



Observation-based investigation of land-precipitation coupling

B.P. Guillard (1), B. Orlowsky (1), S.I. Seneviratne (1), M. Reichstein (2), P. Ciais (3), A.J. Teuling (4), N. Buchmann (5), and K.L. Findell (6)

(1) Institute for Atmospheric and Climate Science, ETH Zurich, Zurich, Switzerland (benoit.guillard@env.ethz.ch), (2) MPI for Biogeochemistry, Jena, Germany, (3) LSCE, Gif-sur-Yvette, France, (4) Wageningen University, Wageningen, Netherlands, (5) Institute of Agricultural Sciences, ETH Zurich, Zurich, Switzerland, (6) (1) GFDL, Princeton University, Princeton, USA

Interactions between land-surface and precipitation are an important component of the climate system and have been the subject of numerous studies. However, in particular the feedback between soil moisture and convective rainfall through indirect mechanisms (e.g., boundary-layer growth and convection triggering related to evapotranspiration) remains poorly understood. Although most modelling studies find positive feedbacks, observational studies are inconclusive up to now, questioning even the sign of the feedback.

Here we explore the relationship between the evaporative fraction and precipitation on the daily time scale using data from FLUXNET sites from the US. An (apparent) positive relationship is found, with higher conditional probabilities of afternoon rainfall for higher values of evaporative fraction. However, we identify that this behaviour could be induced by large-scale precipitation or other confounding variables and also depends on the atmospheric conditions, which merits further investigation.

Therefore, we extend our analysis using additional observational data (precipitation data from radar measurements and early-morning radio-soundings) and a reanalysis product (NARR).

This enables us to better identify and analyze convective situations and also to perform a first cross-validation of the different data sources.