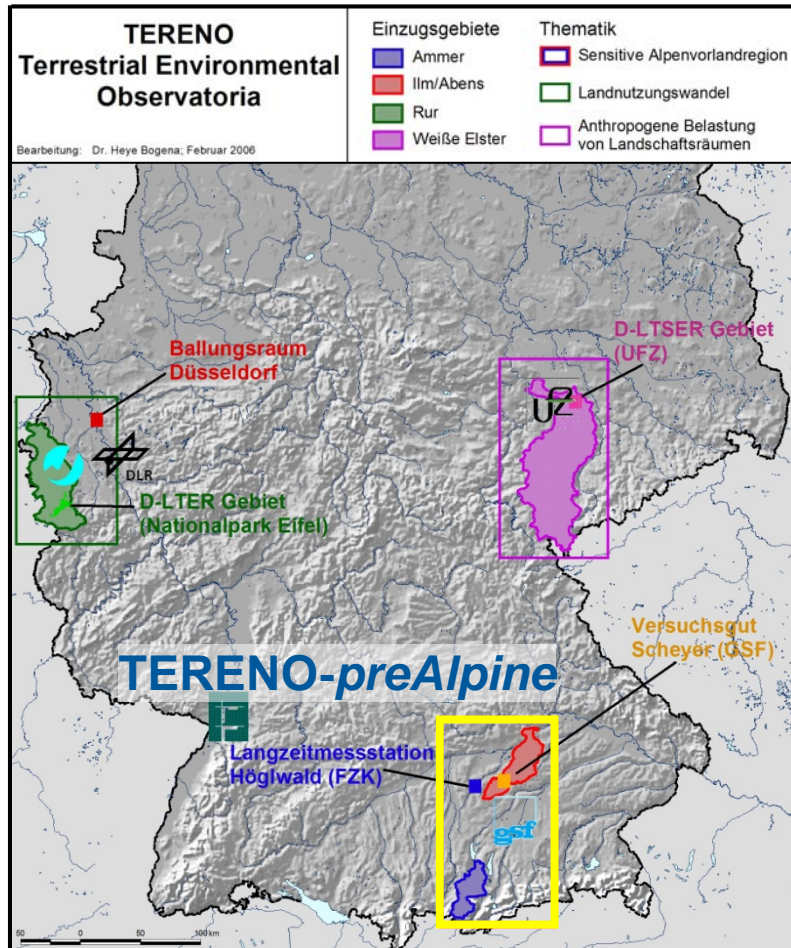


Helmholtz Initiative TERENO

TERENO-preAlpine Environmental Observatories



Long-term Observations and Regional Earth System Modelling

- Support: HGF Large Infrastructures
- Funding decision made in June 2007
- Partners: FZJ, UFZ, HelmholtzZentrum münchen, DLR

Long-term Vision:

- core **observation** and **modelling** area
- **complex & fragmented terrain**
- **attraction point** for partner projects
 - HGF Virtual Institute PROCEMA
 - Priority Progr. HydroChange (pending)
 - European HO-net (pending)
 - HGF/CAS Joint Laboratory ENTRANCE
 - BayFORKAST (pending) ...

TERENO – Longterm Observatory *preAlpine*

Main Objectives

Characterization and quantification of climate change effects on

- changes of the coupled C-/N-cycles and C-/N-storage
- biosphere-atmosphere exchange (trace gases/energy flux/albedo)
- vegetation and microbial biodiversity and of the temporal dynamics of matter turnover and exchange associated with this change in biodiversity
- terrestrial hydrology (alpine water budget, precipitation variability, extreme hydrometeorological events (floods/droughts), seepage water quality/quantity, water retention capacity)

in prealpine ecosystems particularly sensitive to changes in climate, nutrient deposition and land use/management (wet grasslands/fens, forests and agricultural systems).

TERENO – Upgrading of long-term observation station Höglwald

Investments:

Agriculture:

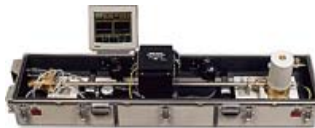
- EC system (energy balance, CO₂, H₂O)
- GHG chamber systems (N₂O, NO_x, CO₂, CH₄)

Ecosystem XXX:

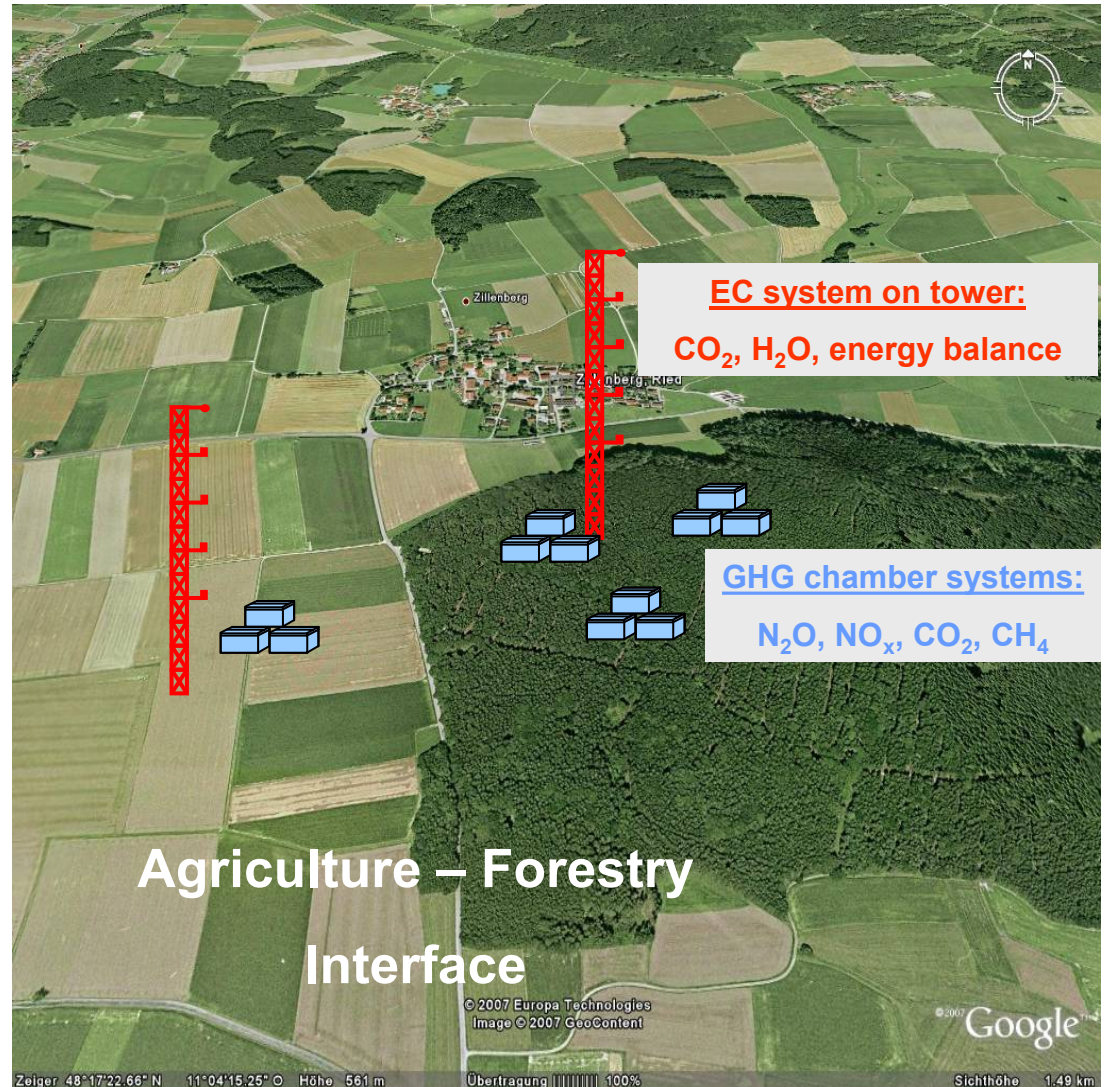
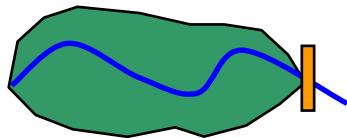
- Climate station



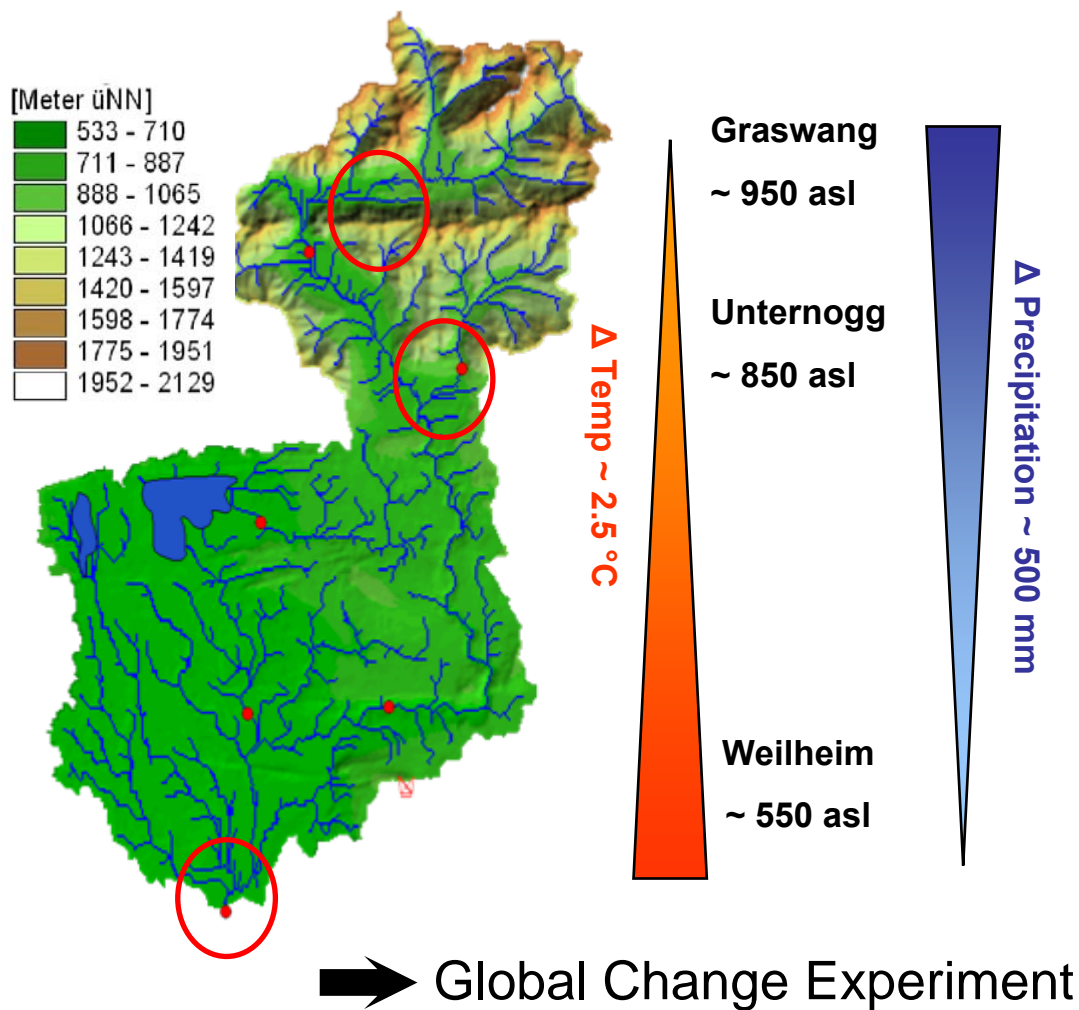
- NH₃-TDLAS



- Water gauges (4) with autosamplers for the quantification of N and C export



TERENO – Climate Feedback Station Ammer Catchment



TERENO – Climate Feedback Station Ammer Catchment

Investments:

- Climate station



- EC system
(Energy balance, CO₂, H₂O)



- Micro rain radar MRR2

- 36 small lysimeters
~ 2 m³



- GHG chamber system (N₂O, NO_x, CO₂, CH₄) for flux measurements at lysimeters



- Photometer for the quantification of nitrate export at two existing water gauges

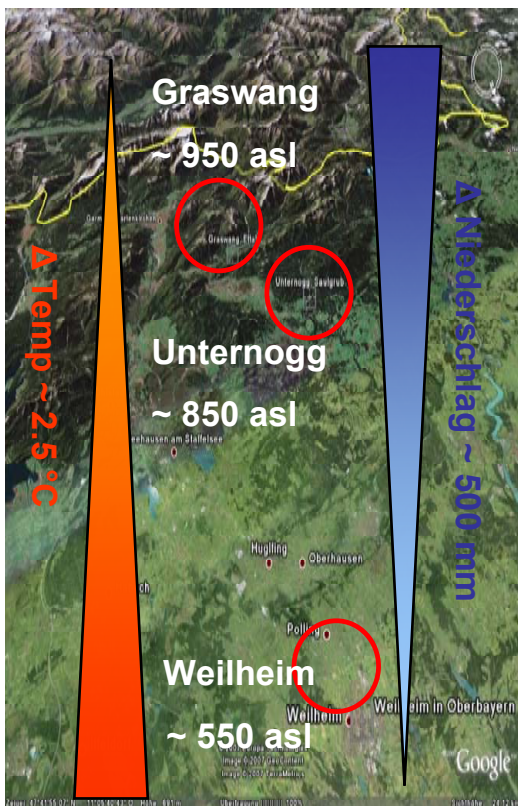


TERENO – Climate Feedback Station *Ammer* Catchment

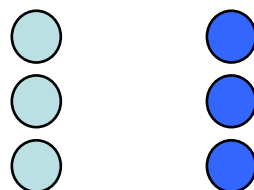
Experimental design of small lysimeters for the simulation of climate change effects

Parameters measured:

- GHG exchange
- NO₃ export
- Water and energy balance
- NO₃/NH₄ concentrations
- Microbial biomass/abundance
- Vegetation



Graswang (GR):



Control Groundwater drawdown

Unternogg (UN):

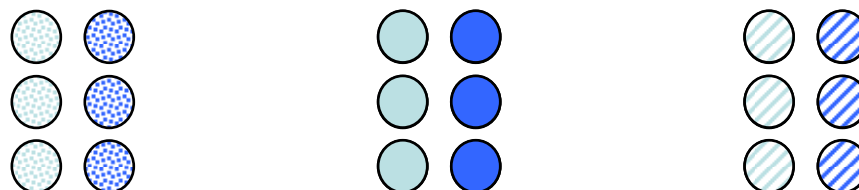
GR + 1°C – 200mm



Weilheim:

GR + 2.5°C – 500mm

UN + 1.5°C – 300mm



Integration of the TERENO Longterm Observatory *preAlpine* in current projects/networks

1. „Messnetz 2000“ (German Weather Service)
2. NitroEurope IP (EU)
3. PROCEMA (Helmholtz Virtual Institute): "Regional Precipitation Observation by Cellular Network Microwave Attenuation and Application to Water Resources Management"
4. DFG-PP „Hydrological Change“ (submitted)
5. Helmholtz-Chinese Academy of Sciences Joint Laboratory *ENTRANCE*
6. Climate Programme Bavaria 2020: BayFORCAST (submitted, pending)

In general, **TERENO** observatories are an open platform and intend to establish new and extend existing national and international scientific cooperations!