

SMAP & OCO-2 Synergy in Assessing Regional Impact of the Southwestern US Drought on Ecosystem Productivity

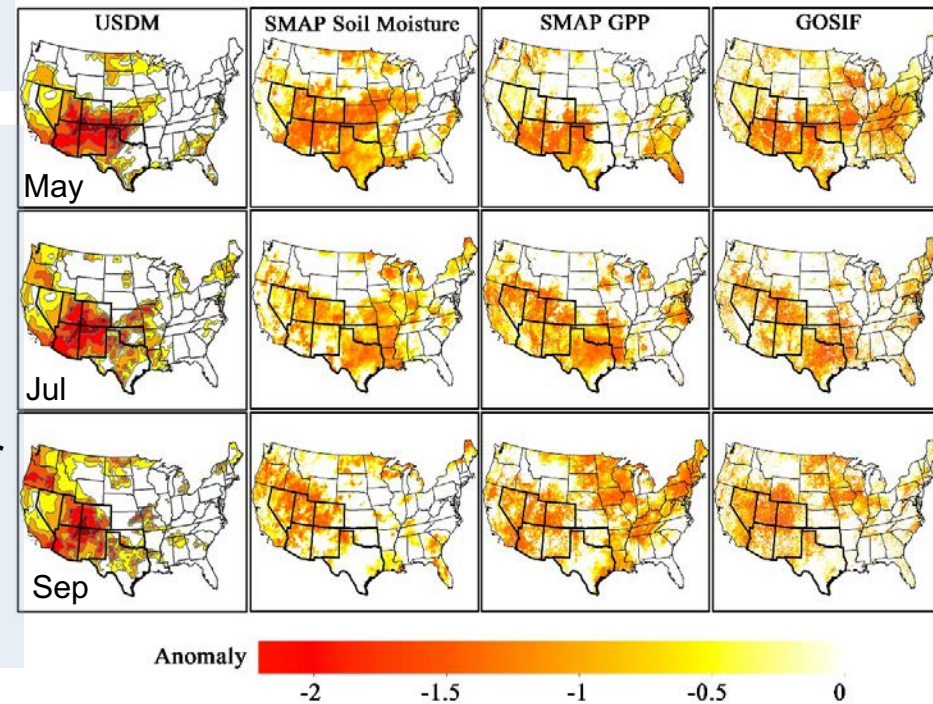


Problem: The US southwest experienced severe drought in 2018 (May-Sep); regional drought impact on ecosystem productivity was unknown, until now.

Finding: Consistency in OCO-2 & SMAP productivity & SM anomalies with USDM, tower C-fluxes, & reported crop yields. **More than 80% of 7 southwest states were impacted by drought;** resulting in anomalous productivity declines from water availability restrictions in dryland ecosystems & croplands ($r=0.65-0.87$; $p<0.001$).

Impact: Combined use of SMAP & OCO-2 reveals how drought impacts plant productivity. ($p<0.001$).

Monthly evolution & extent of 2018 drought



Progression of the drought based on USDM drought intensity; monthly anomalies for SMAP SM & GPP, & OCO-2 GOSIF. The drought began in Apr, peaked in summer & was alleviated by Oct, significantly impacting 7 southwestern states (in black).