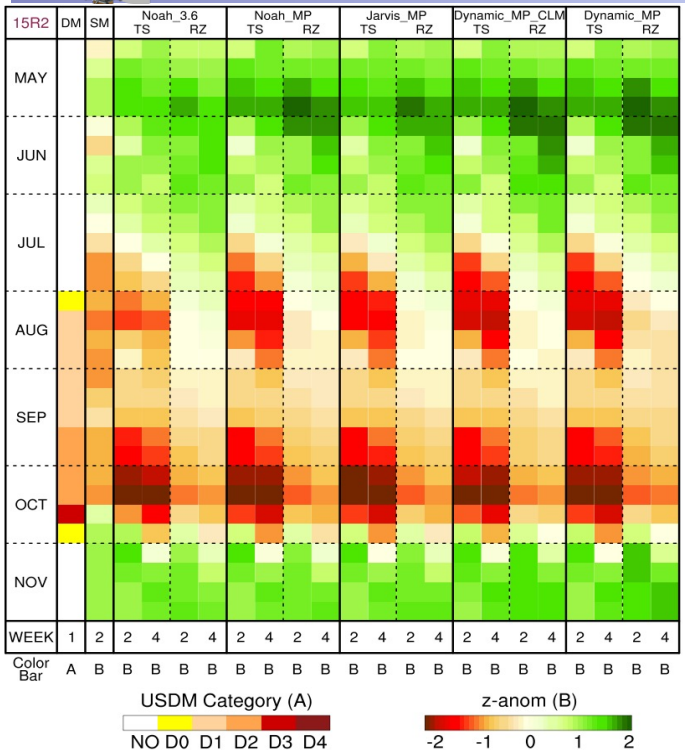
Detection of Flash Recovery-Flash Drought in 2015 over the South-Central U.S.



Drought evolution across the south-central U.S. in 2015. The USDM analysis is shown in column 1 followed by anomalies of SMAP in column 2. Anomalies (based on 1979-2017) of top soil (TS) and root zone (RZ) soil moisture from the Noah 3.6, Noah-MP, Jarvis-MP, Dynamic-MP-CLM, and Dynamic MP simulations are shown in subsequent columns.

Problem: The 2015 growing season across the south-central U.S. was characterized by an unusual sequence of events where parts of the region saw a drought end with a pluvial in the spring, followed by a period of rapid drought intensification (*flash drought)* during late summer that was terminated by heavy rainfall at the end of October, which eliminated drought conditions over a two-week period (*flash recovery*)

Finding: Using NLDAS forcing for five different land surface model simulations in the Land Information Systems (LIS) framework and 36-km L3 Soil Moisture Active Passive (SMAP) data, we determined that SMAP anomalies correctly characterized the rapid changes in the region and the LIS simulations provided an overall accurate characterization, while also providing enough variability in output to determine more optimal configurations for future analysis of flash drought and flash recovery.

Impact: The accurate characterization of the sequence of flash drought to flash recovery increases confidence that SMAP can be used to assess rapid changes in soil moisture conditions in data-sparse regions.

Otkin, Zhong, Hunt, Basara, Svoboda, Anderson, Hain, 2019: Assessing the evolution of soil moisture and vegetation conditions during a flash drought-flash recovery sequence over the south-central Unites States. *Journal of Hydrometeorology.*