Geophysical Research Abstracts, Vol. 9, 06475, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-06475

The contribution of land-atmosphere feedbacks to recent European summer heatwaves

E. M. Fischer (1), S. I. Seneviratne (1), D. Lüthi (1), and C. Schär (1)
Institute for Atmospheric and Climate Science, ETH Zurich, Switzerland
(erich.fischer@env.ethz.ch)

Extreme heatwaves such as in the European summer 2003 highlight the importance of land-atmosphere feedbacks for the continental-scale summer climate. Most of the recent European summer heatwaves have been preceded by a pronounced precipitation deficit in the antecedent spring. The lack of precipitation and the associated depletion of soil moisture result in reduced latent cooling and thereby amplify the summer temperature extremes. In order to quantify the contribution of land-atmosphere feedbacks, we conduct regional climate simulations with and without land-atmosphere coupling for four selected major summer heatwaves in 1976, 1994, 2003, and 2005.

For each event, two simulations are performed using the regional climate model CHRM: One simulation with interactively coupled land-atmosphere processes and another simulation where the soil moisture evolution at each time-step is prescribed by the climatological mean field.

The evaluation of the experiments reveals that land-atmosphere interactions play an important role for the evolution of the investigated heatwaves. During all simulated events soil moisture-temperature feedbacks increase the heatwave duration and account for typically 50-80% of the number of hot summer days. The largest impact is found for daily maximum temperatures during heatwave episodes.

Reference: Fischer E., S.I. Seneviratne, D. Lüthi, and C. Schär, 2007: The contribution of land-atmosphere feedbacks to recent European summer heatwaves, *Geophys, Res. Lett.*, submitted.