

Research Project

Testing the warming and nitrogen theory of carbon sequestration (COST 639)

Third-party funded project

Project title Testing the warming and nitrogen theory of carbon sequestration (COST 639)

Principal Investigator(s) [Körner, Christian](#) ;

Project Members [Caprez, Riccarda](#) ; [Körner, Christian](#) ;

Organisation / Research unit

Departement Umweltwissenschaften / Pflanzenökologie (Körner)

Department

Project Website http://pages.unibas.ch/botschoen/carbon_sequestration/index.shtml

Project start 01.05.2008

Probable end 31.12.2010

Status Completed

Atmospheric CO₂ enrichment and climatic warming as well as N deposition affect input and output of carbon and nitrogen in soils. This experiment will assess quasi steady state signals of these fluxes and pools by using “experiments by nature”, i.e. established gradients of temperature and N input, the major drivers of NPP and the soil C balance. We will test the hypothesis that soil respiration (R) is driven by net primary production rather than temperature (T) per se. We will further test the hypothesis that enhanced nitrogen input (here naturally simulated by stands composed of nitrogen-fixing trees) will facilitate greater carbon sequestration. By selecting topography-driven “IPCC T-gradients” across identical bedrock chemistry and macroclimate and high vs. low N input (Alnus vs. control) we will thus complement data obtained by other projects which employ shorter-term manipulative tests. The work will be conducted in the Swiss midlands and the Central Alps, in part using existing infrastructure at Furka pass (ALPFOR). Our project accounts for the growing international concern about oversimplistic projections derived from idealized (first principle based) laboratory type response functions to large-scale projections (Körner et al. 2007). Our project leans on theory which had been developed earlier by Raich and Nadelhoffer (1989). However, since the majority of experimental approaches adopt manipulative experiments (for soil warming experiments see the review by Rustad et al. 2001), which will also be adopted within the Swiss COST 639 consortium, we see an urgent need of complementing these studies by works using natural thermal and N-gradients. A lot of reasoning in terms of ecosystem carbon budgets relies on carbon pools. While these are significant and measured in a series of national and international attempts, they are rarely combined with actual flux measurements or vice versa. Our survey will aggregate process rates (litter production, root production, thickness growth of trees, soil CO₂-evaluation) and climate, as well as soil data. Our project contributes primarily to the working group 1 agenda of this COST action.

Financed by

Foundations and Associations

Add publication

Add documents

Specify cooperation partners