



Modeling land cover changes with the regional model REMO-iMOVE for Europe

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The future global climate change simulations for the intergovernmental panel on climate change fifth climate change assessment report (IPCC-AR5) incorporate land cover change scenarios given by the land use harmonization project. To be able to downscale the ensemble of global models, the MPI/CSC regional climate model REMO was coupled to parts of the dynamic land surface scheme JSBACH, to be able to incorporate land cover changes consistently into a regional model framework. The coupling concept is based on a strong interconnection of JSBACH and REMO, with the dynamic vegetation model being a subroutine of REMO, to ensure the immediate exchange of information between the models on a model timestep basis. The new model version REMO-iMOVE comprises parametrizations of plant physiological processes like stomatal control, photosynthesis and net primary production on biome scale based on plant functional types. Lower boundary conditions for this new approach are derived from 1x1 km² land cover and soil property datasets to be able to model surface heterogeneity crucial for a regional climate model.

REMO-iMOVE is forced with lateral boundary conditions derived from an ECHAM5-MPI-OM A1B scenario simulation for the years 1955 to 2000. The horizontal distribution of vegetation and soil parameters was changed on annual basis according to the IPCC-AR5 land use harmonization project. Even though some differences occur, REMO-iMOVE is able to reproduce European climate like standard REMO. It will be to discuss, which effect land use changes had on regional climate features of Europe in the last decades.