edu/>), the size of the grid cell used is generally much greater than that for environmental or population data. Data for other important economic variables (e.g., income distribution, employment) are usually reported at the scale of administrative units, which frequently do not correspond with the boundaries of mountain regions. These are not insurmountable problems, but they are significant challenges to obtaining a clear understanding of the conditions and trends in mountain regions.

The objective of MRI in this arena is to define operationally the indicators of environmental, social and economic capital such that other agencies (governments, NGOs, etc.) could perform such assessments themselves with the assurance that the multiple resulting, usually regional, assessments could be added together to create a more global

picture. As this activity is less research and more policy-related, MRI is applying to the Swiss Development and Cooperation Agency for financial support for this effort. In addition, the previously noted launch of GEO-GNOME indicates that there will be a “home” for any and all data created by such assessments, filling the informational void that has characterized mountains regions.

These “Concerted Efforts”, with their focus on implementation, complement the other three i’s of MRI’s mission (initiation, integration, and information) and will provide an important focus for MRI activity in the coming years.



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Photo: D. Fagre





Field Notes

Field Notes



New scenario-based conservation project in the high Andes

The Institute of Regional Ecology (IER) at the National University of Tucumán, Argentina (www.iecologia.com.ar) is developing a research project that emphasizes scenario-based conservation planning in the high Andean wetlands of Argentina. These wetlands (lakes and peatbogs) host high levels of biodiversity and productivity at upper elevations in the Andes and provide essential ecosystem services to local inhabitants. Funded by the Rufford Foundation, FOCA and Foncyt, this project develops spatial conservation planning strategies for subtropical Argentine High Andean wetlands with respect to the most pressing threats of the coming decades: mining and climate change.

For more information about this project, contact Andrea Izquierdo at aeizquierdo@gmail.com or Héctor Ricardo Grau at chilograu@gmail.com.



The future of Norwegian mountain communities

Eastern Norway Research Institute (ENRI) heads a 3 year project (2011-2014) with the title “Mountain areas in Norway as attractive rural communities or urban recreational playgrounds: the challenges to a mountain policy”. The project has established a fruitful cooperation between research milieus in Norway, Sweden (Umeå University), Scotland (University of Highlands and Islands, Perth), Monturban/EURAC in Switzerland/Italy and Canada/USA (International Amenity Migration Centre). A workshop was held at EURAC in Bolzano, Italy, in October, focusing on the three main themes in the project: rural tourism, planning and management, and local participation and influence.

For more information, contact project leader Kjell Overvåg at: ko@ostforsk.no



Changes in peripheral arctic-alpine plants in Glacier National Park

In the summer of 2012, we initiated field research on rare, peripheral arctic-alpine plants growing at the edges of permanent snowfields and glaciers that are retreating due to climate change in Glacier National Park, Montana. The initial research involved establishing plots and baseline studies of species presence and distribution at Siyeh Pass, Preston Park, Piegan Pass, and Mt. Clements snowfields. In 2014, my students and I will return to examine snowfield plants and their functional traits. Read more about this RM-CESU funded research at: www.cfc.umt.edu/CESU/Reports

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Field Notes

Bilateral Research Project: “Added Value of Nature in the Eastern Ore Mountains - Identifying, Assessing, and Communicating Ecosystem Services”

The Eastern Ore Mountains, with their numerous biotopes and ecosystems on both sides of the German-Czech border (including mountain pastures, rocky ridges, moorland, and forests of varying degrees of naturalness), are particularly well suited for recording and describing good examples of ecosystem services.

There are three focal project goals:

1. The recording and assessment of selected ecosystem services in the Eastern Ore Mountains
2. The economic and institutional assessment of environmental policy control tools and of ecosystem management
3. The target-group specific preparation of results, public relations/environmental education – also covering new media (e.g. smartphones)

This project is performed by researchers of the Leibniz Institute of Ecological Urban and Regional Development (Dresden, Germany) and the Jan-Evangelista-Purkyně University in Ústí nad Labem (Czech Republic) and is supported by the European Union, the German Free State of Saxony and the Czech Republic in the framework of the INTERREG programme.

For more information about this project, contact Dr. Olaf Bastian, Leibniz Institute of Ecological Urban and Regional Development, Dresden, Germany. E-Mail: o.bastian@ioer.de



Photo: O. Bastian

Field Notes

Beetles point to a changing climate in the Dolomites

In 2008, the Dipartimento di Biologia, Ecologia e Scienze della Terra at the University of Calabria (Italy) and Parco Naturale Paneveggio – Pale di San Martino (Italy) began work on the project “Dolomites Global Change: Evaluation and monitoring of the effects of climate change on Coleoptera carabidae in high-altitude ecosystems”.

The study was designed to test the hypothesis that species richness, abundance and distribution range are affected by climate change in the southeastern Dolomites (i.e., Paneveggio Park). Using data sampled in 1980 and again at the same sites 30 years later, we compared the diversity of carabid beetles in stands both above and below tree line (1650-2250m) over time.

Our work shows that species richness and abundance have changed over the past thirty years as a consequence of local extinctions and uphill shifts in increments of abundance and distribution ranges. The overall species number has dropped from 36 to 27 and changes in species richness and abundance are more profound above tree line. In forested ecosystems, soil invertebrate biomass has increased and thermophilic carabids have become more common. Thus, changes in carabid assemblages over the past three decades are consistent with the hypothesis that climate change is one of the main factors triggering natural environment modifications.

For more information about this project, contact Roberto Pizzolotto (University of Calabria) at piz@unical.it.



Photo: R. Pizzolotto



Photo: R. Pizzolotto

Announcements



UIAA Mountain Protection Award – join the assessment team or submit a project!

This year the International Mountaineering and Climbing Federation (UIAA) launched its new global sustainable mountain tourism award, the UIAA Mountain Protection Award. It has already attracted a field of very innovative and deserving projects from Europe, Africa, Asia, and South America. Western University of Baku, Azerbaijan is proudly serving as the initial Sponsor of this Award.

Assess: In response to the popularity of this award program this year, the UIAA is now seeking more mountain protection experts from around the world to join the part-time Award Assessors team. Please contact: Linda McMillan (mountains.work@gmail.com) or Valerie Thöni (valerie.thoeni@theuiaa.org).

Submit: If you or someone you know has started a nonprofit initiative geared toward protecting the mountain environment, the UIAA can help you promote it. Once a year, the projects deemed most innovative and effective also receive a cash award so submit today!

For more information, visit <http://mountainprotection.theuiaa.org/pages/award>

Impact investment for science?

A new funding platform is on the horizon, and it's not just for clever start-ups. Maximpact is a philanthropic funding and collaboration platform that links funders with sustainable profit and non-profit initiatives and projects looking for investment, grants or other types of collaboration. Neither a charity facilitator nor a strict profit-building entity, Maximpact supports the development of impact investing, an approach that harnesses the power of market finance to deliver benefit for the planet and its inhabitants.

Maximpact is therefore calling on the mountain research community to submit projects (or "deals" in investment lingo). Project/deals can be submitted directly on Maximpact's portal through a simple registration process, which upon confirmation grants immediate access to the impact investing community.. Projects should demonstrate a clear benefit to mountain environments and/or communities, but need not be limited in scope or subject. For more information, visit www.maximpact.com.

If you submit a project, please let MRI know. We would be very interested in hearing about your experiences with this new funding platform.

InsightShare: Sharing stories of adaptation and resilience

InsightShare aims to strengthen the capacity of its indigenous partners to use participatory video (PV) methods to contribute to the global climate change debate, document traditional responses and solutions, mobilize local people and galvanize support. Over the past few years, communities in the Andes in Peru, the Gamo highlands in Ethiopia and the Cordillera region in the Philippines have created powerful videos and used PV as a catalyst to support community-led reflection, empowerment and self-affirmation. Through the screenings of videos made by other communities, the network strengthens relationships between indigenous communities both locally and across continents.

InsightShare is currently looking for partners, researchers and funders who would like to collaborate in the process of supporting new communities, as well as communities already involved in the network.

For more information and to have a look at the videos, visit the website at www.insightshare.org.





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