

CarboCount CH lay summary

CarboCount CH will investigate human-related emissions and natural exchange between atmosphere and biosphere of the two most important long-lived greenhouse gases carbon dioxide (CO₂) and methane (CH₄) in Europe and especially in Switzerland. As one of the signatory nations of the Kyoto Protocol, Switzerland is obliged to report to the protocol and urge the reduction of its man-made greenhouse gas emissions including CO₂ and CH₄.

CO₂, which is emitted in vast amounts through the burning of fossil fuels, is partially absorbed by oceans and partially by the biosphere which uses CO₂ for the production of organic material through photosynthesis. Atmospheric CO₂ is therefore increasing only about half as rapidly as it would if all emitted CO₂ remained in the atmosphere. It is highly uncertain, however, how the storage capacity of oceans and biosphere will evolve in the future under changing climatic conditions. CH₄ is emitted from a variety of anthropogenic and natural sources and, similar to CO₂, predictions of future CH₄ levels are very uncertain.

The project CarboCount CH will improve our understanding of biosphere-atmosphere exchange processes in a regional environment typical of the northern mid-latitudes. In addition, CarboCount CH will provide quantitative estimates of CO₂ and CH₄ fluxes in Switzerland through a unique combination of information from observations and models. These estimates will provide invaluable input to Swiss policy makers in the context of climate change, notably the Kyoto Protocol and ongoing post-Kyoto negotiations.

To achieve its goals, CarboCount CH will setup a network of four new atmospheric CO₂ and CH₄ measurement sites which will complement existing networks such as the CO₂ flux network Swiss Fluxnet. The Beromünster radio tower will be the flagship of this network where CO₂ and CH₄ will be measured at several different altitudes above ground providing crucial data for flux estimation. The project will also explore new avenues in modeling: The weather forecast model COSMO of MeteoSwiss will be extended with new modules to simulate transport of CO₂ and CH₄ in the atmosphere and to describe the exchange of CO₂ between atmosphere and biosphere. Observations and model simulations will finally be combined in a so-called inverse modeling framework for a better quantification of greenhouse gas fluxes and emissions in Switzerland.