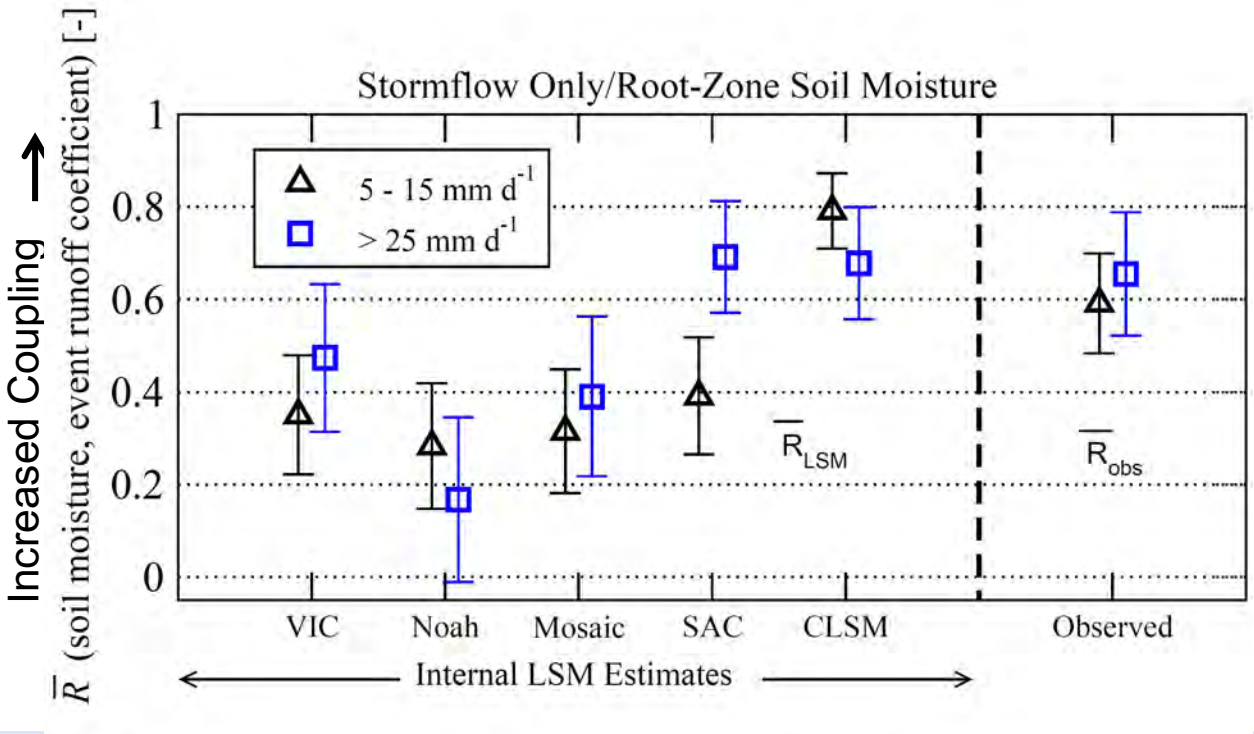
SMAP Finds Bias in Model Representation of Soil Moisture/Runoff Coefficient Coupling

Problem: In order to provide effective flood and low-flow stream flow forecasts, land surface models (LSMs) must accurately represent the coupling between pre-storm soil moisture and the fraction of rainfall converted into stream flow (runoff coefficient).



Finding: SMAP Level 4 soil moisture observations provide a new opportunity to directly observe the coupling between pre-storm soil moisture and land runoff response.

Results demonstrate that LSMs generally underestimate the strength of this coupling.

Impact: Soil moisture represents a major source of predictability for stream flow extremes. SMAP Level 4 data reveals that existing models are neglecting a fraction of this predictability by underestimating the role of soil moisture in determining land surface runoff response. Fixing this bias will improve operational hydrologic forecasting.

Crow, Fan, Reichle, Xia, Liu, May, 2017: Exploiting soil moisture, precipitation and streamflow observations to evaluate soil moisture/runoff coupling in land surface models, *Geophysical Research Letters.*