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Validation of CLM regional climate simulations with European Fluxnet observations

E. B. Jaeger, D. Luethi and S.I. Seneviratne

Institute for Atmospheric and Climate Science, ETH Zurich, Switzerland
(eric.jaeger@env.ethz.ch)

Recent modeling studies have suggested that land-atmosphere coupling has a strong impact on European summer climate variability (e.g. Seneviratne et al. 2006, Nature), an important aspect for the occurrence of extreme climate events such as heatwaves or heavy precipitation. However, few studies have investigated up-to-now the realism of land-atmosphere coupling characteristics from (regional or global) climate models. In the present study, we use observational data from Fluxnet (http://www-eosdis.ornl.gov/FLUXNET/), to validate surface fluxes and land-atmosphere coupling characteristics of regional climate simulations performed with the "Climate Local Model" (CLM). The CLM is a non-hydrostatic regional climate model used by several research groups in Europe (http://www.clm-community.eu/).

We validate here CLM simulations driven with ECMWF forecast analysis data (for the time period 2001-2006) and ERA40 reanalysis data (for the years previous to 2001), computed at standard (0.44^o or ca 50km) and high (0.22^o or ca. 25km) resolution. The analysis focuses on the following aspects: 1) Validation of surface fluxes on diurnal to annual time scales; 2) Validation of links between soil moisture and temperature, and soil moisture and precipitation based on process and statistical analyses; 3) Investigation of the impact of spatial resolution for the involved processes.