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Poster.1: . # Morning Soil Moisture Heterogeneity is Strongly Linked to Daytime Convection over Subtropical South America

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Abstract

How does surface heterogeneity, specifically mesoscale gradients in soil moisture (SM), affect convective initiation (CI) over Subtropical South America (SSA)? Recent work has shown that mesoscale circulations induced by soil moisture heterogeneity can lead to convective initiation preferentially over "dry patches" and thus, exert a sub-daily negative feedback. Using satellite data from various infrared and microwave sensors, we track nascent convective clouds and quantify the underlying, antecedent, soil moisture characteristics over different eco-regions of subtropical South America (10S-40S). We find that convection initiates preferentially over strong negative (positive) along-wind gradients of surface temperature (soil moisture) associated with spatially warmer (drier) soil patches, over regions with lower topographic complexity and moderate background wind speed. This work presents the first observed link between mesoscale soil moisture heterogeneity and convection over the South American continent. Further proposed research will investigate the effect of SM heterogeneity on CI over SSA using output from the 20-year convection-permitting Weather Research and Forecasting (WRF) model simulations run by the NCAR South America Affinity Group (SAAG), and subsequently perform multi-day SM homogenization runs under a range of synoptic conditions to test whether heterogeneous SM conditions lead to diurnally earlier onset and increased frequency of daytime convection.