The Bavarian Prealpine Observatory

Hans Peter Schmid, Harald Kunstmann, Hans Papen, Jean Charles Munch, Eckart Priesack

TERENO Advisory Board Meeting

October18/19.10.2009

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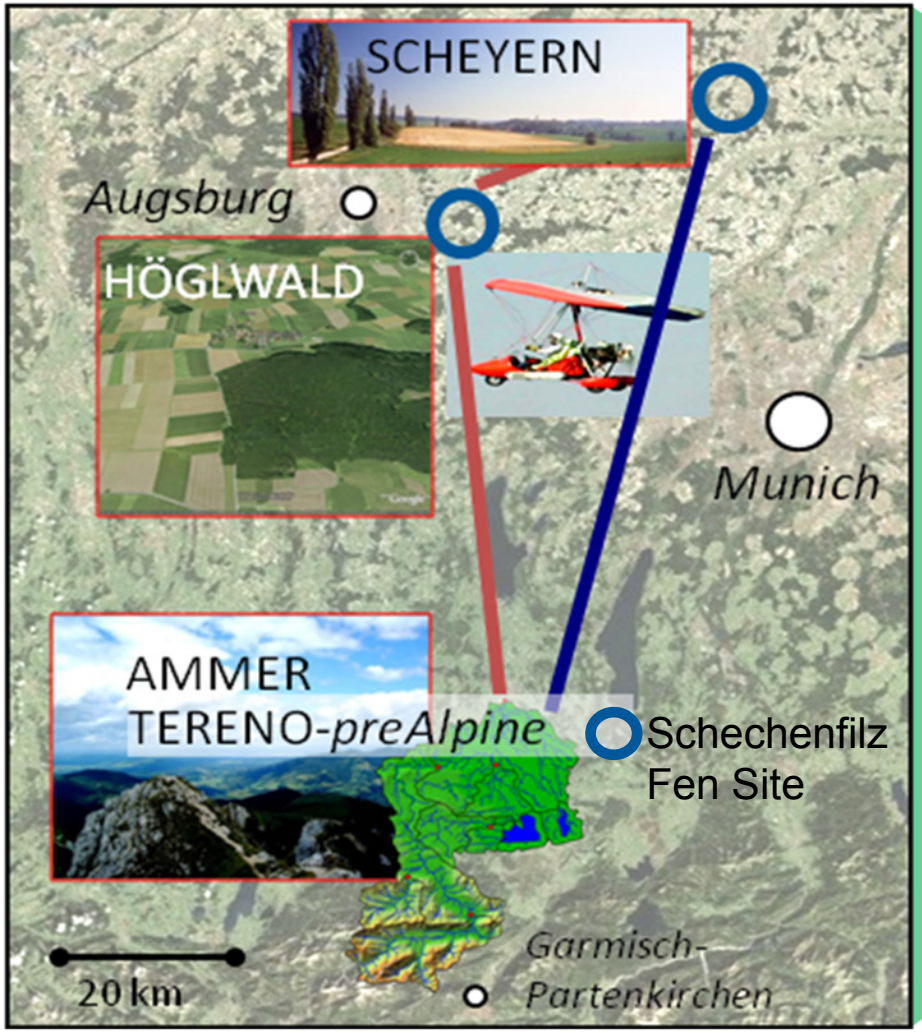

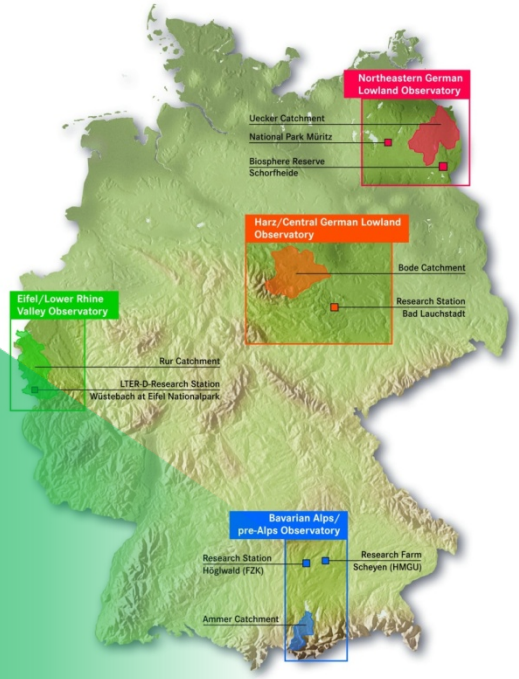

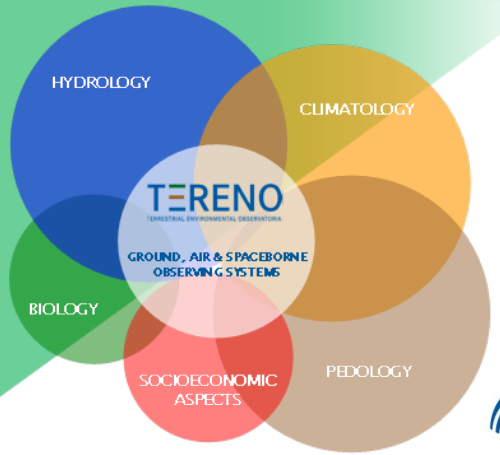

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“In House” Research Goals

- Long-Term **biosphere-atmosphere exchange** (greenhouse gases, energy balance)
- Coupled **C-/N-cycles** and C-/N-storage
- **Vegetation and microbial biodiversity** (temporal dynamics, relation to matter turnover)
- **Alpine watershed hydrology** (water budget, Karst related problems, precipitation variability, floods/droughts, seepage water quality/quantity, water retention capacity)
- **Nutrient deposition** and **land use/management** (wet grasslands/fens, forests and agricultural systems).
- **Methodology development** for micrometeorological observations in complex terrain

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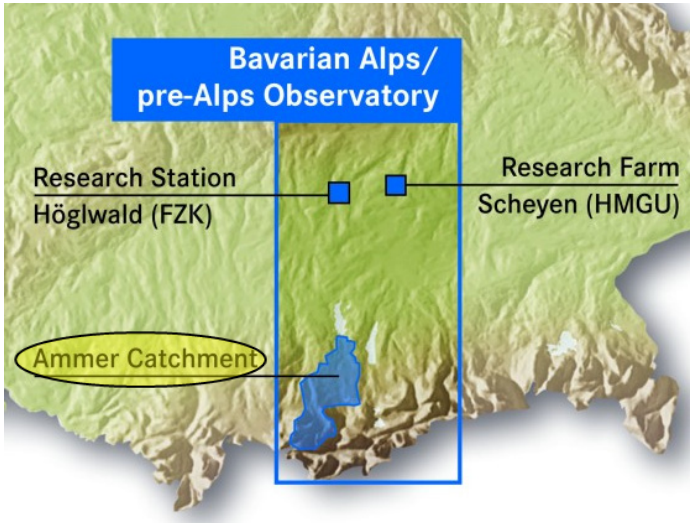
Ammer Catchment Observatory



- area of ~710 km² (601 km² above Weilheim)
- alpine and prealpine landscape with high spatial differentiation in geology and pedology
- elevations: from 533m (a.s.l., Ammersee) to 2185m (Kreuzspitze)
- two dominant landscape units: the prealpine hill country and moorland and the Swabian-Upper Bavarian foothills of the Alps.
- Dominant geology: lime-alpine zone (south), flysch zone (north

TERENO Infrastructure

- **Graswang-, Rottenbuch-, Fendt Sites**
  - 3 EC towers: momentum, heat, H_2O, CO_2, plus TERENO-ICOS: N_2O, CH_4 fluxes
  - 36 Lysimeters: soil water balance,
  - GHG (N_2O, CO_2, CH_4) measurements at lysimeters
- **Geigersau Site:** 1 X-Band precipitation radar
- **Sites to be determined:** 3 Climate stations

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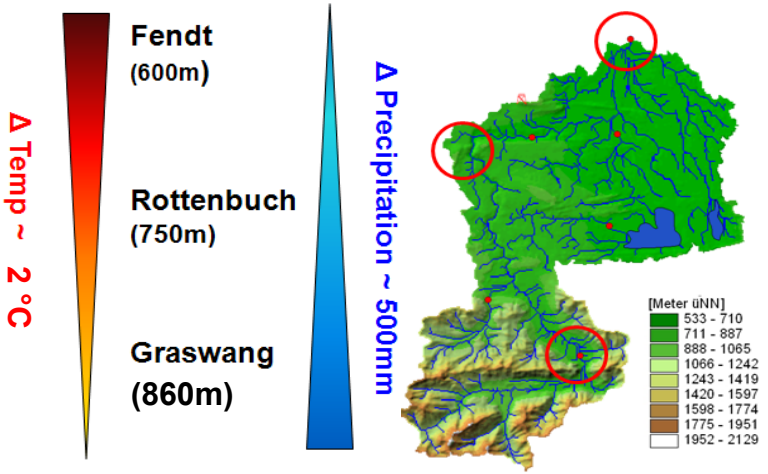
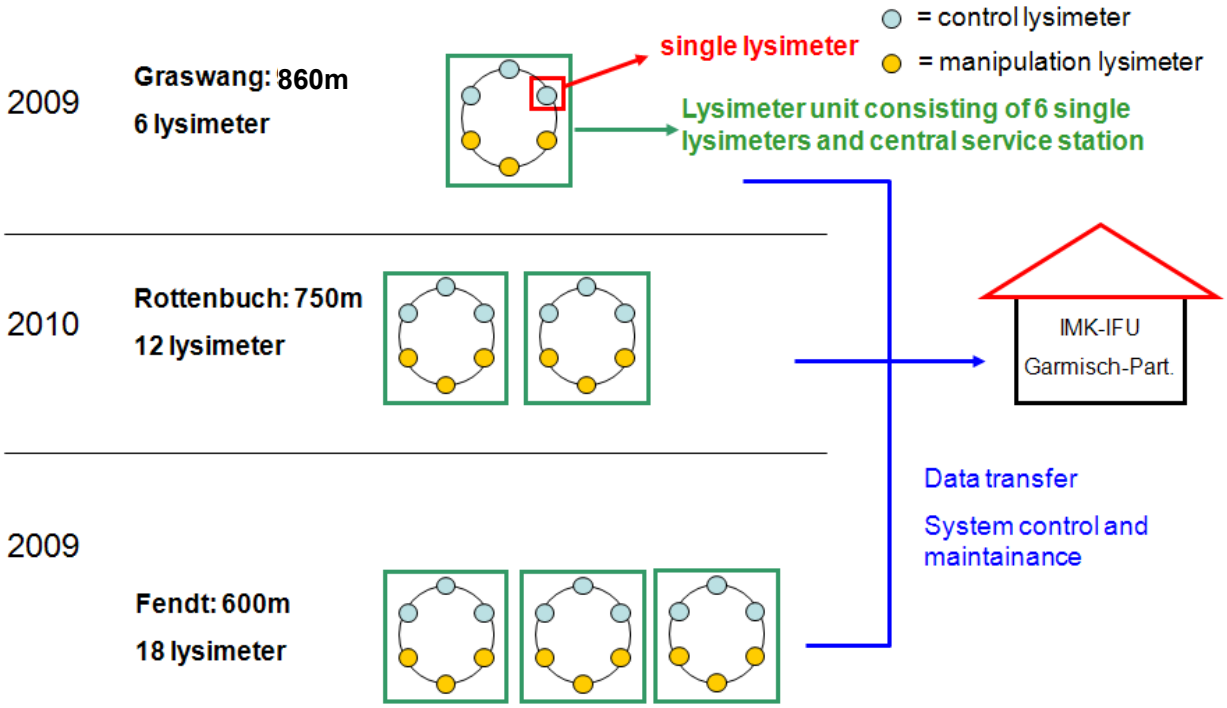
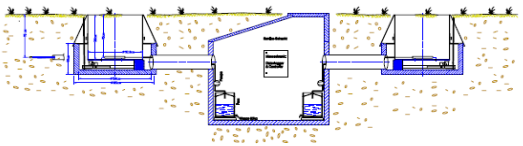
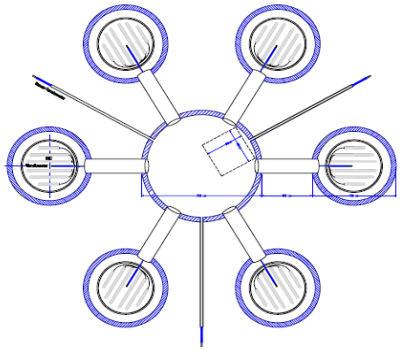
Climasequence: how do grassland ecosystems adapt to climate change?

- grassland soil monoliths transplanted along the natural gradient in temperature and precipitation
- climate change effects on C/N cycles
- associated plant and microbial processes/populations/biodiversity
- terrestrial hydrology and water quality









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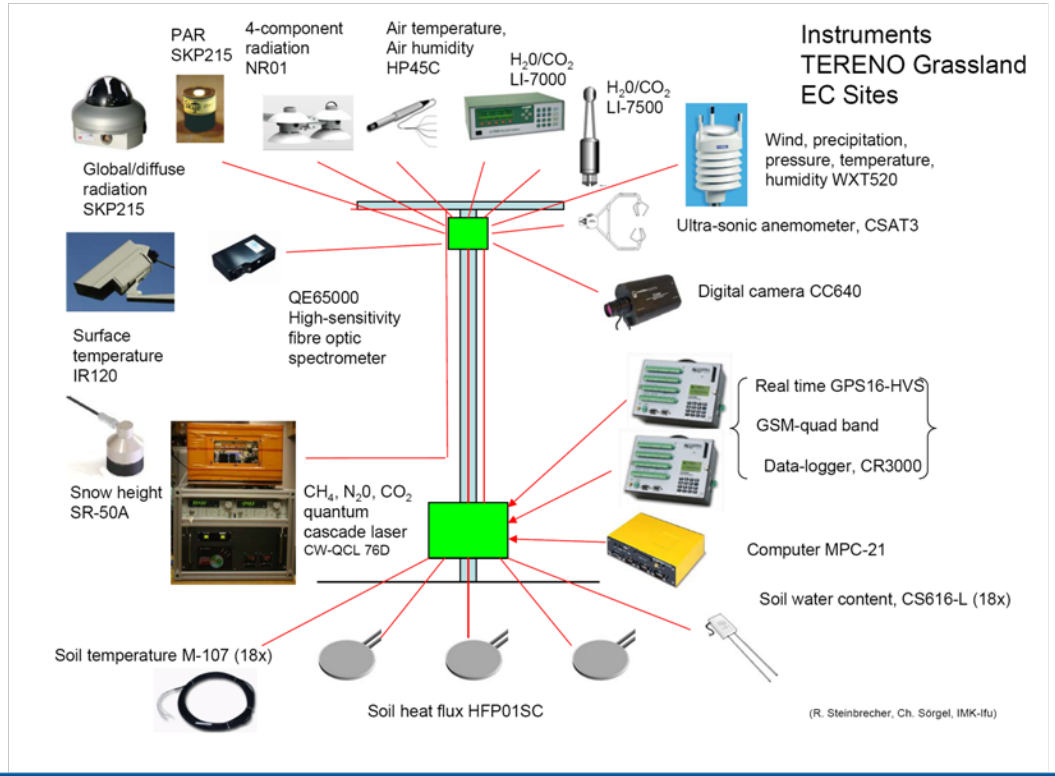
integrated carbon observation system

A European infrastructure dedicated to high precision monitoring of greenhouse gas fluxes

http://www.icos-infrastructure.eu/

- ICOS mission: “To provide the long-term observations required to understand the present state and predict future behavior of the global carbon cycle and greenhouse gas emissions.”
- 5 EC-sites at TERENO-prealpine, -Harz, and –Eifel received additional funding to expand instrumentation to include fluxes of CH_4 and N_2O + upgrade to ICOS standard
- TERENO is recognized by ICOS-D as primary candidates to receive long-term (staff) funding



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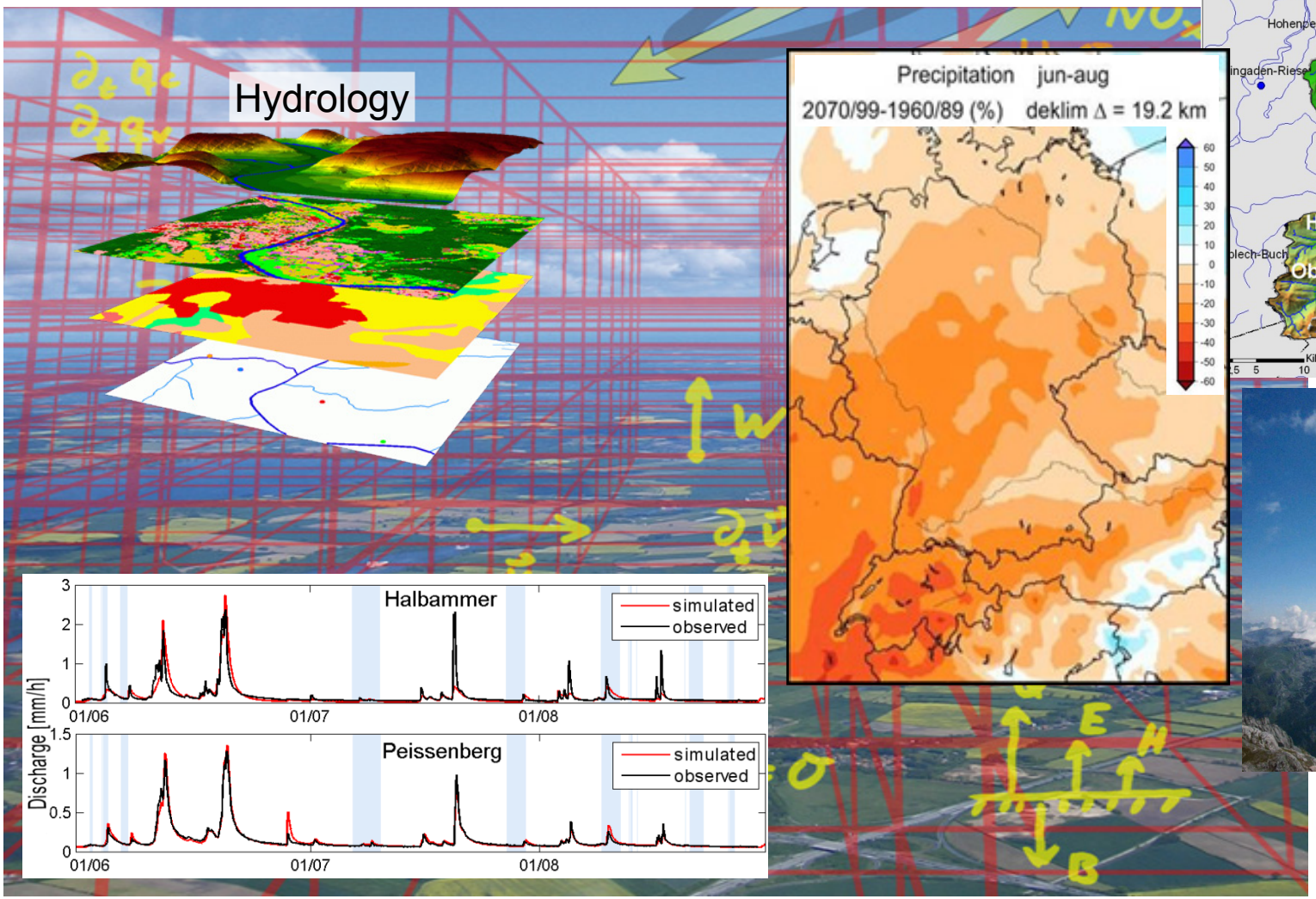
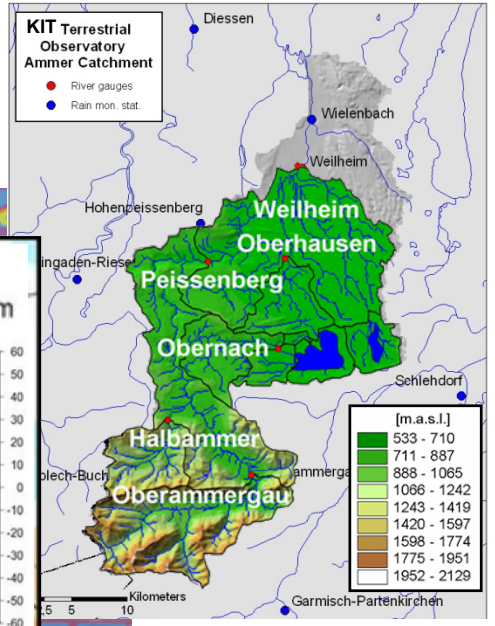
Observations and Meso-Scale Modelling of Alpine Watershed Hydrology





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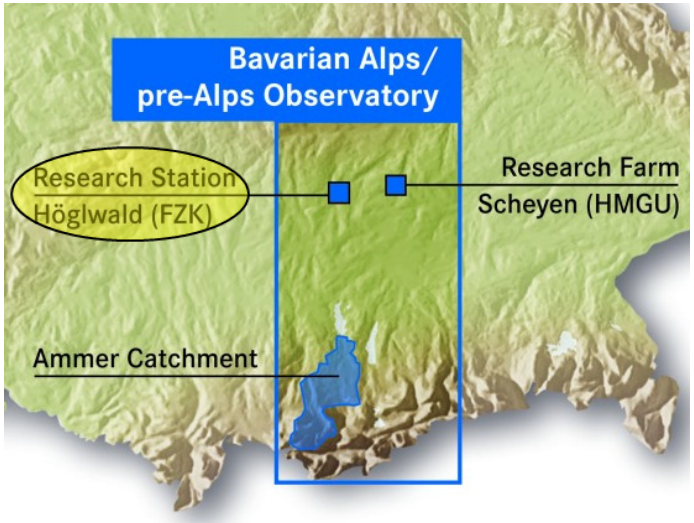
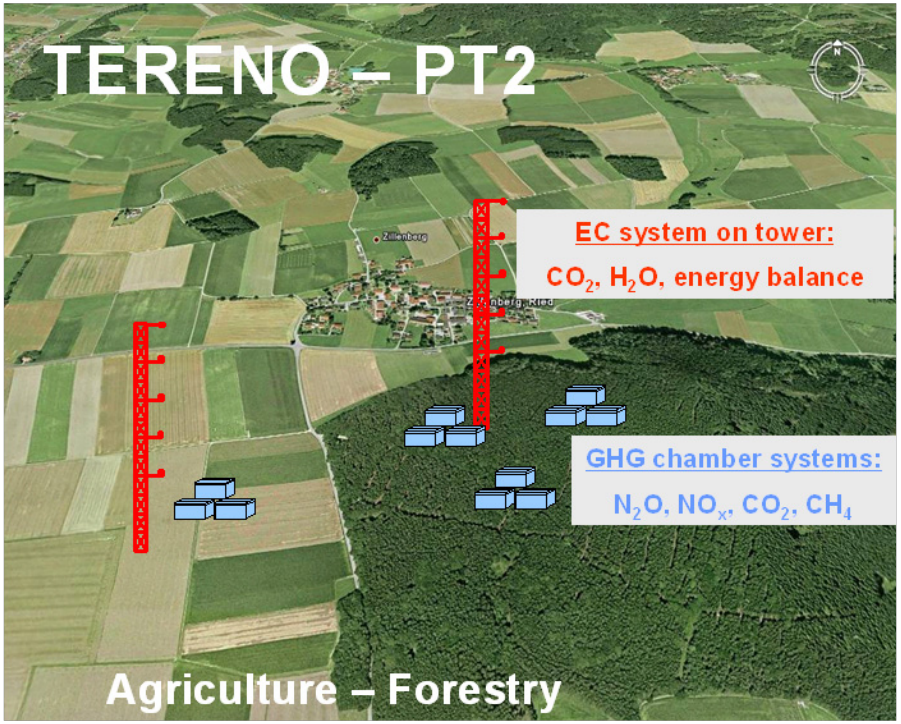
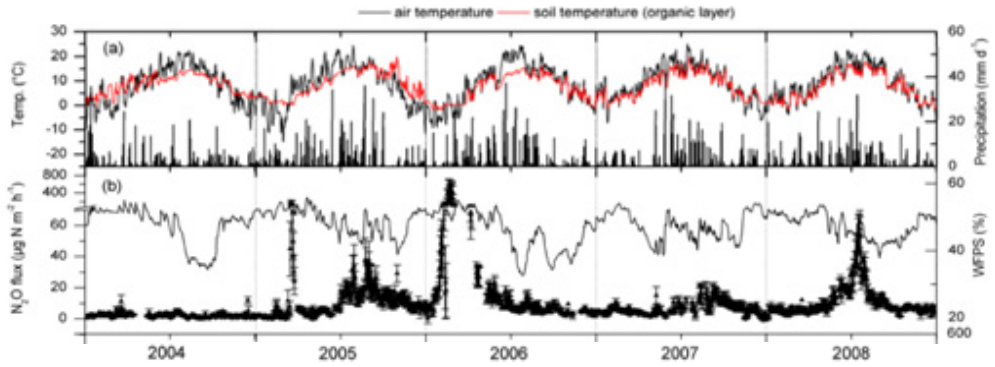
Höglwald Forest Research Station





- N_2O emission measurements since 1993
- EC- CO_2 fluxes since 2005
- designated ICOS-D core site



Expansion to agricultural partner-site (as a TERENO-double site) planned for 2010.

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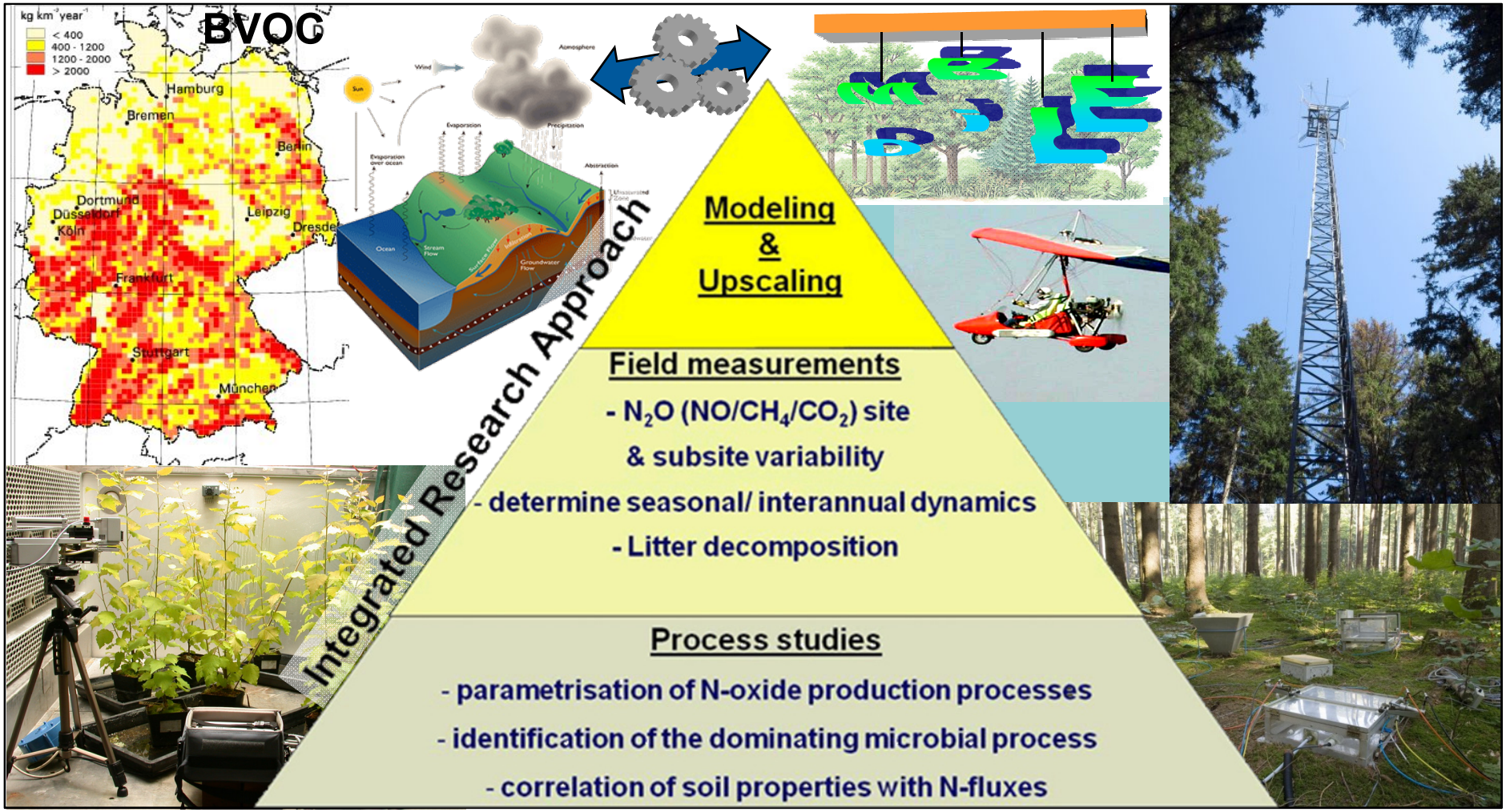
Höglwald Forest Research Station

Integrating long-term observations with experimental work, model development and evaluation



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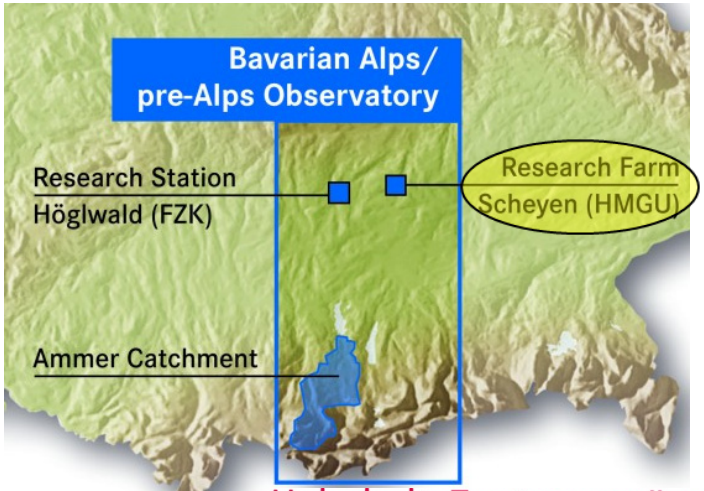
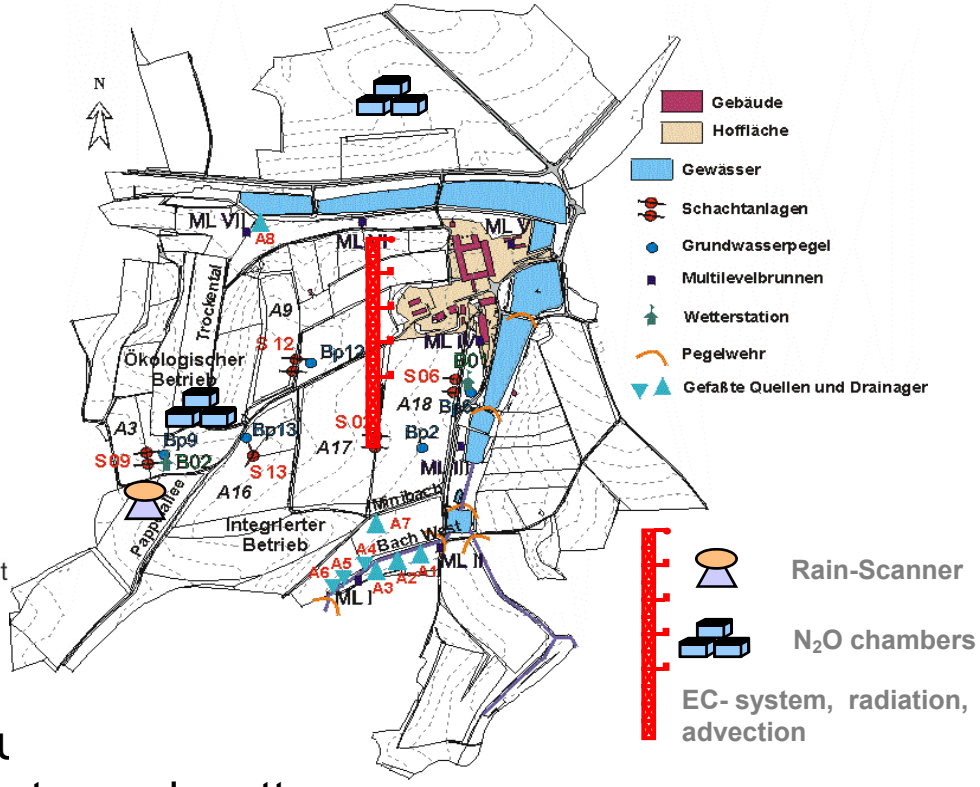
Scheyern Research Farm





TERENO-Scheyern Objectives:

- Impact of feedbacks between land su
  atmosphere on terrestrial fluxes of water and matter
- Influences of soil and landuse changes on water balance, soil fertility, biodiversity and regional climate
- Consequences of large anthropogenic interferences (e.g. open mining, deforestation) on terrestrial systems

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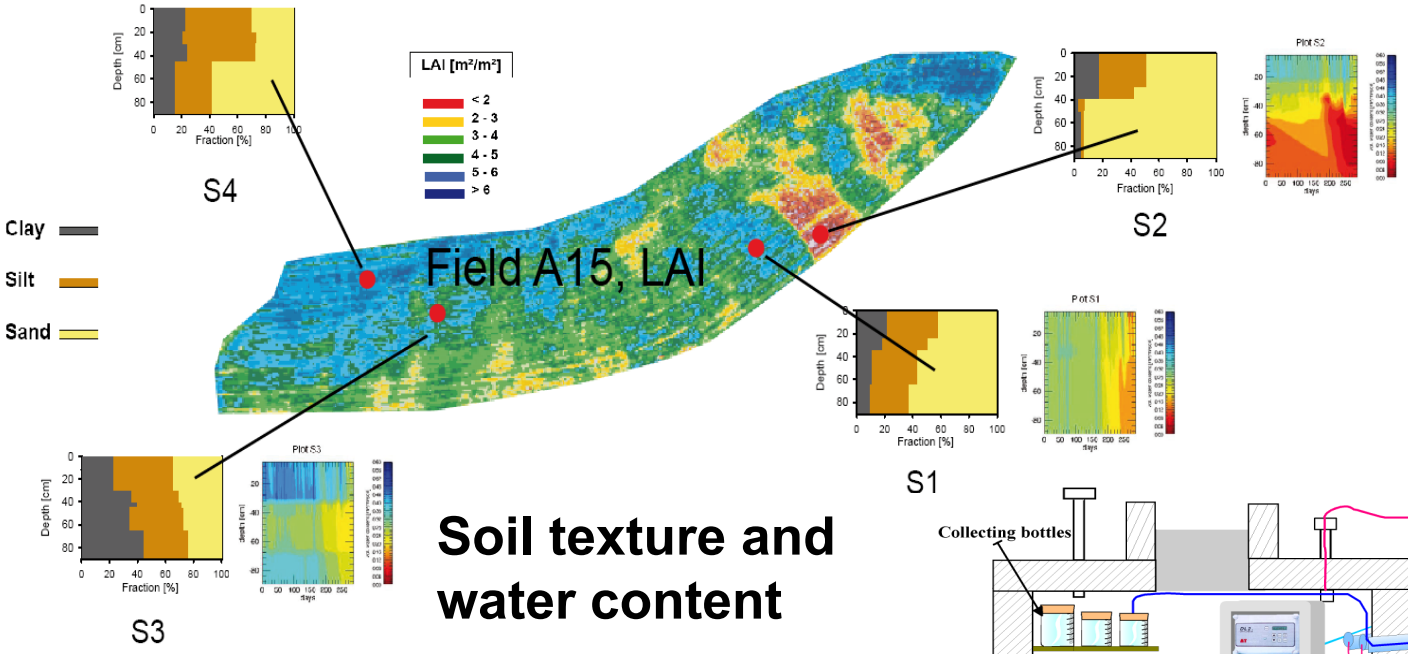
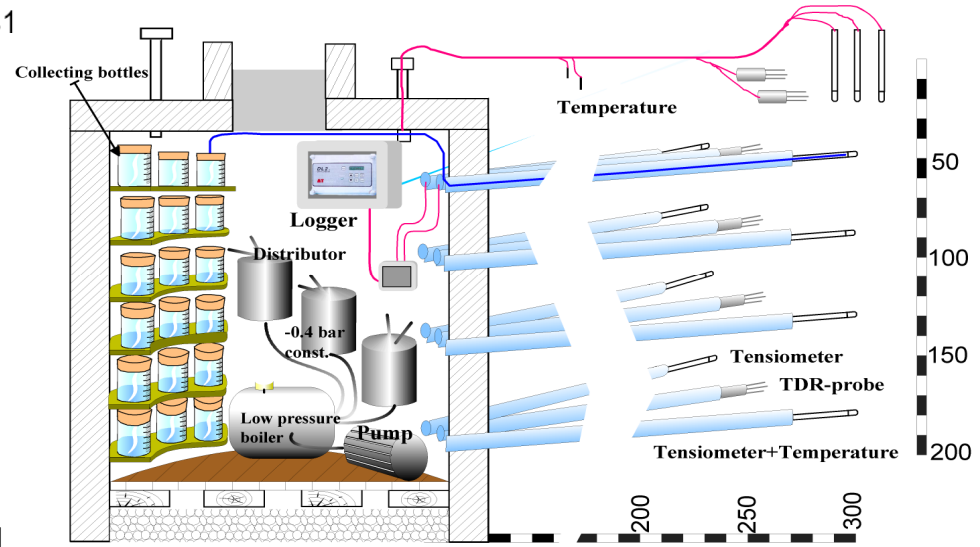
Scheyern Research Farm



Soil texture and water content



- Observation and modelling of soil texture and water content/quality
- Influence of management style on soil texture, C/N budgets, erosion
- Ecosystem-scale observations of GHG and energy balance fluxes in preparation

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Implementation schedule of the Bavarian Prealpine Observatory

	2008				2009				2010				2011			
Work packages/Equipment	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
River Ammer Catchment:																
Identification of 3 grassland sites incl. Soil Surveys																
Climate Change Experiment: 36 Lyimeters																
Rain Radar																
3 EC Stations (& TERENO-ICOS)																
Höglwald-Forest:																
EC-Stations																
Climate Stations																
Research Farm Scheyern:																
EC Station																
Climate Stations																
Rain Radar																
6 Lysimeters																
Soil moisture sensor network																
Runoff and soil erosion observation systems																
Water quality measurement systems																
Data management system																

Installation
Operation

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TERENO's Elixir of Life: Research Partnerships

- Technical University of Munich (Soil Science) – FORKAST Project
- Technical University of Munich (Vegetation Ecology) – VTI Project "Schechenfilz"
- Technical University of Munich (High Frequency Engineering) - PROCEMA
- University of Applied Science Regensburg - PROCEMA
- University of Bayreuth
- University of Augsburg
- University of Regensburg
- Weilheim Water Authority
- Bavarian State Forests Department
- German Weather Service (DWD) - PROCEMA
- Ericsson Transmission Germany, Karlsruhe, Germany - PROCEMA
- Center for Ecology and Hydrology (CEF), Edinburgh, UK
- Tel Aviv University, Israel - PROCEMA
- Israel Oceanographic & Limnological Research Ltd, Migdal, Israel - PROCEMA
- The Cyprus Institute, Energy, Environ. & Water Res., Nicosia, Cyprus - PROCEMA
- Inst. of Atmos. Physics (IAP) of the Chinese Academy of Sciences

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Thanks for your interest!

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KIT Karlsruhe Institute of Technology

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