

Improve processes on regional and local climate induced by land-atmosphere feedbacks

Abstract

Land use and land cover change is recognized as an important forcing on local, regional and global climate, and consequently alter the hydrological and energy cycle. Continued pressure on agricultural land, food insecurity and required adaptation to climate change have made integrated assessment and modelling of future agro-ecosystems development increasingly important. Yet, recent reviews revealed that neither climate modelling approaches nor the analysis tools are fully up to the task. There is a need for improving processes introduced by land atmosphere feedbacks by integrating relevant processes interactively into regional climate models, which are important for vegetation atmosphere interactions on climate time scales. Furthermore, missing processes need to be included, which are relevant on smaller spatial scales. Generally, a change of the simulated climate elements through integration of these climate relevant processes is expected. Although vague are the direction and strength of these feedbacks and their mutual influence. The novelty of this project is to account for transient anthropogenic land use, for a more heterogeneous land cover, and for a vegetation phenology, which varies throughout the season. The key challenges to consider the inherent uncertainty are to advance regional climate modelling for improved assessment of climate change impacts on extremes and food security.