Geophysical Research Abstracts
Vol. 14, EGU2012-12850, 2012
EGU General Assembly 2012

Assessing global-scale land evapotranspiration: Results from the LandFlux-EVAL initiative

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Land evapotranspiration (ET) is an essential component of the climate system, which links the water, energy and carbon balances on continents. In addition, it plays an essential role for the occurrence of extreme events such as heat waves and droughts [1]. However, it has been long linked with uncertainties in most regions of the world due to the lack of reference global observations. This situation is gradually changing thanks to the development of global datasets based in part on observations. These include dedicated satellite-derived products, observation-driven land surface model simulations, reanalysis data products, and datasets based on atmospheric water balance estimates.

The LandFlux-EVAL initiative (http://www.iac.ethz.ch/url/research/LandFlux-EVAL), which is part of the LandFlux activity spearheaded by the GEWEX radiation panel, aims at evaluating and inter-comparing these newly available ET datasets. In this presentation, on-going results of the LandFlux-EVAL initiative will be highlighted [2,3], together with their implications. In particular we will provide estimations of biases and uncertainties in current land ET estimates and their relation to forcing vs ET algorithms. Corresponding analyses of IPCC AR4 simulations and first evaluations of AR5 simulations will also be presented. Finally, the closing of the terrestrial and energy budgets at the global scale will be discussed.

[1] Seneviratne, S.I., et al., 2010: Investigating soil moisture-climate interactions in a changing climate: A review. Earth-Science Reviews, 99, 3-4, 125-161, doi:10.1016/j.earscirev.2010.02.004.
[2] Mueller, B., et al., 2011: Evaluation of global observation-based evapotranspiration datasets and IPCC AR4 simulations. Geophysical Research Letters, 38, L06402, doi:10.1029/2010GL046230.
[3] Jimenez, C., et al., 2011: Global inter-comparison of 12 land surface heat flux estimates. Journal of Geophysical Research, doi:10.1029/2010JD014545.