Geophysical Research Abstracts
Vol. 16, EGU2014-14660, 2014
EGU General Assembly 2014

Sensitivity of the interannual climate variability due to land-use changes

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Deforestation and land-use changes are major issues in Amazonia. An increase of agriculture will impact the land-use as well as the regional climate. Since up to 80 percent of the precipitation in central Amazonia comes from local evapo-transpiration, these impacts can be expected to be strong. The sensitivity of regional weather and climate to land use changes in central Brazil is studied within the CarBioCial project (www.carbiocial.de). Here, a hierarchical model chain for South America has been developed consisting of a combined dynamical and statistical downscaling approach. The dynamical component is represented by the Weather and Research Forcasting Model (WRF, Skamarock et.al. 2008) developed by NOAA. Sensitivity studies are performed by applying different land-use scenarios. Simulations of both present day and potential future climate conditions are evaluated. The land-use scenarios are created by the LandSHIFT model (developed by the University of Kassel). It combines anthropogenic and ecological subsystems and is driven by socio-economic and agricultural developments. One part of the model calculates the net primary production NPP of crop earnings as input for the 'land use and cover' part (LUC-model). The analyses focus on changes in the mean climate and in the variability.