Inhalt

Department Chair’s Message  2
Research Projects        3–4
Teaching               5–7
My work at GIUZ

  Leigh Johnson       8
  Claudia Schreiner  9
  Samuel Abiven       10
  Damien Palacio      11
  Itta Bauer          12
Publication highlights 13
Department Chair’s Message

You are holding in your hands the Annual Report 2011 of the Department of Geography. If you are a frequent reader of our annual reports, you will have noticed that it distinctly differs from its predecessors: It is considerably thinner, and follows a different style in presenting the achievements of our Department over the past year. In previous years, we have focused on comprehensiveness and exhaustiveness, providing brief accounts of a near-complete list of research projects, various figures and statistics about student enrolment and teaching, etc. etc. While being exhaustive was the right approach for many years, it seemed increasingly out of place more recently. The Department has been growing significantly over the recent years due to the addition of new faculty positions, and hence our annual report has been growing year after year, in sync with our head count. Also, electronic communication is now the preferred means of information provision and seeking for most, and hence we can safely assume that a well-maintained website will find better readership than a two-pound report. And finally, we still (have to) produce our Academic Report for the UZH administration every year, containing exhaustive lists of facts about the output of the Department; those who prefer this format thus still have an alternative.

So, what you are seeing here is the prototype of what we hope to become the new reporting format for the friends of our institute. «New» is usually connotated with «exciting», and of course we hope that this new format provides exciting reading for you. The focus is now on highlighting rather than comprehensives, and on selection rather than exhaustiveness. Although the selection of contributions in this report provides a cross-section of the output generated over the past year in the various branches and groups of our Department, it is by no means representative in a statistical sense. The contributions simply shed highlights on some exciting results and activities, and we hope they invite you to visit our homepage and find out more about these and other activities that we have pursued over the past year.

I’d like to end my introduction by thanking those who made this annual report happen. Ross Purves and Michael Schaepman conceived the new format and solicited the contributions for the report. Martin Steinmann was responsible for the graphical design and layout. And of course, I’d like to thank all the authors, but also all other staff members and students of the Department of Geography, who make this such an exciting place to teach and do research, and who make me a such a proud department chair.

Robert Weibel, Chair
Gletscher Laserscanning Experiment Oberwallis in voller Fahrt

Das «Gletscher Laserscanning Experiment Oberwallis» (GLAXPO) erforscht Gletscherände-
gerungen am Findelengletscher bei Zermatt im Kanton Wallis. Seit 2005 wird die so-
genannt direkt glaziologische Massenbilanz mit Hilfe von Schmelzpegeln und Schnee-
schächten auf der Gletscheroberfläche erhoben. Zur Unterstützung und Kontrolle dieser
in-situ Messungen wurden mehrere digitale Höhenmodelle aus flugzeuggebundenem
Laser Scanning erzeugt und aus den lokalen Höhendifferenzen die Eis-Volumenände-
 rung bestimmt: dieser Teil der Arbeit, von der Planung über die Datenverarbeitung bis
zur Auswertung, wird durch meine Dissertation abgedeckt. Um die Höhenmodelle zur
Validierung und Kalibrierung der traditionellen in-situ Methode verwenden zu können,
habe ich eine detaillierte Genauigkeitsanalyse der Daten durchgeführt und konnte die
vermutete hohe Genauigkeit der neuen Messmethode mit Zahlen belegen. Diese Hö-
henmodelle dienen deshalb in einem nächsten Schritt zur Überprüfung der direkt glaziologi-
schen Massenbilanz.

Ein weiteres Ziel des GLAXPO-Projektes besteht
darin, einen Blick in die Vergangenheit des Ein-
zugsgebiets des Findelengletschers zu werfen
und mittels digitalisierten historischen Landes-
karten Gletscherstände von 1862 bis heute dy-
amisch zu visualisieren (Philipp Rastner) und
zusätzlich mittels Modellierung aus Klimapro-
gnosedaten die zukünftigen Gletscherstände
bis ins Jahr 2100 aufzuzeigen (Matthias Huss).

Philip Claudio Jörg ist Doktorand
in physischer Geographie und Fernerkundung.

Modellierte Gletscherstände 1862 – 1933 &
Laser-Höhenmodell Hillshade 2010 (P. Rastner)
Research Projects

Does an international degree matter? Perspectives from employers and returned international graduates in Kyrgyzstan and Nepal

Scholarship programmes for students are seen as one way to encourage brain circulation particularly for countries where higher education remains weak. In Asian countries such as Kyrgyzstan or Nepal an increasing number of people study abroad but only about half of them return. Within the research project «Migration, Knowledge and Development» I look at graduates and their return experience with respect to their professional life as well as exploring the perspectives of employers and the broader contexts of job availability and employability.

Academia in Kyrgyzstan provides an interesting example. My fieldwork in 2011 revealed that universities are targeting internationalisation of their institutions but have a serious shortage of academic staff. Therefore universities wish to recruit returnees for strategic positions in teaching, research and administration. This is not an easy task, especially since state universities are perceived to be a working environment with low salaries and where corruption is high. Nevertheless, interviewed returnees were very motivated and created spaces and possibilities where they could apply their knowledge and initiate ideas for changes. Furthermore, scholarship programmes «top up» salaries to attract returnees.

At the same time there are also challenges. Having «experience from abroad» has a high symbolic value and can also create tensions with more established staff. Although welcoming new ideas they also felt that their long-term working experience was disregarded with newcomers disconnected from the local working environment and culture. In addition their lack of knowledge about international academia and languages excludes them from newly established alliances. At the same time some more senior staff started participating in short-term international exchange programmes as well language courses.

Susan Thieme is ‘Oberassistentin’ in human geography.
During the academic year 2010/11 we introduced a student response system (also known as «clicker») and tested it for the first time in two of large introductory courses at the BSc level (GE0113: Introduction to Cartography and GEO246: Statistics in Geography). We invited the students to rent a receiver, akin to a TV remote controller, for a small fee and bring it to lecture throughout the semester. Students used the device to electronically respond to multiple-choice style questions we posed during lecture. We then displayed aggregate results of the anonymous responses or «votes» immediately after the polls directly on lecture slides projected the lecture hall. Specifically in courses with complex teaching material such as statistics, I find this immediate feedback to students and lecturers to be quite beneficial in many ways. For example, students get immediate feedback on how well a discussed concept was understood, and as a lecturer I am able to check what kinds of (mis-)conceptions students might bring to class at the beginning, and how the covered material has changed their understanding by the end of lecture. Based on the course evaluations the student response system was well received and encourages us to further explore its potential in future courses.

*Sara Fabrikant is professor of geographic information visualization and analysis.*
Teaching

Teaching about groundwater is challenging as groundwater, compared to surface water, cannot be seen and groundwater processes are usually rather slow. Based on a sandbox used for teaching basic groundwater concepts by Allan Rodhe at Uppsala University, Ivan Woodhatch built a very nice groundwater sandbox which is now being used for teaching at GIUZ. The sandbox serves as a physical model of groundwater processes and helps provide a better understanding of groundwater processes.

The 1m x 0.5m x 0.1m box is partly filled with sand, representing an aquifer. Water flows through the sandbox driven by a gradient, which can be adjusted by vertically moving two reservoirs at the inlet respective outlet and pumping water from a larger reservoir beneath the sandbox to the inlet reservoir. In addition, rain can be simulated using a shower! Groundwater levels can be observed in small tubes attached to the sandbox. One special development were diodes which make the groundwater levels in the tubes clearly visible through red lights.

Different experiments can be conducted with the sandbox including determining storage characteristics and hydraulic conductivity, observing the effect of rainfall for different groundwater levels and visualizing groundwater flow using dye tracer injections. These experiments can be done both as demonstrations in lectures and, proving an even better learning experience, as student hands-on experiments.

Jan Seibert is Professor in Hydrology and Climate.
Teaching


Cornelia Nussberger ist Geographiestudentin mit Spezialisierung in Fernerkundung.
My research asks how markets for risk transfer are changing in anticipation of climate change. Growing understanding and awareness of climate change risks coincides with both an unprecedented array of financial products and a decisive shift towards market-based environmental governance. Accordingly, economic markets in (re)insurance and related financial instruments are often presented as solutions to enable global risk sharing and risk reduction across populations and geographic scales.

I am currently studying the creation and development of such markets in two radically different contexts of «converging» and «emerging» market spaces in the insurance industry. The first project examines the convergence between reinsurance and finance in the market for catastrophe bonds. My results highlight dynamics reinforcing the concentration of catastrophe bond issuance in «peak perils» such as U.S. hurricane risk, and call into question the ability of these instruments to provide meaningful risk reduction for developing areas that are highly vulnerable to climate change.

The second project focuses on weather index-based microinsurance to insure rural agricultural and pastoral households in regions of the global South with high climatic variability. My research suggests that the current «footprint» of these projects is a complex function of insurers’ search for new markets, the availability of climate data, shifting state/peasant political relations, and preexisting social relations that sanction how weather risks are understood and shared. As the final two factors are virtually ignored in existing studies of index insurance, I am developing two case studies in East Africa to investigate them further.

Leigh Johnson is a postdoctoral researcher in economic geography.


Im GIUZ kann ich nun die Erfahrungen, die ich in der Analytik und im Support gesammelt habe, vereinen. Auch gibt es hier die Möglichkeit mit anderen Instituten zusammenzuarbeiten und Informationen auszutauschen. Mit den Studierenden, Doktorierenden und ProfessorInnen zusammenzuarbeiten, ist abwechslungsreich, und ich kann so vielleicht auch meine Freude an der Analytik und Chemie weitergeben.

Claudia Schreiner ist Labortechnikerin in Bodengeographie.
How can we sustain 9 billion people and at the same time mitigate global change at the planet scale? Often, agriculture is presented as one of the key human activities responsible for degradation of the environment and thus driving climate change. If agriculture is one of the origins of the problems, it could also be part of the solution. One important aspect is the management of soil organic matter, in the form of residues of dead plants that decay in the soil. This decay can take decades and meanwhile, these organic compounds play major roles: they provide nutrients to the living plants or they structure physically the soil and prevent from erosion, among other examples. Even more interesting, they store in soil, in an organic form, carbon dioxide that would be otherwise in the atmosphere be playing its role as a greenhouse gas.

This aspect is one of my main research foci. I am investigating how organic matter resides in soil, and for how long. I am particularly interested in two kinds of organic matter: roots and black carbon. Roots might represent a majority of the soil organic matter, but accessing them is difficult and, therefore, so is their study. To facilitate this we built up a unique growing chamber in the Institute’s cellar, where we can follow the growth and death of roots thanks to a system based on stable isotopes. Black carbon is organic matter that has experienced high heat, for example, charcoal or soot after a wildfire. It is suspected to be the compound that stays the longest in the soil and to increase soil fertility, but the mechanisms are not yet fully understood. We investigate the fate of back carbon in soil, as well as its effect on soil fertility, using chemical as well as microbiological methods. This research takes place in Switzerland, but also in India, in the framework of an InnoPool project. My key aim is to ascertain whether black carbon really is as stable as presumed in the literature, and whether it could thus become a potential technology for agriculture.

Samuel Abiven is a senior research scientist in soil science.
My work at GIUZ – Damien Palacio

I’m French, from Bayonne which is located in South West of France (~7Km from Atlantic Ocean, ~30Km from Spain). I studied at Pau University (~100Km from Bayonne) where I did a Bachelors in Computer Science and then a Masters in Internet Technologies specialized in Software Engineering. My Masters thesis was focused on edge detection in old photos (image processing). Thereafter, I completed a Ph.D. in Computer Science on Geographic Information Retrieval on unstructured texts, at the LIUPPA (computer science laboratory of Pau University). The goal was to build a geographical search engine which could extract spatial and temporal information from old books, and, rank documents corresponding to queries submitted by users. I then worked for 1 year as Lecturer for the Department of Law, Economic and Management, and, Department of Computer Science, still at Pau University.

After that I really wanted to go to another country, where English was spoken if possible to improve my English and have new kinds of experiences. I never learned German (I choose Spanish as third language) but as an international city and university I felt I will be nice to work in Zurich. I could improve my English and learn German. That’s one of reason I choose GIUZ. The city and its surroundings are also really nice. Great landscapes, lakes, mountains, everything easily reachable is also a good point. When I went for a brownbag in GIUZ I found people really friendly. In fact, one important reason made me chose GIUZ is that Ross Purves is well known in the GIR field, and I was really interested to work with him. The different proposed topics of my postdoc are really linked to what I did during my Ph.D.

Damien Palacio is a postdoc in Geocomputation.
My work at GIUZ – Itta Bauer


Itta Bauer ist Oberassistentin in der Geographielehrlerausbildung.
Publication highlights

To better understand Lateglacial and Holocene climate change, glacial and periglacial landforms were dated in the eastern Swiss Alps using a combined approach of numerical (10Be) and relative dating techniques. Based on this approach, we obtained one of the first fully reliable ages for the Daun-stadial (>14.7 ka) moraines (14.9±1.8 ka), supporting a pre-Bølling chronological position.


In Coltekin & Reichenbacher (2011) we systematically document approaches tackling problems related to having ‘too much information’, especially when we face bandwidth limitations. First we calculate the bandwidth needs, demonstrating that currently for some tasks one may have to wait for days to download a meaningful geographic data set. Then we review a perceptually inspired level of detail management and filtering approaches, followed by a review of design considerations to avoid clutter in a geographic display. We finish by a brief discussion on digital divide and its implications.


Abrupt and gradual greening and browning trends have been detected in large parts of the world. The net global trend has showed greening since the 1980s, but analysis indicates that the area with browning trends increased over time while the area with greening trends decreased. The Southern Hemisphere showed the strongest evidence of browning. For 15% of the global land area, trends were found to change between greening and browning. This demonstrates the importance of accounting for trend changes when analyzing long-term NDVI time series.

The state, development donors and the Taliban have attempted to effect social change in Pakistan’s Swat valley. To understand these dynamics, I compare the explanatory power of deliberative and radical theorising. I show that both approaches fail to provide analytical, procedural or normative insights due to their Eurocentric ontologies. I advocate a change in focus from ontologised explanation to an analysis of the actual ‘how of politics’. This focus on ‘politics as practice’ provides differentiated insights into Swat as a postcolonial arena.


In this paper we give an overview of the important issues and primary challenges of research on permafrost in cold mountain regions. Interactions between glaciers and permafrost in cold mountain regions have so far received comparatively little attention and, consequently, an improved understanding of governing processes and their relation to climate change is urgently needed.

The last decade has seen a string of discoveries that questioned long-standing theories about soil organic matter. In this article these findings are critically summarized and potential implications for our understanding of, and our ability to predict how the terrestrial carbon cycle will respond to a changing world are discussed.


When modelling catchment runoff several model structure decisions have to be made, which are often rather subjective. We systematically evaluated the effect of these decisions on low flow simulations by testing 79 different model structure combinations. A main finding was that different combinations performed best for summer and for winter low flows, making identification of one optimal combination difficult. While certain structure decisions could be rejected based on consistently poor performances, it was not possible to identify single best decisions.


We describe an algorithmic approach to extracting an index describing “valleyness” within landscapes, based on a digital elevation model. The algorithm by asking participants asked to assess the valleyness of geolocated photographs, and these rankings were com-
pared to algorithmic values generated for these locations, demonstrating that a computationally derived value is capable of capturing some elements of valleyness as perceived by humans. Such approaches are a key step in improving the representation of landforms in computers.