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Radiation and available water controls on modeled evapotranspiration across eight Amazonian flux tower sites: Results from the LBA-MIP

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Amazon forests play an important and complex role in the global cycles of water and carbon, and important advances have been made in understanding Amazon processes in recent years. However, reconciling modeled mechanisms with observations across scales remains a challenge. To better address this challenge, we initiated a Model Intercomparison Project for the 'Large-Scale Biosphere Atmosphere Experiment in Amazonia' (LBA-MIP) to integrate modeling and observational studies for improved understanding of Amazon basin water and carbon cycling. Here, we report on the initial results of this project, which used the network of meteorological data from Amazon tower sites (the BrasilFlux network) in forest and converted lands to drive a suite of land surface ecosystem models that simulate energy, water and CO2 fluxes. We focus here on controls on evapotranspiration (ET), and in particular on how well models capture the observed diurnal and seasonal cycles of ET across sites. In assessing mechanisms responsible for differences in model performance, we found that soil moisture storage capacity was an important factor in ability of models to match observed seasonal cycles. Soil moisture storage capacity is not routinely measured at all flux tower sites, but such measurements could improve our ability to empirically discriminate among different model mechanisms used to match observed seasonal patterns.