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New Spring Climate Indicator (SCI) Metrics from Satellite Optical & Microwave ESDR Fusion

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Kim, Y.; Kimball, John S.; Didan, Kamel; and Henebry, Geoffrey M., "New Spring Climate Indicator (SCI) Metrics from Satellite Optical & Microwave ESDR Fusion" (2014). *Numerical Terradynamic Simulation Group Publications*. 370.

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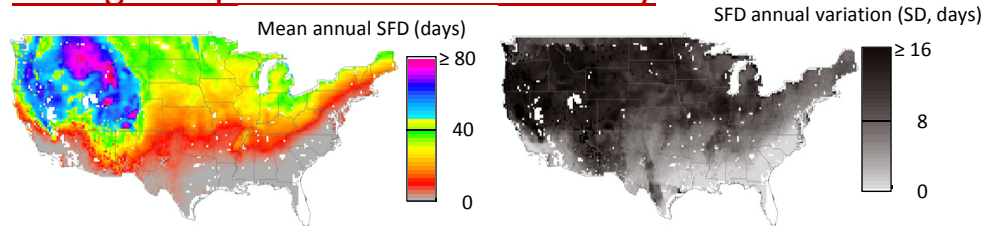
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New Spring Climate Indicator (SCI) Metrics from Satellite Optical & Microwave ESDR Fusion

Y. Kim, J.S. Kimball, K. Didan, G. Henebry, 2014. *Agric. For. Meteorol.* 194

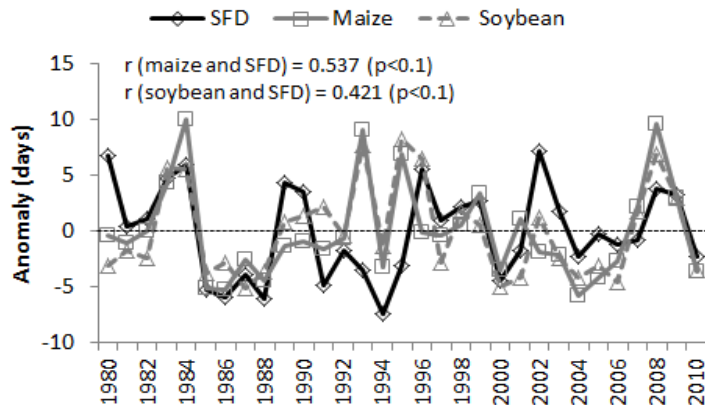
Strong SCI spatial & annual variability



Spring Frost Day (SFD) metric defines the number of frozen days in spring. **Spring Frost Damage Day (SFDD)** metric is the sum of frozen days during active canopy development. The SCI metrics are developed by synergistic fusion of NASA MEaSUREs microwave (¹FT-ESDR) & optical-IR (²vegetation phenology) ESDRs spanning a 30+ year record.

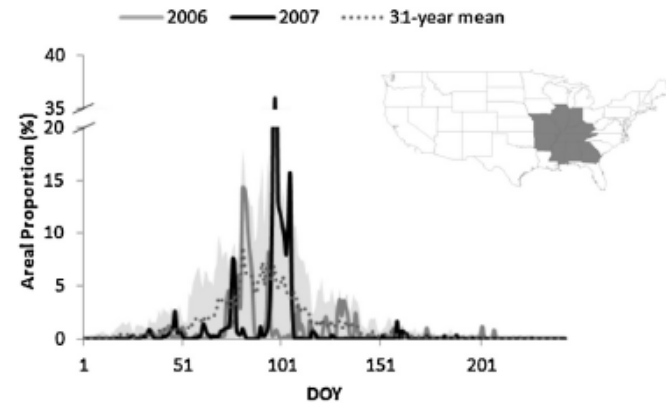
SCI sensitive to Agriculture timing & productivity

Mean SFD vs Maize & Soybean spring planting dates



SCI detects anomalous spring frost impacts

2007 spring SFDD frost anomaly spanning 9 states



Findings:

- The SFD defines frozen temperature controls to spring canopy onset & crop planting dates
- The SFDD is a stronger indicator of frost related damage to vegetation productivity
- An unusual spring frost event in April 2007 was captured by the SFDD metric & caused a large vegetation growth decline across 9 southern states;
- The new SFD & SFDD metrics provide an effective tool for regional frost risk assessment & monitoring.

Funding: NASA MEaSUREs program

¹FT-ESDR: <http://nsidc.org/data/nsidc-0477.html>

²VIP-ESDR: http://phenology.arizona.edu/viplab_data_explorer.php