Forschungszentrum Karlsruhe
in der Helmholtz Gesellschaft

Karlsruhe Institute of Technology

TERENO - Terrestrial Environmental Observatories

Long Term Observatory *Alpine Upland*

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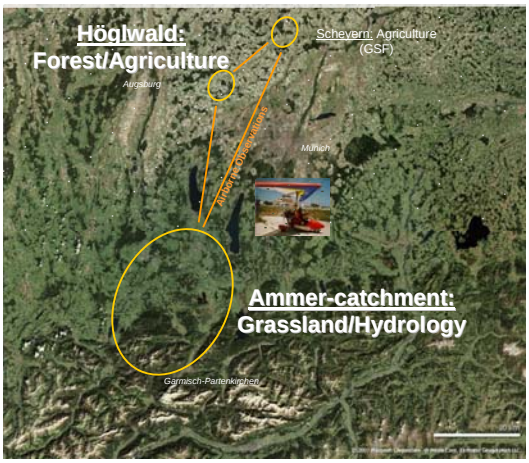
Introduction

Climate change observations since 1860 show a dramatic temperature increase of around 2°C in the German Alps. Regional climate models simulate an additional warming of 2°C during the next 40 years, in combination with decreasing precipitation amounts, especially in summer time (~ -30%). This will affect the biosphere, gas exchange processes, energy balance, as well as the water cycle in this climate sensitive region. Long term observations are an indispensable pre-requisite to improve our knowledge of the complex biosphere-hydrosphere-atmosphere (BHA)- interactions and to detect and analyze the impact of Global Change parameters on these interactions as well as to develop, improve and validate BHA model systems. Therefore, we establish a **long term observatory in the alpine and pre-alpine upland in southern Bavaria, Germany,** to observe the effects of Global Change on complex terrestrial ecosystems. Within the *Alpine upland*, we cooperate with GSF who expand the existing Observatory Scheyern, located north of Munich. The Observatory is part of the TERENO project, which consists in total of three long term observatories located all over Germany.



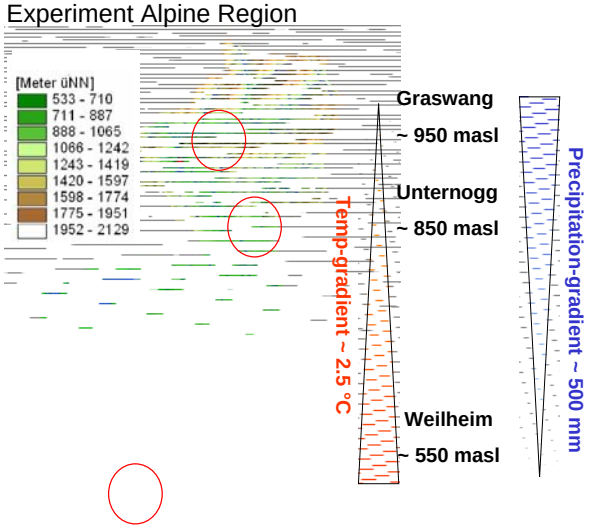
Main Objectives

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 coupled to this change in biodiversity
- terrestrial hydrology (alpine water budget, precipitation variability, extreme hydrometeorological events (floods/droughts), seepage water quality/quantity, water retention capacity)

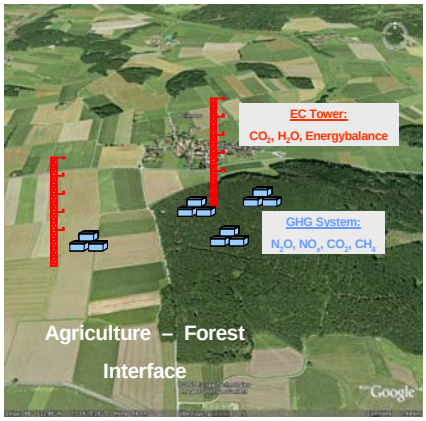
TERENO-Observatories are an open platform and intend to establish new scientific cooperations!

Observatory Ammer-catchment: Climate Change Experiment Alpine Region



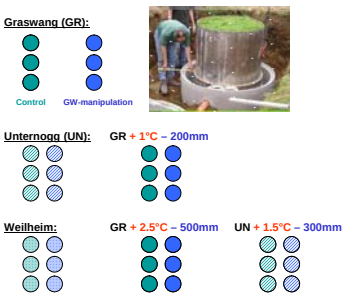
Observatory Höglwald: Agri – Forest Interface in the prealpine region

- Build-up a new instrumentation field in the agricultural area located next to Höglwald.
- Upgrading and expansion of the already existing long term observation station "Höglwald" for investigation of **BHA interaction between agriculture and forest ecosystems** using advanced measuring equipment.



Instrumentation

In the Ammer-catchment, a **lysimeter network** , consisting of total 36 monoliths at three locations, will be realized. In a climate change experiment, monoliths will be transplanted along the existing natural gradient in temperature and precipitation.

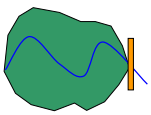


Additional instrumentation for both observatories:

Automated C and N trace gas measuring equipment

EC-Tower & climate station

TDL-AS,for EC based N_2O measurements



discharge gauges including C and N flux monitoring

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