

ATS/CIRA Colloquium

David Gochis

NCAR RAL

Multiscale observations and modeling of land-atmosphere interactions

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ATS room 101; Discussion will begin at 3:30pm

Refreshments will be served at 3:00pm in the coffee lounge

The complexity of land-atmosphere coupling occurring across a wide range of temporal and spatial scales makes it difficult to isolate cause and effect relationships in hydrometeorological and hydroclimatic events. In turn, such complexity and non-linearity inhibits the definition of generalized or simply parameterized functional relationships for describing land atmosphere interactions across scales. In this seminar, recent work related to developing and deploying advanced multiscale land surface processes in both weather and climate models will be presented. This work aims to explicitly and implicitly improve characterization of landscape complexity and its impact on hydrometeorological and hydroclimatic processes such as convective initiation, the diurnal cycle of rainfall, precipitation-runoff responses and soil moisture-vegetation interactions. First, results from a recent suite of climate simulations using the coupled CAM/CLM modeling system and a new sub-grid fine-mesh parameterization are presented. Results from these simulations show significant impact from sub-grid precipitation disaggregation on land atmosphere coupling as well as trans-seasonal runoff responses in transient snow/complex terrain regions of N. America. The dependence of regional hydroclimatology on precipitation character from this and other studies is then expanded upon using findings from several years of observational studies from the North American Monsoon region of western Mexico. Lastly, the impact of analyzed and forecasted precipitation character on detailed runoff processes (hillslope redistribution, groundwater coupling, streamflow and reservoir levels) using a newly enhanced land surface parameterization are presented. The seminar concludes with a preview of findings from a planned flash flood forecast demonstration project to be conducted over the Colorado Front Range region during the spring and summer of 2008.