Changing Cropland in Changing Climates: Quantifying Two Decades of Global Cropland Changes

Science Questions
- How has cropland area changed over the past twenty years in regions with significant climate trends?
- What climate factors are most strongly associated with changes in cropland area?

Analysis
- Calculated linear trend in crop area and climate metrics
- Identified patterns using correlation and linear trend estimations (2001-2018)

Results
- Climate trends explained little overall variability in cropland area changes, but increasing mean temperature, extreme heat, PET, and drought were associated with higher levels of cropland loss
- Patterns generally reflected underlying climate suitability (increasing temperature was associated with cropland loss in hot regions and gains in cool regions)
- Strongest patterns occurred at extremes (regions with high cropland change; regions with borderline climate suitability)

Significance
- Agricultural adaptation to climate change affects not only food security but larger land use changes, with implications for the environment, ecosystem health, and carbon storage
- Understanding large-scale response patterns can provide context for local land use changes, and provide cross-regional comparability

Acknowledgements: Research supported by NASA-CMS (80NSSC21K1059), NOAA-EPP (NA16SEC4810006), and NSF-INFEWS (EAR1639327, 1828910).