m r i

mountain research initiative

The Mountain Research Initiative

MRI Key Contact Workshop
prior to the 2013 Fall Meeting of the American Geophysical Union

8 December 2013, San Francisco

The Faculty Club

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photos front cover: (from left to right) Paramo de La Nevera, Colombia © Guillermo Andres Ospina; Cedar Creek Ecosystem Science Reserve and Results from MRI KCW at ESA, Minneapolis © MRI

Global Change Research in Mountain Regions:
MRI Key Contact Workshop preceding AGU Fall Meeting 2013

Background

A Key Contact Workshop (KCW) is a 1-day event facilitating and fostering the dialogue between scientists with various backgrounds. The three tools, namely written research summaries, snapshot presentations, and small working groups, stimulate interdisciplinary thinking and allow peers to take a fresh look at your research.

The workshop accommodates a maximum of 24 speakers/workgroup chairs, and a few additional participants from a broad range of fields and disciplines from both natural and social sciences. KCWs usually precede major conferences that mountain researchers attend anyway, in this case the 2012 Fall Meeting of the American Geophysical Union. They offer an additional platform to scientists interested in the dialogue with peers from other disciplines.

Objectives

The KCW brings together active researchers from around the world working on global change in mountain regions to:
1. present a brief overview of their research programs,
2. comment on fellow participants' research, and
3. discover opportunities for new interdisciplinary research collaborations.

Procedure and Tools

Participants

1. prepare a 1-2 page contribution to the Catalogue of Research Summaries (containing information on their research activities and future plans) prior to the workshop,
2. outline current and, especially, future research programs in 5 minute presentations during the KCW,
3. chair a working group during the event to discuss their research programs in depth (30-40'), and
4. actively participate in other working groups during the KCW.

Fees

No fees apply to workshop participation. Participants are expected to organize their travel and accommodation themselves and to cover their own expenses.

Workshop Leader

Dr. Gregory B. Greenwood
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Venue

The workshop will take place in the Seaborg Room of the UC Berkely Faculty Club.
The best way to get to the campus of the University of California in Berkeley from San Francisco or another Bay Area city is to travel by BART. See the Quick Planner at **http://www.bart.gov/** to find a train that will get you from your hotel to the Downtown Berkeley station by 9:30 AM. The BART website should be able to answer your questions if you are not familiar with the system, as can station attendants. You can purchase tickets at station ticket machines.

If travelling from San Francisco, you should take the Pittsburg/Bay point trains leaving you with sufficient time to walk to the faculty club.
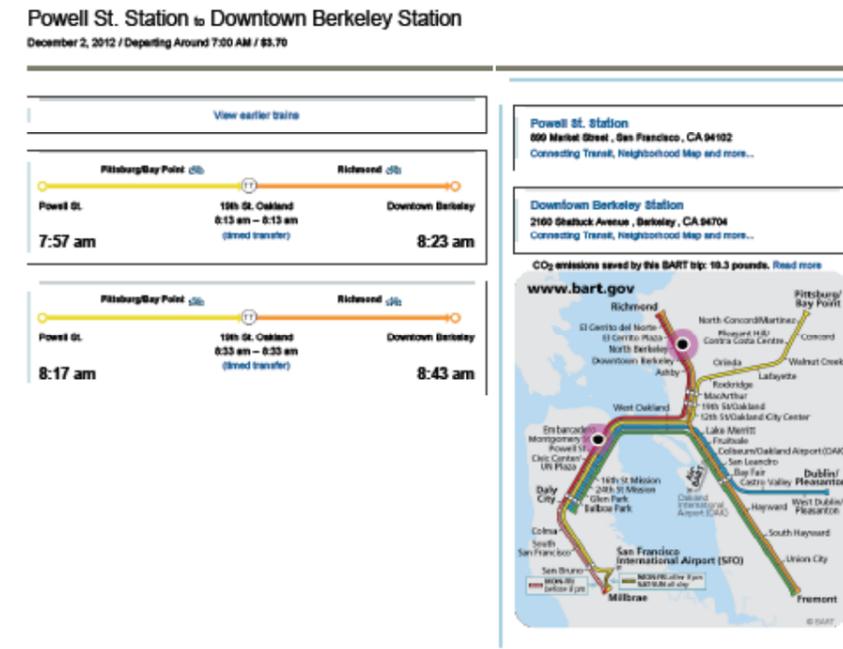
From the Downtown Berkeley BART station, walk up to the campus and continue for about 10 minutes to reach the Faculty club. You can find a campus map at http://berkeley.edu/map//maps/large_map.html to guide you. Or go to Google maps to see a picture that looks like this:

If you are travelling by car see http://berkeleyfacultyclub.com/directions.

Program

Time	Activity
10:00	Registration and Coffee
10:15	Welcome and Instructions
10:30	Panel 1
11:30	Panel 2
12:30	Lunch
14:00	Panel 3
15-15:30	Break
15:30	Panel 4
16:30	Open Discussion
17:30	Closing Remarks and Evaluation

Panel assignment

	Speaker	Participants			
1	Elzbieta Czyzowska-Wisniewski	Riccardo Rigon	Hadi Fadaei	Fengpeng Sun	#N/A
	Jeremy Littell	Saif Al Qaydi	Rand Decker	Rachel Chisolm	Johannes Werner
	Chunqiao Song	Qinghua Ye	Smriti Basnett	Mohammad Soharabi	Jing Li
	Qiao Liu	Chaolu Yi	Uwe Börst	Erin Stacy	#N/A
2	Riccardo Rigon	Saif Al Qaydi	Qinghua Ye	Jeremy Littell	#N/A
	Hadi Fadaei	Rand Decker	Smriti Basnett	Chunqiao Song	Johannes Werner
	Fengpeng Sun	Rachel Chisolm	Mohammad Soharabi	Qiao Liu	#N/A
	Chaolu Yi	Uwe Börst	Erin Stacy	Elzbieta Czyzowska-Wisniewski	Jing Li
3	Uwe Börst	Qinghua Ye	Hadi Fadaei	Qiao Liu	#N/A
	Saif Al Qaydi	Elzbieta Czyzowska-Wisniewski	Jeremy Littell	Fengpeng Sun	Jing Li
	Rand Decker	Mohammad Soharabi	Smriti Basnett	Chaolu Yi	Johannes Werner
	Rachel Chisolm	Erin Stacy	Riccardo Rigon	Chunqiao Song	#N/A
4	Mohammad Soharabi	Elzbieta Czyzowska-Wisniewski	Jing Li	Fengpeng Sun	Johannes Werner
	Erin Stacy	Jeremy Littell	Chaolu Yi	Riccardo Rigon	#N/A
	Qinghua Ye	Saif Al Qaydi	Uwe Börst	Rachel Chisolm	#N/A
	Smriti Basnett	Rand Decker	Qiao Liu	Hadi Fadaei	Chunqiao Song
5	Jing Li	#N/A	#N/A	#N/A	#N/A
	Johannes Werner	#N/A	#N/A	#N/A	#N/A

The Workshop Procedure

Each participant will have 5 minutes to present the highlights of his or her research program using up to 4 slides. No PowerPoint is a fine solution, too; you may use a flipchart if you prefer. Presentations should address current and future research in hopes of triggering questions and input from your colleagues.

You should also include a project idea you would like to develop during the workshop. The presentation can go beyond your own personal research interest, targeting the strategic aims of an entire research group or institution. You are not expected to promote your institution *per se,* but advocate priority research themes and activities that could benefit from the different perspectives the other participants can bring to it. In general your presentation should be forward-looking, targeted at future projects (vs. past achievements), and brief.

After all four panel members have made their presentation, everyone will gather at tables corresponding to their respective codes (assignment will come via e-mail) for up to 40 minutes of interdisciplinary thinking, comments, and suggestions to the presenters, who will lead discussion of their research ideas. All participants should stay with their assigned table for the first five or ten minutes, but thereafter participants can move to another other panel. The cycle then repeats. We will have three sessions before lunch, and three after.

MRI has run Key Contact Workshops in Europe and the US. The MRI Events webpage http://mri.scnatweb.ch/events/ provides more information on these workshops, along with research summaries. This workshop will be similarly organized, taking stock of suggestions from recent workshop evaluations

Instructions to Work Group Leaders

Role of the Chair

- Introduce your specific topic for discussion.
- Facilitate a focused discussion that meets your needs.

Role of the Rapporteur

- The Chair can select a Rapporteur if he/she wants to.
- Support the chair by taking notes, writing down/drawing ideas on the flip chart.
- Watch the time and notify the groups when five minutes remain to allow a wrap-up.

Material for Working Groups

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

Technical Framework

Working groups sit around a table with paper or a flip chart.

1. The chair briefly introduces the topic that he/she wishes to discuss.

2. The rapporteur, if designated, writes the working group number (e.g., B3) and a short heading on the flip chart and uses it as a mind map documenting the discussion and ideas (unfiltered!).

3. The Chair can present any topic but as a default, the following three questions can be used:
   i. How could the presented research be improved? (free brainstorming, focus on "what?")
   ii. Which other discipline/approach/methodology would shed new light on the proposed research? (focus on "how?")
   iii. Which individuals/research groups/project consortia have worked or are working in a related field and should be consulted? (focus on "who?")

4. The Chair wraps up the discussion identifying the most important elements/insights that could improve his/her research project.

Please note

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

If you work with cards

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

RESEARCH SUMMARIES

Saif Al Qaydi

Saif Al Qaydi (Prof),

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Dean of College of Humanities and Social Science
UAE University, United Arab Emirates

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http://faculty.uaeu.ac.ae/alqaydi/

What are your central research objectives?

I am interested in studying food security in the mountain areas characterized by desert environment and associated with shortage on both water and fertile soil. My project focuses on future alternatives including the growth of farm crops, in some foreign lands, especially the main strategic cereals in addition to importing them to the United Arab Emirates (UAE). Within the Gulf Cooperative Council (GCC) region, the UAE produces an extremely limited amount of its necessary foodstuffs (especially, strategic cereals) depending almost entirely on imports as a result of its growing population.

On what do you take data?

The main sources of my data are driven from the same local and governmental agencies dealing with the food security such as farming agencies, chambers of commerce, ministry of economy and ministry of water and environment which tackle the UAE farming activities. Other sources of data are the World Bank and the FAO.

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

Studying the World supply of main cereals such as rice, wheat imported by the UAE as a major part of its population diet. With the collected data it might be useful to construct future scenarios of the UAE main food suppliers and its effect on the UAE food security, particularly with the recent environmental and political issues occur at main supplying countries and the globe environmental changes such as floods, fire and heavy rain.

What is the geographic scope of your research?

Desert and arid zone with limited source of water areas are among those regions coming under my research interests. The GCC countries will be also covered as a result of their similarity on the environmental issue.

Geographic scope: Where do you gather data?

Since my project is dealing with several countries, which export food to the UAE, it is essential to get data from these countries including India, Pakistan and Vietnam.

Over what geographic domain do your conclusions hold?

The GCC countries and the UAE, as well as other desert areas.

What agencies and foundations fund your research?

None, the research is based on personal funds

What are the time horizons of your funding?

1 year.

What kinds of resources will your funding support?

I cover all the expenses of my research

The future: How you would like to see your research program evolve over the next 5-10 years?

Food shortage is an international issue and looking for future alternatives to produce food in the UAE has constituted one of the challenged confronting the government due to the increasing growth of the UAE population in the future. Providing assistance to the government to find food-growing alternatives is one of my main goals.

New methodologies for data acquisition?

Establishing a UAE food security data and gathering new information about the substitute/ host food- growing countries with political and environmental entities appropriate with the UAE one will likely open new horizons in this respect.

New methodologies for data analysis?

Engaging some additional statistical and modeling methods, which deal with such various environmental data.

Incorporation of new disciplines into your program?

Linking UAE and GCC countries farm data such as food security with worldwide environmental issues related to flood and political crises could open new vistas on how to deal with this issue in the future.

Expansion to new geographic areas?

Other GCC countries such as Saudi Arabia, Qatar, Kuwait and Oman.

What other new challenges are you thinking about?

Bartering UAE and other GCC oil-producing countries with food supplies will probably be reflected positively on World oil production and prices.

Smriti Basnett

Senior Research Fellow, Divecha Centre for Climate Change,
Centre for Atmospheric and Oceanic Sciences (CAOS)
Indian Institute of Science, Bangalore

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What are your central research objectives?

Snow and Glacier studies in Sikkim Himalaya.

On what do you take data?

Satellite images. MODIS, Landsat, IRS-AWiFS, LISS III.

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

Snow cover and glacier area changes and influence of debris cover and lakes on glacial retreat.

What is the geographic scope of your research?

Long term monitoring of moraine dam lakes, snow cover distribution and glacier area change assessment for Sikkim Himalaya.

Geographic scope: Where do you gather data?

Internet and Field data.

Over what geographic domain do your conclusions hold?

Sikkim

What agencies and foundations fund your research?

Divecha Centre for Climate Change, Indian Institute of Science, Bangalore.

What are the time horizons of your funding?

December 2013.

What kinds of resources will your funding support?

Lab facilities, scholarship.

The future: How you would like to see your research program evolve over the next 5-10 years?

I want to pursue further with a post doc research related to Sikkim Himalayas.

New methodologies for data acquisition?

I want to study past glaciation, so probably will be using some dating techniques. It would include moraine dating. But, i still have to explore the possibility. Satellite data will also be used for interpretation.

New methodologies for data analysis?

I have to explore.

Incorporation of new disciplines into your program?

Lake expansion study. Early warning system. Installation of an autonmatic weather station.

Expansion to new geographic areas?

Long term monitoring of snow and glaciers in Sikkim, and estimate the storage of water.

What other new challenges are you thinking about?

To estimate the stored volume of water and ice in Sikkim Himalaya, to estimate the contribution of melt to the river Tista, and monitor the availability of water in the future.

Uwe Börst

Department of Geography University of Bonn

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What are your central research objectives?

My central research objectives deal with temporal and relief based variations of water balance elements as well as long term trend analyses in high mountain ecosystems. One point of main effort determines vertical lapse rates i.e. liquid rainfall and snow and their contribution to glacier mass balance changes and downstream runoff.

On what do you take data?

I take long term climatic data along vertical and horizontal transects in high mountain areas with high temporal resolution. That includes a network ranging from fully equipped energy flux weather stations to basic stand-alone soil temperature sensors. For glacier mass balance studies I collect differential GPS data from glacier surfaces in terms of ice speed and elevation change. Latter is supported by in situ ablation stick investigations. At the outflow of the catchments, stream discharge is measured and stable isotope samples are taken.

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

The goal is to get a better understanding about the water balance in high mountain areas (i.e. above the equilibrium line and the influence of short and long term storage in snow and ice in downstream runoff) in steady state conditions and furthermore under the impact of different climate change scenarios.

What is the geographic scope of your research?

Karakoram (Northern Pakistan) and the European Alps.

Geographic scope: Where do you gather data?

Primarily in higher elevations in mountain areas close to the equilibrium line supplemented by comparative measurements close to existing weather stations mostly maintained by governmental meteorological departments.

Over what geographic domain do your conclusions hold?

My conclusions hold over glacerized watersheds in the Hindukush-Karakoram-Himalaya range and the European Alps.

What agencies and foundations fund your research?

The research is funded by the Swiss Agency for Development and Cooperation (SDC), the German Academic Exchange Service (DAAD) and by the University of Bonn (Germany).

What are the time horizons of your funding?

The current funding covers the next two years.

What kinds of resources will your funding support?

Instrumentation, field trips, regular maintenance, a limited number of graduate students and post-docs.

The future: How you would like to see your research program evolve over the next 5-10 years?

I would like to have my research program evolved towards a closer collaboration with local universities in der Karakoram-Hindukush-Himalayan with more test sites in a variety of elevation ranges and origin of humidity.

New methodologies for data acquisition?

With my personal field experience in collecting data I can't emphasis enough the importance of a mandatory standard for the installation and operation of high mountain weather stations to guarantee reliable and comparable data sets as well as a super carefully post processing and correction of the collected data (data gaps, sensor shifts et cetera). An international binding agreement about this topic would improve the chance to compare time series from different sources fundamentally. A second important improvement would be a common data platform with an open data policy for high mountain related ecosystem data maintained by a supranational organization.

New methodologies for data analysis?

Although long term in situ measurements are time and money consuming a smart combination of field data as 'ground control' and calibration with different existing and enhanced remote sensing technics leads to a wide range of further going investigations especially in difficult accessibly areas.

Incorporation of new disciplines into your program?

I would like to deepen my cooperation with specialists in runoff modeling in high mountain areas.

Expansion to new geographic areas?

Setting up new test sites in the monsoon influenced East Himalayan.

What other new challenges are you thinking about?

Getting more into physical modeling.

Phairot Chatanantavet

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What are your central research objectives?

Studying interactions among climate, hydrology, ecology, and geomorphology in a mountain watershed, and the impacts of climate changes to ecohydrology, river habitats, and ecosystems.

On what do you take data?

Temperatures, wind, precipitation, radiations, flow discharge, DEM, LAI, GPP, Evapotranspiration, soil data, forest types, snow data, etc.

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

I use these data to input into our ecohydrological model as well as to calibrate/verify the results. Then I use the predicted climate outputs for future scenario (years 2047-2057) and predict how ecohydrologic and geomorphic variables change for the future climate condition.

What is the geographic scope of your research?

currently the model applies to a watershed in Montana USA (North Rocky Mountain Range) but the model framework should apply to any watershed in the world.

Geographic scope: Where do you gather data?

NASA MODIS, USGS, STRATSGO soil data, WRF, SNOTEL, National Atlas Database.

Over what geographic domain do your conclusions hold?

It should be primary Pacific Northwest USA but the modeling approach should apply anywhere.

What agencies and foundations fund your research?

US NSF.

What are the time horizons of your funding?

Currently May 2013 - May 2015, may extend longer.

What kinds of resources will your funding support?

Fast computers, postdoc (myself).

The future: How you would like to see your research program evolve over the next 5-10 years?

This topic I am conducting is currently important and popular in the US as it is highly interdisciplinary. For the next 5 - 10 years, hopefully we will know more and expand on the current knowledge.

New methodologies for data acquisition?

probably. as the sources have improved rapidly as far as how we, users, can gather them online.

New methodologies for data analysis?

Not sure.

Incorporation of new disciplines into your program?

Right now I am taking into account economists and social scientists enouth. hopefully as my research goes on, I will collaborate more with them.

Expansion to new geographic areas?

Definitely. I am thinking about doing a bigger and broader scale for a continent studying how ecosystems/services change due to climate changes.

What other new challenges are you thinking about?

Applying my work to sensitivity/location of landslides in a watershed, stream habitats vulnerability, frequency and intensity of forest fires due to climate changes.

Rachel Chisolm

PhD Student - The University of Texas at Austin
Center for Research in Water Resources, Department of Civil Architectural
and Environmental Engineering

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What are your central research objectives?

I am looking at the impact of climate change on high mountain glacial watersheds. I am studying long-term changes in mass balance of tropical glaciers and emerging glacial lakes and especially the risk of glacial lake outburst floods (GLOFs) and the vulnerability of populations living in the path of these floods. One focus of our research group is to model the physical processes that make up a GLOF event and link these models together to model the GLOF starting at the trigger point and ending at the areas of inundation in downstream communities and cities.

On what do you take data?

My data collection efforts have focused on the use of ground penetrating radar to measure ice thickness.

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

The ice thickness measurements will be used to characterize the three-dimensional bedrock topography of the glaciers and total volume of ice. A more accurate characterization of ice thickness and volume will ultimately lead to a more informed glacier mass balance model.

What is the geographic scope of your research?

My focus is on glacial watersheds in the Cordillera Blanca mountain range in the Peruvian Andes. Our research group is also doing work in the Himalayas with the idea of finding similarities between high mountain glacial watersheds in the two regions and promoting knowledge transfer between the regions.

Geographic scope: Where do you gather data?

We have taken GPR measurements on several glaciers in the Cordillera Blanca, Peru.

Over what geographic domain do your conclusions hold?

Some of the general findings about how glaciers of the Cordillera Blanca respond to climate change may be applied to other tropical and subtropical glaciers and glacial watersheds. The methods we are developing for modeling GLOF events and the different elements of the process chain may be applied to any glacial watershed that is vulnerable to outburst flooding.

What agencies and foundations fund your research?

My research is currently funded by USAID.

What are the time horizons of your funding?

1 year secure funding, possibly 2.

What kinds of resources will your funding support?

The funding supports two graduate students, and we have limited funds for travel expenses and some field equipment.

The future: How you would like to see your research program evolve over the next 5-10 years?

In addition to furthering our understanding of the physical processes in high mountain glacial watersheds and their influence on GLOF risk, we would like to involve more local stakeholders and build capacity in Peruvian universities and government agencies so that as we come to understand more about how climate is impacting glacial watersheds in the Cordillera Blanca, the Peruvian people will have the ability to adapt to the changes that are happening.

New methodologies for data acquisition?

The use of GPR for measuring ice thickness is a relatively new endeavor in the Cordillera Blanca. We are working with the Peruvian Glaciology Unit to help them establish a program to regularly monitor the glaciers of the Cordillera Blanca with GPR.

New methodologies for data analysis?

We are using physical models to study the different components of the glacial watershed system and how they interact with each other. For example, the lake model that I am working on looks at the impact of an avalanche with the glacial lake and the resulting impulse wave propagation that is a key component of the GLOF process that has not been very extensively studied.

### Incorporation of new disciplines into your program?

This type of work studying the impact of climate change on tropical glaciers and GLOF risk is by nature interdisciplinary. Glaciology has traditionally been a sub discipline of the geosciences, but as civil engineers, we are bringing a new perspective to the issue with physical models and evaluation of engineered lake safety systems and other adaptation strategies. However, this work also cannot be successful without involving the social sciences because the impact on communities is such a key component.

Expansion to new geographic areas?

Once we have refined our approach to modeling the physical processes of a GLOF event, this same approach can be applied to other glacial lakes and watersheds in the Peru as well as glacial watersheds in the Himalayas.

What other new challenges are you thinking about?

See above.

Elzbieta Czyzowska-Wisniewski
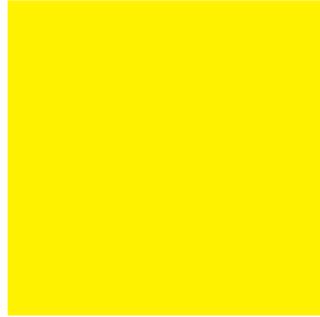
University of Arizona

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What are your central research objectives?

Water resources in alpine environments, alpine regions as water towers in arid and semi-arid regions.

On what do you take data?

Remote sensing and ground data.

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

Future chnages in water resources.

What is the geographic scope of your research?

For now, North America, the Colorado Basin.

Geographic scope: Where do you gather data?

Northe America, the Colorado Basin

Over what geographic domain do your conclusions hold?

Alpine regions.

What agencies and foundations fund your research?

NSF, NASA, USA federal offices.

What are the time horizons of your funding?

2-5 years.

What kinds of resources will your funding support?

All.

The future: How you would like to see your research program evolve over the next 5-10 years?

Extend my research to Asia and South America.

New methodologies for data acquisition?

More ground data.

New methodologies for data analysis?

Learning machine (ANN).

Incorporation of new disciplines into your program?

YES, connection between all watershed factors.

Expansion to new geographic areas?

Yes, ASIA, SA.

What other new challenges are you thinking about?

Cost of data.

Rand Decker

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What are your central research objectives?

Snow avalanches, snow hydrology.

On what do you take data?

Historic avalanche run-out distances, snow loads, visual appearance of constructed works in the mountains, snow water equivalent (SWE) of mountain snowpacks.

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

Effectiveness of avalanche security systems and constructions, including visual impacts, snow water resource volumes for reservoir management and water supply.

What is the geographic scope of your research?

Winter alpine mountains, worldwide.

Geographic scope: Where do you gather data?

Jackson, Wyoming, Flagstaff, Arizona.

Over what geographic domain do your conclusions hold?

Winter alpine mountains, worldwide .

What agencies and foundations fund your research?

Wyoming Dept. of Transportation, Central Arizona Project (water supply agency), Hewlett Foundation.

What are the time horizons of your funding?

1 to 3 years.

What kinds of resources will your funding support?

PI, students, some instrumentation.

The future: How you would like to see your research program evolve over the next 5-10 years?

Internationalize it, including more cooperation.

New methodologies for data acquisition?

Improved remote (cold) autonomous data acquisition and management.

New methodologies for data analysis?

Continuing integration of GIS spatial analysis tools in modeling efforts.

Incorporation of new disciplines into your program?

Snow and ice control for highways and airports, impact of climate change.

Expansion to new geographic areas?

Europe, N. Africa, Central Asia.

What other new challenges are you thinking about?

The sensitivity of winter alpine climates of change, including adaptation and resilance of infrastructure in the mountains.

Hadi Fadaei

Research Institute for Global Change (RIGC), Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

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http://www.jamstec.go.jp/rigc/e/index.html

What are your central research objectives?

The central research objectives are to: 1- Improve the land cover mapping over the large scale area by using new techniques and new approaches to improve information for forest resource monitoring addressed to the problem statement. 2- Determining the plantations area and, natural forest located in the mountainous region which has a different characteristic from that in the flat and low land of Sarawak, Malaysia. The main objective of this study will be to extract characteristic of plantation and natural forest by analyzing the ALOS/AVNIR2 images and compare to ground truth obtained from forest survey. Ground based measurements were collected at plantations and natural forest in mountains region. The data of the forest structure such as tree height, diameter at breast height (DBH), crown diameter, tree spacing and the spectral measurement by the Spectro-radiometer (MS-720) of the endmember in 10×10 square meter as like as AVNIR-2's pixel size were collected. In particular, I am interested to work as research scientist in the tropical region, especially in understanding the sources of climate change in high mountains that affect by local government and local people.

On what do you take data?

1. Local map that provide by local government 2. In situ data measurement 3. Satellite image of ALOS/AVNIR-2+PRISM 4. Google earth image.

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

Those data utilized and pre-processed (atmospheric correction, topographic correction, slope correction etc.) to get a high resolution land cover mapping for the large scale area. Also, analyze the important role of the spectral dimension of vegetation from comprehensive field spectra measurements and remote sensing data as well as simulated to the optical data in high spatial resolution in the land cover mapping.

What is the geographic scope of your research?

The study sites are located in the Sarawak province in Borneo region of Malaysia, (Bintulu: 3º 20' 56.00"N, 113º 4' 9.70"E), (Sampadi: 1º 51' 10.85"N, 109º 31' 50.81"E).

Geographic scope: Where do you gather data?

Satellite imagery collected from JAXA's archive of ALOS satellite data and in situ data gathered from plantation site that is located in Bintulu: 3º 20' 56.00"N, 113º 4' 9.70"E.

Over what geographic domain do your conclusions hold?

Primarily, this research conclusions hold to a regional scale, provide the reprehensive as a candidate to extend for whole are of tropical region especially in Malaysia/Sarawak. It can be consider extending to the other tropical region such as Kalimantan as well as mountainous area.

What agencies and foundations fund your research?

This project is supported by the Ministry of environmental in Japan that called S-9 project.

What are the time horizons of your funding?

S-9 project is 5 years project that start from 2011-2015 that divided to two phase, first phase (2011-2013), second phase (2013-2015).

What kinds of resources will your funding support?

Logistic and analysis.

What kind of resources will your fining support?

I am working on this project as postdoctoral researcher for first phase (2011-probably March 2014).

The future: How you would like to see your research program evolve over the next 5-10 years?

I would like to focus on the following these research questions: —How can high accurate land cover map be produced over the large scale of tropical forest in Indonesia/Kalimantan? The problem statement over the tropical region is the atmospheric effects such as cloudiness, haze and aerosol A combination of microwave data (ALOS-2/PALSAR-2) and passive multispectral data (AVNIR-2 + PRISM) and hyperspectral data coupling related ground measurement data I would like to conduct this research on the tropical forest of Kalimantan region in collaboration with Dr. Pietro Ceccato (pending on funding resources made available). —How to map crops at an early stage? This part of research is to classify crops at early stage by time series multispectral and hyperspectral resolution in the coupling ground measurement data. The ground measurement data of the spectral properties of each stage of the growing season are required to estimate the phenology of crops. I recently conducted a survey with a colleague, to map the spectral radiance from the plantation area from endmember in the tropical forest. 3. What is the impact of the spectral reflectance from endmember on land cover mapping? —For example, an evaluation of the impact of the spectral reflectance from endmember would involve an analysis of the supervised classification following scenarios: —Import the Spectra properties from data collection of endmember to —Conduct a supervised classification such as Spectral Angle Mapper (SAM), Tree Decision or Support Vector Machine (SVM).

New methodologies for data aquisition?

We will collect remote sensing data (PALSAR microwave, AVNIR-2 + PRISM and hyperspectral) for the analyses of the land cover. I have an experience about using microwave data from ALOS/PALSAR. Also, I am Co-Pi of next generation of ALOS-2/PALSAR-2. Also I will attempt to be a next Pi for next generation of ALOS-3 that wills onboard the optical sensor (AVNIR-2 + PRISM). I will go to the field survey to get biophysical parameters and spectral characteristics of vegetation end members in the forest on the base of data analysis. I will estimate best model from combination data derived from remote sensing data and field surveying.

New methodologies for data analysis?

We identify the spectral properties of each segment for land cover types from the point view of spectral are significant and, it should be consider in the multi-scale classification. Supervised classification by Support Vector Machine (SVM) of imaging spectrometer has been considered.

Incorporation of new disciplines into your program?

The next program that I am going to continue is classify the vegetation cover of Kalimantan and Indonesia by multi sensors onboard ALOS satellite such as PALSAR as a microwave synthetic aperture radar and, AVNIR-2 + PRISM as optical sensors. In addition, data from hyperspectral sensors will be applied. We examine the spectral reflectance of optical sensor data with their temporal variation for various land surface conditions. Using a combination among the data from sensors afore-mentioned, we try to obtain the highest resolution information of land cover/use. Evaluation of the classification will performed with in situ information of the spectral reflectance of end members of vegetation.

Expansion to new geographic areas?

Expansion to the other region of tropical forest like Kalimantan and Indonesia by multi sensors onboard ALOS satellite such as PALSAR as a microwave synthetic aperture radar and, AVNIR-2 + PRISM as optical sensors, with perspective of expansion in the croplands.

What other new challenges are you thinking about?

There will be some challenges to obtain at high accuracy land cover mapping in tropical regions and croplands as following: 1. To reduce the atmospheric effects that contaminate the data of satellite optical sensor for achieving the high resolution land cover mapping 2. To examine the applicability of the spectral reflectance obtained from a combination of the multi sensor 3. To acquire the ground truth spectral reflectance of vegetation end members especially in the region of limited access 4. To reveal the spectral reflectance response under different biochemical and biophysical attributes, and viewing geometry of the crop in different growth stage.

Ping Fu

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What are your central research objectives?

Paleoglaciology.

On what do you take data?

Glacial landforms.

What are you attempting to predict or characterize using those data?
Glacial timing, erosion.

What is the geographic scope of your research?

Quaternary glaciations.

Geographic scope: Where do you gather data?

The Tibetan Plateau.

Over what geographic domain do your conclusions hold?

High Asia.

What agencies and foundations fund your research?

SSAG, the Swedish Society for Anthropology and Geography

What kinds of resources will your funding support?

PhD study, field work, lab work.

The future: How you would like to see your research program evolve over the next 5-10 years?

Getting broader and higher impact.

The future: New methodologies for data acquisition?

Higher resolution remotely ,sensed images.

The future: New methodologies for data analysis?

Statistic analyse.

The future: Incorporation of new disciplines into your program?

Modeling, geology.

The future: Expansion to new geographic areas?

Global.

The future: What other new challenges are you thinking about?

Examination of future modeling results.

Li Jing

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What are your central research objectives?

Cryosphere.

On what do you take data?

Remote sensing, ground observation.

What are you attempting to predict or characterize using those data?
Spatial change and related with climate.

What is the geographic scope of your research?

Regional.

Geographic scope: Where do you gather data?

West China.

Over what geographic domain do your conclusions hold?

Tarim River Basin.

What agencies and foundations fund your research?

National Natural Science Foundation of China.

What are the time horizons of your funding?

3 years.

What kinds of resources will your funding support?

Young scientist.

Jeremy Littell

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What are your central research objectives?

Project climate impacts on ecological, hydrologic, and physical systems in Alaska and mountain environments.

On what do you take data?

Air, surface, soil, water temperature; tree seedling establishment; tree-rings/paleoclimate proxies; disturbance - fire; stakeholder science needs.

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

Observe the physical climate of high latitudes/altitudes and how it is changing with climate change and use it to project the fate of landscape structure and processes and ecosystem response in high altitude/latitude environments and what it means for the agencies that manage them.

What is the geographic scope of your research?

Primarily Alaska, but also mountains of northwest North America.

Geographic scope: Where do you gather data?

Alaska (interior, south central, southeast); Cascades: Rocky Mountains.

Over what geographic domain do your conclusions hold?

For fire and seedling establishment, across any physical gradient we can represent. For stakeholder needs, only the places we have asked!

What agencies and foundations fund your research?

US Geological Survey.

What are the time horizons of your funding?

Uncertain.

What kinds of resources will your funding support?

Any and all, but it requires strategic planning years in advance. We can leverage considerable amounts of grad students and postdocs, field work and equipment, and workshops etc.

The future: How you would like to see your research program evolve over the next 5-10 years?

There are at least a dozen arctic intiatives all trying to understand climate change in the high latitudes. I would like to see our own research program better coordinated with other efforts, and focused on observation of the physical environment and the mechanisms by which it drives change in ecological systems managed for resources

New methodologies for data acquisition?

Alaska is data sparse - any new methodology has potential, but monitoring is expensive. Can inexpensive arrays paired with more expensive core sites be coordinated to understand big spatial problems with big data?

New methodologies for data analysis?

Our problem is not a lack of methods that can elicit what we know from what we think we know; instead, our problems hinge more on a lack of coordinated effort and actual observation of processes that matter to people and are therefore sustainable.

Incorporation of new disciplines into your program?

Yes. Much of the history of ALaskan climate change history, with one or two notable exceptions, have focused on the "natural" environment. But people - and particularly their perception they "manage" systems - are a big part of it. We need a different brand of social science, not merely the insistence that social science become a part of the fabric of understanding the nature and fate of our landscapes, but instead how we go from a community of measurers to a community of practice. THAT would be quite useful.

Expansion to new geographic areas?

Pan-arctic, and the mountains of Alaska have much that could be contributed to the understanding of mountains of the world, but context is everything.

What other new challenges are you thinking about?

The challenge of funding research (of any kind) in our new political and financial world - it's very difficult to imagine basic research for curiosity's sake surviving more than another decade, if that. How do we justify research in the mountains and the arctic / high latitudes and make it sustainable. Almost everything I really want to know is going to take decades to find out, but if we can't convince the taxpayers and government officials it's worth it, we can't be useful!

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What are your central research objectives?

Energy balance.

On what do you take data?

Wwn observations, and GEBA, BSRN.

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

To understand the present climate and climate changes.

What is the geographic scope of your research?
Global, especially high latitudes and altitudes.

Geographic scope: Where do you gather data?

Greenland and the Alps.

Over what geographic domain do your conclusions hold?

Arctic and high altitudes.

What agencies and foundations fund your research?

Swiss NSF, and ETH research fund.

What are the time horizons of your funding?

Next three years.

What kinds of resources will your funding support?

Field experiments.

The future: How you would like to see your research program evolve over the next 5-10 years?

Mainly theoretical development.

New methodologies for data acquisition?

Rather compilation and analyses of what we have obtained.

New methodologies for data analysis?

ditto

Incorporation of new disciplines into your program?

Rather to train the next generation.

Expansion to new geographic areas?

Not considered at this stage.

What other new challenges are you thinking about?

Synthesizing the past works.

Liu Qiao

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What are your central research objectives?

Subglacial processes of temperate glaciers.

On what do you take data?

Field observations.

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

What is the geographic scope of your research?

Cryosphere.

Geographic scope: Where do you gather data?

Mount Gongga.

Over what geographic domain do your conclusions hold?

Glaciology.

What agencies and foundations fund your research?

National Natural Science Foundation of China.

What are the time horizons of your funding?

2014-2017.

What kinds of resources will your funding support?

Post-docs.

New methodologies for data acquisition?

Remote sensing.

Incorporation of new disciplines into your program?

No.

Riccardo Rigon

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What are your central research objectives?

Modelling the Hydrological Cycle in Mountain Areas.

On what do you take data?

No data - We model.

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

Any hydrological quantity of interest, including temperature, and permafrost.

What agencies and foundations fund your research?

EU FPs.

What are the time horizons for your funding?

3 years.

What kinds of resources will your funding support?

Graduate students, post-docs, consumables.

The future: How you would like to see your research program evolve over the next 5-10 years?

Including ABL in modelling, and working out a sound thermodynamica of the processes.

New methodologies for data analysis?

Studying the entropy flows in the water-ecosystems.

Incorporation of new disciplines into your program?

Ecology - Thermodynamics.

Expansion to new geographic areas?

Posibly Himalaya.

Mohammad Sohrabi

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What are your central research objectives?

Hydrology; Extreme Events; Eco-Hydrology.

On what do you take data?

I use meteorological and hydrological datasets.

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

Discharge, Stream temperature, Flow velocity and climate chage and Dam operation effects on eco-hydrology particularly, aquatic habitats.

What is the geographic scope of your research?

River Basin.

Geographic scope: Where do you gather data?

NCDC, USGS or other federal institutes.

Over what geographic domain do your conclusions hold?

Studied river basins.

What agencies and foundations fund your research?

Bureau of Reclamation.

What are the time horizons for your funding?

3 years.

The future: How you would like to see your research program evolve over the next 5-10 years?

I want to investigate interactions between Climate, Hydrology, Ecology and Economy.

What other new challenges are you thinking about?

I have developed a drought index and a stream temperature model. I want to couple these models to available hydrological, habitat and economical models to understand climate change impacts.

Chunqiao Song
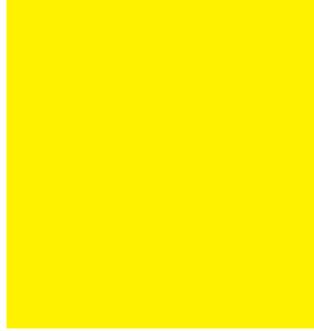
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What are your central research objectives?

Climate change impacts on High Mountain Asia.

On what do you take data?

Remonte sensing.

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

Relationship between alpine environment change and climate variability.

What is the geographic scope of your research?

Tibetan Plateau and surroundings.

Geographic scope: Where do you gather data?

Online.

Over what geographic domain do your conclusions hold?

Regional.

What kinds of resources will your funding support?

Graduate students.

The future: How you would like to see your research program evolve over the next 5-10 years?

New methodologies for data analysis?

Incorporation of new disciplines into your program?

Expansion to new geographic areas?

What other challenges are you thinking about?

Erin Stacey

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What are your central research objectives?

A CZO spanning the rain-dominated oak savannah to the snow-dominated conifer forests of the southern Sierra Nevada is providing opportunities to develop much-needed process-based understanding of critical-zone function, evolution, and response to both rapid seasonal changes and human-induced perturbations. This understanding has applications in many areas relevant to society, including forest management, water resources management and adaptation to climate change. As the Education and Outreach Coordinator for the Southern Sierra CZO, I manage research communications and reporting duties, organize meetings, and build our educational program.

On what do you take data?

We collect a broad suite of data, including eddy covariance flux measurements, a distributed network of snow depth and soil moisture sensors, soil matric potential, sap flux, geophysics, groundwater movement and chemistry, bedrock and soil biogeochemistry, and a host of other factors.

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

We are attempting to create a process-based understanding of critical-zone function, evolution, and response to both rapid seasonal changes and human-induced perturbations. We aim to understand how mountain soil and regolith properties develop and interact with changes in climate and human-induced perturbations to control: i) the distribution, density and activity of forests and other vegetation, ii) the amount and timing of runoff from mountain watersheds, and iii) the options available to resource managers to enhance forest and water management, and other ecosystem services, given these changes.

What is the geographic scope of your research?

The Southern Sierra Nevada lies in the southern Sierra Nevada, with the four main sites in a transect from the oak woodlands of the foothills to subalpine forests. Most of the sites lie within the Upper Kings River Basin. Our longest-running and most heavily instrumented site is at Providence Creek.

Geographic scope: Where do you gather data?

We gather data at the San Joaquin Experimental Range (400 m), Soaproot Saddle (1100 m), Providence Creek (1700-2100 m), and Short Hair Creek (2700 m). Soaproot Saddle, Providence Creek and Short Hair Creek all fall within the Sierra National Forest. An additional study site is located in Sequoia National Park at Wolverton and Long Meadow.

Over what geographic domain do your conclusions hold?

Our research is immediately applicable to the entire range of the Sierra Nevada and its greater region, including downstream water users across California. In a broader sense, lessons from the Southern Sierra CZO can be applied to montane forest management around the world, particularly in regions that derive much of their water from mountain snowpack.

What agencies and foundations fund your research?

The National Science Foundation funds the Southern Sierra CZO.

What are the time horizons of your funding?

Roughly 5 years.

What kinds of resources will your funding support?

Funding supports major instrumentation, ongoing monitoring, and staff time.

The future: How you would like to see your research program evolve over the next 5-10 years?

The strategy for the coming years will be to consolidate the current knowledge of forest and water management for improved modeling and prediction purposes. Building on the diversity of ongoing projects at the Southern Sierra CZO, a suite of core measurements will be expanded from the main Providence site across the elevational transect. Each location will be the site of one-time assessments (soil, rock, and water characterizations) as well as ongoing time series (including meteorology, water and carbon fluxes). In addition, the tower at the highest elevation site, Short Hair Creek, will be reconstructed. The sum of these efforts will inform modeling efforts for more accurate and flexible results. Southern Sierra CZO investigators will continue to share those results with regional stakeholders and policymakers to improve resource management.

New methodologies for data acquisition?

New methodologies for data acquisition include the ongoing development and refinement of a wireless sensor network for snow depth and soil moisture; additional efforts Other efforts under discussion include a biogeochemical and spatial analysis of the black carbon created during prescribed burns, and stable isotope studies on vegetation, neither of which have yet been completed for the sites.

New methodologies for data analysis?

Processing of data from LiDAR flights at all of the study sites have engaged remote sensing for analysis of the canopy and forest structure, as well as tree species identification. Results from field investigations are continually being incorporated into hydrologic ecosystem models (including RHESSys and PIHM) in order to improve predictive abilities and scaling for models of our system.

Incorporation of new disciplines into your program?

New researchers are always welcome at our Observatory. Potential studies under development include isotopic analyses, additional pedology work, more geophysical surveys, and spatial analyses on ecosystem paradigm shifts.

Expansion to new geographic areas?

We hope to place an additional eddy covariance flux tower at a higher elevation in order to extend the transect upward. Additional measurements would be made at this site. The wireless sensor network developed for water balance measurements at the Southern Sierra CZO is being implemented at additional sites across the Sierra Nevada range.

What other new challenges are you thinking about?

There are two challenges that occur to me. I am always trying to expand the reach and impact of our educational program. We take undergraduate classes from Davis and Merced to the site for lessons in field methods, and work with a high school program on a snow research project. These projects and our online activities would be improved with better access to data (including streaming cameras) from the site in real time. Second, we are focused on how to connect our investigations with those at other CZOs across the nationwide network, as well as the co-located NEON site under development in order to promote collaboration, education efforts, and better understanding of the development of soil and regolith.

Fengpeng Sun

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What are your central research objectives?

My research consists of using dynamical downscaling to project regional climate change and its impacts in southern California. My research includes baseline historical reconstruction of regional climate and future climate projections using a high-resolution regional climate model, WRF.

On what do you take data?

My research involves collecting in-situ observational data, reanalysis data (e.g., NARR) and CMIP5 global climate model output.

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

The in-situ data is used for model validation purpose. The reanalysis data and CMIP5 model output are used to generating boundary/initial conditions to drive the regional climate model.

What is the geographic scope of your research?

Current domain includes California, with focusing on the Great Los Angeles region, including the mountainous regions. Future domain targets the Sierra Nevada Mountain.

Geographic scope: Where do you gather data?

Data covering southern California and the Sierra Nevada will be collected. Web data portals provide the data.

Over what geographic domain do your conclusions hold?

Different region has its unique orography and coastal lines (if applicable), so the conclusion is precisely applied to the region of interest.

What agencies and foundations fund your research?

Funding from DOE, City of Los Angeles and private foundation.

What are the time horizons of your funding?

2- years.

What kinds of resources will your funding support?

Research funds for salary and graduate student.

The future: How you would like to see your research program evolve over the next 5-10 years?

Regional climate projections and the consequential impact assessments, especially the impact on local water resources, are essential for regional/local policy-makers and decision-makers. This type of research is drawing and will draw more and more attention thanks to increasing frequency and severity of extreme weather/climate events. Meanwhile, improving the capability and reliability of regional climate downscaling, as well as uncertainty quantification across various models and emissions scenarios are among those critical missions in regional climate community.

New methodologies for data acquisition?

Combination of both dynamical and statistical downscaling.

New methodologies for data analysis?

Building an interface to translate downscaled regional climate projections into fine scale water resource management models.

Incorporation of new disciplines into your program?

A must-be but it is also a challenge.

Expansion to new geographic areas?

For climate scientists working on climate change projections, it is important and also challenging to create interdisciplinary interests for other scientific communities and build a collaboration across disciplines, including but not limited to environment, hydrology, water resource management and planning, biodiversity. It is equally pivotal to disseminate the climate change information and publicize it to general community, most importantly, in a way without involving any politics, to inform the public to build a sustainable living environment.

Johannes Werner

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What are your central research objectives?

Climate of the Late Holocene.

On what do you take data?

Temperature, Moisture from natural climate archives and historical documents.

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

Past Climate Change.

What is the geographic scope of your research?

Europe and Mediterranean.

Geographic scope: Where do you gather data?

Through colleagues.

Over what geographic domain do your conclusions hold?

Europe and Mediterranean, land only!

What agencies and foundations fund your research?

DFG, DAAD.

What are the time horizons of your funding?

until April 2014.

What kinds of resources will your funding support?

Post-Doc (own position), travel.

The future: How you would like to see your research program evolve over the next 5-10 years?

include marine archives? Will maybe lead to weather pattern estimation in the past.

New methodologies for data analysis?

More advanced statistics - Baysian methods.

Incorporation of new disciplines into your program?

Oceanography.

Expansion to new geographic areas?

Arctic?

What other challenges are you thinking about?

Actually getting extremes in the past - the current methods won't be able to do that correctly!

Qinghua Ye

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What are your central research objectives?

My central research objectives is observing changes of land cover (including glaciers, lakes, wetlands, etc.) on terrestrial surface, 1) to find out the objective changing facts and rules of those sensitive indicators in the global climate change at multi-sphere in the Earth System Science from multi-sensors at different spatial– temporal scales, 2) to predict the future of our living world.

On what do you take data?

I take data on phenomena includes Glacier, Lake, Lake Ice, wetlands, etc., all of which belong to one kind of the Land Cover on the earth surface. What's more, as glacier melt runoff flows into nearby lakes, glacier volume and lake depth changes are also very important data for us in research. Glacier, lake and wetlands change are characterized based on times series of data.

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

Using the data, we are trying to monitor the land surface changes and to predict the future of lakes, glaciers, land surface changes and the possible driving factors on the Tibetan Plateau.

What is the geographic scope of your research?

The geographic scope of my research is on the Tibetan Plateau and its surroundings.

Geographic scope: Where do you gather data?

Data are acquired by an integrative multi-disciplinary approach, which couples multi-sensor remote sensing data with in-situ measurements on the Tibetan Plateau. Satellite data mainly comes from some free data centers by internet. Seven comprehensive stations have been set up by our institute of Tibetan Plateau Research of CAS since 2005, which are collecting in-situ data all day and all nights at different geographical zones on Tibet.

Over what geographic domain do your conclusions hold?

Our conclusions hold on spatial temporal changes of land surface on the Tibetan Plateau and its surroundings in the global climate change, also its impacts and driving factors.

What agencies and foundations fund your research?

Projects from the National Natural Science Foundation of China (NSFC), the National Basic Research program of China from Ministry of Science and Technology of the People's Republic of China, and the Knowledge Innovation Foundation Program for outstanding Young Scholar from Chinese Academy of Sciences (CAS) are the major foundations for my research.

What are the time horizons of your funding?

Six months.

What kinds of resources will your funding support?

It provides financial support for our research.It provides financial support for expenses of graduate students, in-situ investigations, expenses of conferences, etc. in our research..

The future: How you would like to see your research program evolve over the next 5-10 years?

Since most of the climate change studies by modeling or satellite observations nowadays are usually carried out by different groups separately, lots of important linkages are missed in the whole story due to shortage of interdisciplinary and trans-disciplinary studies. In the next 5-10 years it needs us to have multi-disciplinary scientists together in interdisciplinary researches on global climate change at multi-spheres using multi-integrative approaches.

New methodologies for data acquisition?

Data acquisition needs both from higher spatial-temporal resolution of tandem satellite sensors system for vulnerable or sensitive indicators monitoring in requirements, and for data calibration and validation by remote observations at multi-platforms for climate model improvement in prediction by correcting imperfections and reducing uncertainties to the utmost, etc.

New methodologies for data analysis?

Multi-integrative approaches and comprehensive methodologies are necessity for data analysis now.

Incorporation of new disciplines into your program?

It is time to work with multi co-operations based on interdisciplinary and integrated research on theories and methodologies.

Expansion to new geographic areas?

Widen our research geographic area, Continental or globally research scope could help us understand what is happening in the world nowadays.

What other new challenges are you thinking about?

It is challenging our innovative abilities not only with wide scope of experience, skills and acquiring new knowledge, but also the integrated research ability for multi co-operations by scientists in related fields.

Chaolu Yi

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What are your central research objectives?

Glacial changes in the past.

On what do you take data?

Glacial moraines.

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

Climate change.

What is the geographic scope of your research?
Geomorphology.

Geographic scope: Where do you gather data?

Tibet and its surroundings.

Over what geographic domain do your conclusions hold?

Physical Geography.

What agencies and foundations fund your research?

NSFC and CAS.

What are the time horizons for your funding?
3 to 5 years for a project.

What kinds of resources will your funding support?

Research.

New methodologies for data acquisition?

Cosmogenic neuclides surface exposure dating. Observation in situ.

New methodologies for data analysis?

yes

Incorporation of new disciplines into your program?

maybe

Expansion to new geographic areas?

not sure

What other new challenges are you thinking about?

Precise of dating.

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