Land-Atmosphere Interactions in Nature and Models

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The land surface is a slow manifold relative to the atmosphere that provides predictability and prediction skill across a range of time scales, peaking in the "subseasonal" time range between 1-3 weeks. We will present a brief history of past notions of land-atmosphere feedbacks, and how our current understanding has evolved largely from climate model experiments. Land-atmosphere coupling occurring through the energy and water cycles is in fact a chain of processes that is only completed when certain "ingredients" are in place. Validation of weather and climate model behavior is only beginning to happen as the needed observational data sets are becoming available. We show evidence of land surface impacts on prediction skill and highlight current shortcomings that may inform model development and forecast improvement.