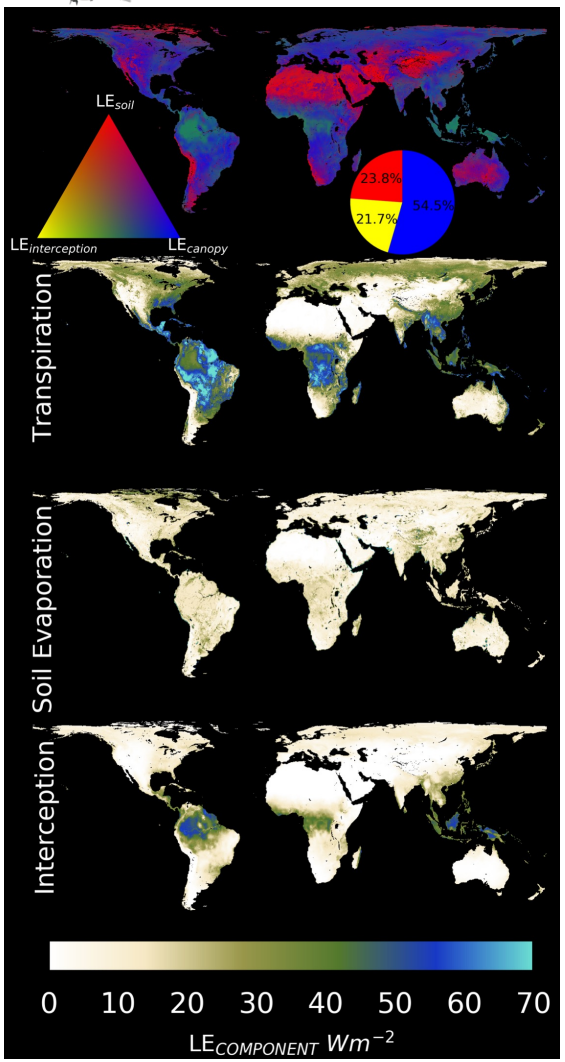
SMAP Soil Moisture Improves Determination of Global Evapotranspiration



ET components as a percentage of total ET. Red indicates more soil evaporation, blue indicates more canopy transpiration, yellow indicates more interception evaporation.

Problem: Accurate estimation of global evapotranspiration (ET) is essential to understand water cycle and land-atmosphere feedbacks in the Earth system. Satellite-driven ET models provide global estimates, but many of the ET algorithms have been designed independently of soil moisture observations.

Finding: First, we assessed the new ET data at multiple validation sites around the world. The largest improvements to ET with SMAP occurred in dry regions. Next, we quantified the dominant components of ET globally and in doing so advanced understanding of key processes that links the water and energy cycles.

Impact: Recent evidence suggests that the hydrological cycle is accelerating, with ET playing a central role. As the land surface dries, quantifying where and to what degree reductions in water availability are related to ET and soil moisture becomes increasingly important. Because of the new and critical information from SMAP in ET, we can better identify thresholds and quantify ecosystem impacts related to changes in water distribution.

Purdy, Fisher, Goulden, Colliander, Halverson, Tu, Famiglietti, 2018: SMAP soil moisture improves global evapotranspiration. *Remote Sensing of Environment.*