

Atmosphere – Ecology – Glaciology – Cluster within the DFG Priority Program 1372

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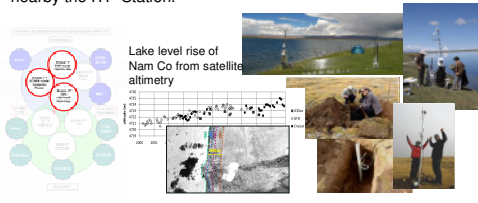
Motivation and Goals

The South East Asian and Indian Monsoon is one of the most important circulation systems of the earth affecting countries with the highest concentration of population in the world. Knowledge on possible changes within this system due to recent climate change is of utmost importance. The monsoon is closely connected with the existence of the Tibetan Plateau – the “Third pole”. Key questions are, if changes in ecosystems and land use on the Tibetan Plateau can affect the monsoon circulation and whether a changing monsoon circulation intensifies changes in land use. This includes glaciers, seasonal snow cover and permafrost since these features form an important water source in the region and affect other ecosystem services including soil productivity and C sequestration.

Experimental Studies

NamCo 2009

- Measurements of energy fluxes between the atmosphere and the Nam Co lake and the surrounding grassland close to the ITP-Station.
- Use of Active Tracer High-resolution Atmospheric Model (ATHAM) for the investigation of processes at the surface-atmosphere interface and the resulting effects on regional circulation at Nam Co lake.
- Establishment of a measurement network for automatically recording of soil-hydrological parameters in a wetland test-site nearby the ITP-Station.



Xinghai 2009

- Investigation of grazing impact on vegetation structure, soil properties, C stock and CO₂ fluxes.
- Studies on sequestration and fate of C from root exudates in soil.



Zhadang Glacier 2009/10

- Investigation on short- and long-term variations in energy and mass balance components due to large-scale atmospheric forcing, including variations and shifts in glacier dynamics induced by climate change.
- The detailed field studies are complemented by remote sensing of glacier fluctuations and glacier characteristics.
- The distinct patterns of glacier changes and varying influence of Indian Monsoon and Westerlies on the TIP are analyzed to estimate the future dynamic response of these glaciers to climate change.

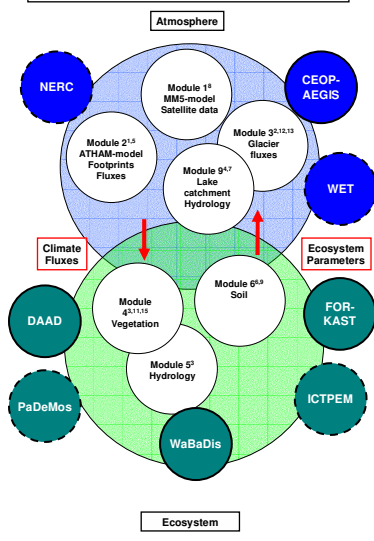


Kema 2010

- Multidiscipline experiments on the response of *Kobresia pygmaea* pastures to land use and climatic changes.
- Analysis of the C and water cycles on a wide range of temporal and spatial scales.
- Evaluation of grazing effects on vegetation dynamics, CO₂ fluxes and C and N turnover.



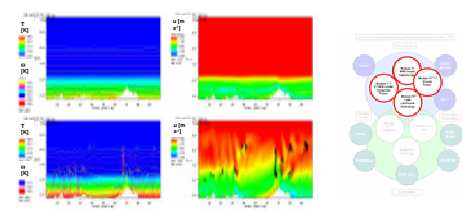
A common atmospheric-ecosystem-glacier project within TIP



Modeling Studies

WRF – ATHAM – Cooperation

- ATHAM and WRF are used for studies of the circulation at the Nam Co basin processes at different scales
- Nam Co lake has a steady regime of thermal land-lake-mountain circulation that develops almost every day and greatly affects the transport of energy and moisture in the area



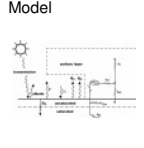
Young Scientist Meetings

- Göttingen, Nov. 2010
Analysis of experimental data
- Berlin Jan. 2011
Discussion of model codes and coupling



Technology transfer

- Atmospheric flux measuring technique
- Chamber-, lysimeter-techniques and labeling
- Modeling coupling, exchange of model-parts e.g SVAT-Model



Planned activities

- 2011 Young Scientist Workshop on: *Scale interaction in the C and water cycle* in Bayreuth, Germany
- 2011 Joint Kobresia Ecosystem Experiment, Kema, Tibetan Plateau (Soil and biosphere)
- 2012 Joint Kobresia Ecosystem Experiment, Kema, Tibetan Plateau (Fluxes in atmosphere, biosphere and soil)
- 2011-2013: glaciological and atmospheric measurements and modeling activities at Zhadang Glacier
- Common documentations and publications

Module 1: Observation and modeling of the atmosphere of the Tibetan Plateau⁸

Module 2: Mesoscale circulations, and energy and gas exchange over the Tibetan Plateau^{1,5}

Module 3: Dynamic responses of glaciers on the Tibetan Plateau to climate change^{2,12,13}

Module 4,5: Ecosystem fluxes and structures in response to grazing and environmental gradients^{3,11,15}

Module 6: Development and degradation of Kobresia root mats and their effects on C and N turnover and C sequestration^{6,9}

Module 9: Integrated system analysis to understand the implications of the Asian Monsoon System on the Tibetan hydrology with focus on Nam Co Basin Plateau^{4,7}

Common WEB Page and internal data basis



<http://www.bayceer.uni-bayreuth.de/TIP-AEG>