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Editorial

Land-Atmosphere Interactions

Marcos Heil Costa,[1] Michael T. Coe,[2] and David R. Galbraith[3]

[1]*Federal University of Viçosa, 36570-000 Viçosa, MG, Brazil*
[2]*Woods Hole Research Center, Falmouth, MA 02540-1644, USA*
[3]*University of Leeds, Leeds LS2 9JT, UK*

Correspondence should be addressed to Marcos Heil Costa; mhcosta@ufv.br

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The bidirectional interactions between the land surface and the atmosphere play important roles in determining weather and climate across multiple time scales. The influence of soil moisture on short-term weather forecasts, the role of phenology and surface radiation balance in seasonal and intraseasonal climate variability, the interaction of land cover and long-term mean climate in several regions of the world, and the emissions of greenhouse gases due to changes in land cover or agricultural practices are well-known examples of these interactions.

This special issue deals with different aspects of the interactions between land and atmosphere, using observations and modeling.

Y. Yang et al. provide a critical evaluation of the nonparametric approach to estimate terrestrial evapotranspiration, one of the most challenging problems for hydrometeorologists. They concluded that the nonparametric approach is very close to the equilibrium evaporation equation under wet conditions and that its applications in dry conditions should be avoided.

Missing data is an inevitable problem when measuring CO_2, water, and energy fluxes between biosphere and atmosphere with eddy covariance systems. X. Zhao and Y. Huang (this issue) compared three gap-filling methods for eddy covariance net carbon fluxes in three short vegetation sites. They found that the performance of the filling techniques depended on the time scale, gap length, and time of day (day or night), concluding that a combination of the available methods reduced cumulative bias and deviation for gap-filled net ecosystem exchange fluxes.

J. Cleverly et al. used ten years of eddy covariance measurements to evaluate the role of drought and flooding on radiation, evapotranspiration, and latent heat fluxes over groundwater-dependent riparian forests. A very interesting result is that, during flooding periods, annual values of evapotranspiration exceed annual precipitation by 250–600%, whereas it is greatly reduced during periods of severe drought.

Finally, two papers presented results from a combination of modeling and observations. V. Potopová et al. discussed the effects of climate change on the duration of the agricultural growing season in the Elbe River lowland, Czech Republic, during the 21st Century, while X. Lai et al. compared soil moisture variations over China from simulations with the Community Climate Model 4.0 with observations from a microwave multisatellite soil moisture dataset.

Marcos Heil Costa
Michael T. Coe
David R. Galbraith