



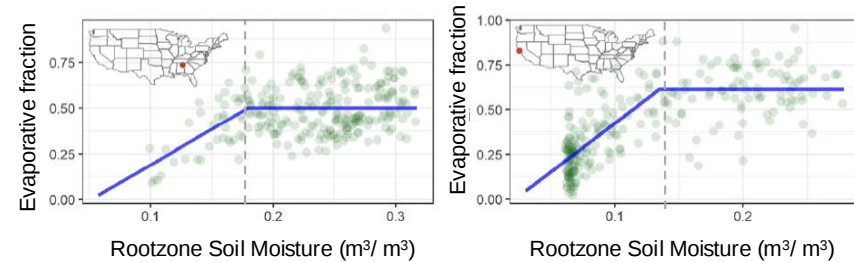
Rootzone Soil Moisture Dynamics Using Terrestrial Water-Energy Coupling



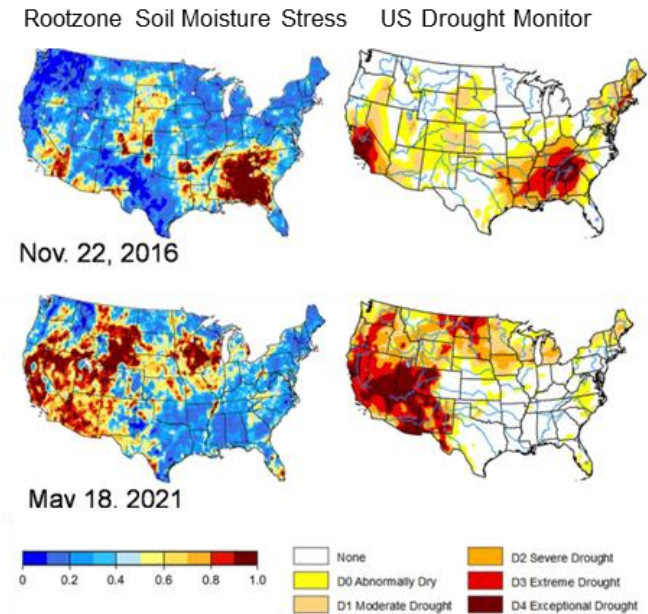
Problem: Rootzone soil moisture is a critical variable in maintaining crop productivity. While in-situ observations of rootzone soil moisture remain sparse, L-band soil moisture sensors such as SMAP have a shallow penetration depth of ~5 cm. Spatial-temporal contiguous estimates of rootzone soil moisture moisture stress are needed to estimate agricultural drought severity and direct mitigation efforts in near-real-time.

Finding: Terrestrial energy flux partitioning responds synchronously to rootzone soil water availability. A recursive low-pass filter can simulate rootzone soil water dynamics when used in conjunction with surface soil moisture- evaporative fraction coupling framework.

Impact: A framework is developed for estimating rootzone soil moisture stress at a continental scale using surface soil moisture and evaporative fraction. This will enhance near-real-time agriculture drought monitoring for CONUS.



Rootzone soil moisture relationship with evaporative fraction at two contrasting locations



A comparison of estimated rootzone soil moisture stress with US drought monitor outlook