



## MICMoR Summer School 2014

Examining Mountain Ecosystems in Regional to Global Environments of Carbon-cycling and Climate (EMERGE-CC)

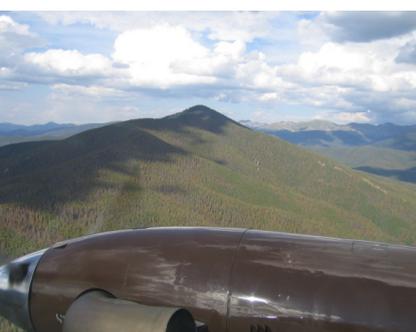
Institute of Meteorology and Climate Research  
KIT/IMK-IFU, Garmisch-Partenkirchen, Germany  
July 21-30, 2014



Ocean and terrestrial biospheric carbon sinks offset a large fraction of the world's fossil fuel emissions. Further, their response to climate variability drives interannual variability in atmospheric CO<sub>2</sub>. Attempts to quantify these fluxes and predict their future magnitude is frustrated by significant spatial variability in carbon uptake and decomposition processes. This variability is especially large in terrain, which features complex intersections of topography, micro-climate, and ecosystem types. How do we as a community improve our ability to measure and predict these fluxes?



This course will provide PhD students and Postdocs the opportunity to engage in classroom lectures, computer lab simulation exercises, field trips with measurement practice, and greenhouse tours to understand and directly apply knowledge about carbon cycle and climatic variability in terrain. Lectures will focus on both large-scale global carbon cycling among land, ocean, atmosphere, and socioeconomic systems, and regional to plot level case studies. Students will work in groups to design, implement, and present mini-research projects. Planned field excursions include mountain grassland drought manipulation experiments, canopy spectroscopy at eddy covariance flux tower sites, stream chemistry sampling, and airborne mountain valley CO<sub>2</sub> profiling. Finally, professional development discussions and opportunities to socialize with colleagues are planned.



By the end of the course, participants will be able to explain the basics of the global carbon cycle, understand its sensitivity to ongoing climate change in terrain, and articulate current research questions and its relationship to their own research. Participants will have gained hands-on experience with aspects of sampling design, integration of multi-scale spectroscopic, climatic, and biogeochemical observations, ecosystem model-data assimilation, tracer-transport inversions, statistical analysis, and scientific presentation. Several of the exercises will provide students with software, statistical tools, or applications of standard methods that they can use in their own research.

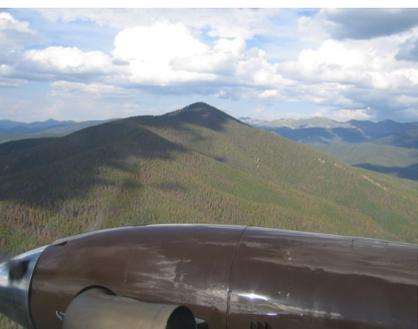
### Presenters

Ankur Desai (University of Wisconsin, USA) – lecturer in charge  
Paul Stoy (Montana State University, USA)  
Amy Trowbridge (Indiana University, USA)  
Diego Riveros-Iregui (University of North Carolina, USA)  
Michael Bahn (University of Innsbruck, Austria)  
Shawn Serbin (U.S. Dept of Energy Brookhaven National Lab, USA)  
Quinn Thomas (Virginia Tech, USA)  
Jon Lin (University of Utah, USA)  
Matthias Mauder (KIT/IMK-IFU, Germany)  
Matthias Zeeman (KIT/IMK-IFU, Germany)  
Nadine Rühr (KIT/IMK-IFU, Germany)  
Ralf Kiese (KIT/IMK-IFU, Germany)  
Wolfgang Junkermann (KIT/IMK-IFU, Germany)

### Contact:

MICMoR Coordination Office  
KIT / IMK-IFU  
Kreuzeckbahnstraße 19  
82467 Garmisch-Partenk.

[www.micmor.kit.edu](http://www.micmor.kit.edu)  
[info@micmor.kit.edu](mailto:info@micmor.kit.edu)



Contact:

MICMoR Coordination Office  
KIT / IMK-IFU  
Kreuzeckbahnstraße 19  
82467 Garmisch-Partenk.

[www.micmor.kit.edu](http://www.micmor.kit.edu)  
[info@micmor.kit.edu](mailto:info@micmor.kit.edu)

## Eligibility

The course is open to a maximum number of 25 PhD students and Postdocs with a background and research interests in atmospheric or environmental sciences, ecology, or biogeochemistry. Competency in introductory statistics, calculus, physics, and ecology is expected. The course will require working in mountain field settings in all weather conditions, data analysis with spreadsheet and computer modeling tools, and written and oral presentations to classmates.

## Application

To apply, please submit a statement of motivation, a short CV highlighting your educational background and research positions or experience, and arrange to have a letter of recommendation sent by your advisor, or academic familiar with your work. Please send your application documents to the MICMoR Coordination Office at [info@micmor.kit.edu](mailto:info@micmor.kit.edu).

Application deadline is **May 15, 2014**. There is no tuition fee; however, participants must cover travel and accommodation costs.

## Draft Schedule (as of 26 Feb 2014)

SUNDAY July 20

Evening: Arrival, ice-breaker

MONDAY July 21

Introduction and welcome

Morning: Lectures on global carbon cycle (Desai, Thomas)

Afternoon: Modeling exercise (Thomas)

Evening: Student poster session

TUESDAY July 22

Morning: Introduction to activity 1: Airborne CO<sub>2</sub> and inversions (Junkermann, Lin)

Afternoon: Planning of airborne activity

WEDNESDAY July 23 **\*\*FIELD TRIP 1\*\***

All day: Airborne CO<sub>2</sub> profiling and discussion of project (Lin, Junkermann)

Evening: Lecture on inverse modeling (Lin)

THURSDAY July 24

Morning: Analysis of data and presentation of group projects (Desai)

Afternoon: Introduction to spectroscopy (Serbin)

FRIDAY July 25 **\*\*FIELD TRIP 2\*\***

Morning: Spectroscopy and ecology field trip at TERENO (Kiese, Serbin)

Afternoon: TERENO soil activities (Riveros)

SATURDAY July 26

Free-time

SUNDAY July 27

Afternoon: Professional development discussion

Evening: hike in Partnachklamm, dinner

MONDAY July 28 **\*\*FIELD TRIP 3\*\***

Morning: Trip to Innsbruck site for drought experiment (Riveros, Bahn, Wohlfahrt, Trowbridge)

Afternoon: Analysis at site

TUESDAY July 29

Morning: Simulation modeling and flux net analysis lectures (Stoy, Desai, Mauder, Zeeman)

Afternoon: Modeling, statistical exercises (computer based) (Stoy, Desai, MPI-Jena group)

WEDNESDAY July 30

Morning: Final lectures, student presentations

Afternoon: Evaluations and departure