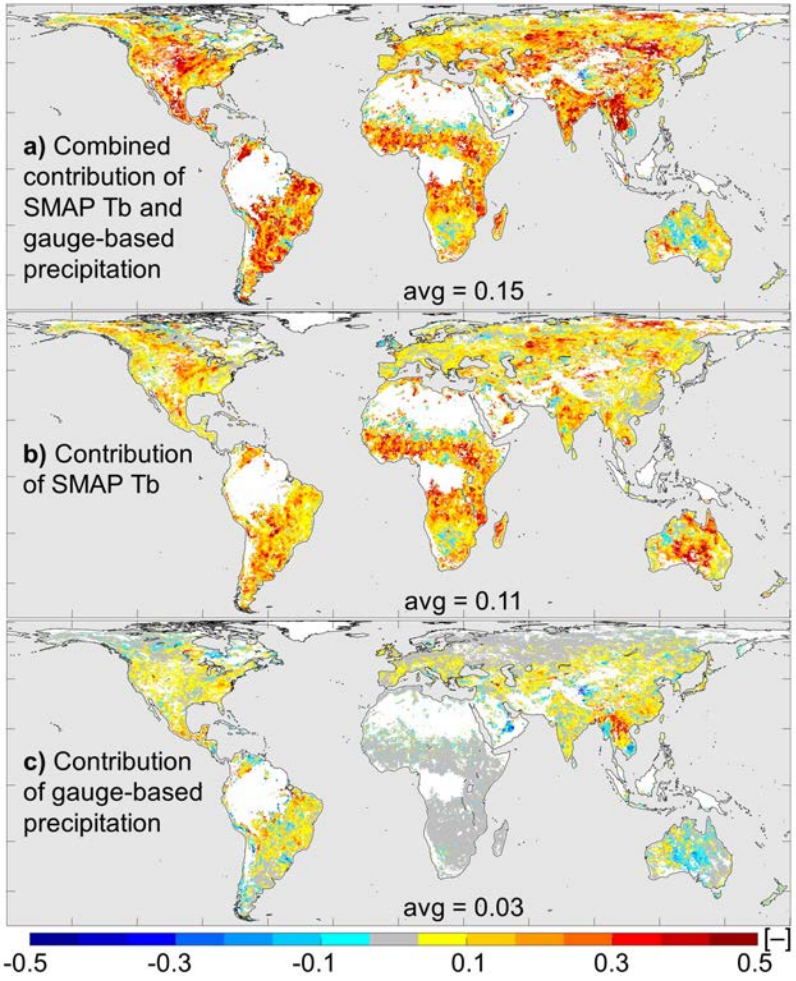
Contribution of Gauge-Based Precipitation and SMAP Measurements to SMAP L4 Soil Moisture Product Skill

Problem: How much do gauge-based precipitation data and SMAP brightness temperature (Tb) observations contribute to L4_SM skill?

Finding: SMAP's contribution to L4_SM skill is greater in otherwise in poorly instrumented regions, incl. portions of South America, Africa, & central Australia. Both data sources contribute about equally to L4_SM root-zone soil moisture skill; L4_SM runoff skill largely stems from gauge-based precipitation data (not shown).

Impact: Results demonstrate the importance of SMAP Tb for global soil moisture estimation and will guide future algorithm improvements.



Surface soil moisture skill difference between L4_SM and simulations (a) without SMAP Tb and gauge-based precipitation, (b) without SMAP Tb, and (c) without gauge-based precipitation. Skill is anomaly time series correlation, estimated using independent ASCAT retrievals as Instrumental Variable.

Reichle, et al., 2020: The Contributions of Gauge-Based Precipitation and SMAP Brightness Temperature Observations to the Skill of the SMAP Level-4 Soil Moisture Product, *Journal of Hydrometeorology*.