Geophysical Research Abstracts
Vol. 13, EGU2011-7499, 2011
EGU General Assembly 2011
© Author(s) 2011

Integrating carbon fluxes for an improved simulation of land use – atmosphere feedback

Kristina Brust, Valeri Goldberg, and Christian Bernhofer

TU - Dresden, Institute for Hydrology and Meteorology, Chair of Meteorology, Tharandt, Germany
(kristina.brust@tu-dresden.de)

Changes in climate and land use interact in a complex system with various feedbacks influencing water, carbon, and other matter fluxes. An objective within the project MeteoEcoTech (MET) is the detection and validation of climate and land use effects on these fluxes and their contribution to matter budgets.
To consider feedbacks between climate change, atmosphere, and land use the Atmospheric Boundary Layer model HIRVAC (High Resolution Vegetation Atmosphere Coupler) was coupled with the photosynthesis module PSN6, and soil water and interception modules of the hydrological model BROOK90. Recently, the source code was modified to support easy handling.
HIRVAC simulations have been performed on the scale of landscape elements, representing typical land use in Central Europe. Thereby the parameters of vegetation modules were parameterised from literature. Long-term eddy covariance (EC) measurements at different sites (spruce forest, crop rotation) serve as background for validation.
Results show that HIRVAC is able to simulate latent and sensible heat fluxes, evaporation, and CO2 fluxes at the two investigated sites; spruce as well as crop (2009 winter barley, 2010 rapeseed) adequately well.
Increased CO2 concentrations have direct impact on transpiration via stomatal closure. Such feedbacks between CO2- and water fluxes will be demonstrated utilising the improved version of HIRVAC. In the future, HIRVAC should be suitable to perform runs within a sensitivity study for feedbacks between (i) land use, (ii) water and matter fluxes, and (iii) climate change in a coupled mode with the atmosphere.