

Weekly Report

SCSB/CISESS
Cooperative Research Program Division (CoRP)
STAR/NESDIS
National Oceanic and Atmospheric Administration (NOAA)

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Publications

Extreme Phenological Events: CISESS Consortium Scientist Xiaoyang Zhang (Geospatial Sciences Center of Excellence (GSCE), South Dakota State University), published an article last month in Nature's *Scientific Reports*. The article is about *extreme phenological events*. While there is a lot of research on how climate change is affecting animal and plant life cycles over the long-term, this research shows that the increase in annual temperature variability may be a more serious threat to ecosystems. They looked at satellite measurements of the Enhanced Vegetation Index (EVI2) over CONUS for a 25-year-period to measure the point at which vegetation started to turn green in the spring, what they "green-up onset." In 1996, a nationwide extreme phenological event occurred when cooler spring temperatures delayed the green-up onset by up to 30 days. In 2012, there was another nationwide extreme phenological event when warmer spring temperatures moved up the green-up onset by 20 days. A pixel-by-pixel review showed that 62% of the continental U.S. experienced an increase in annual variability of green-up onset over this period.

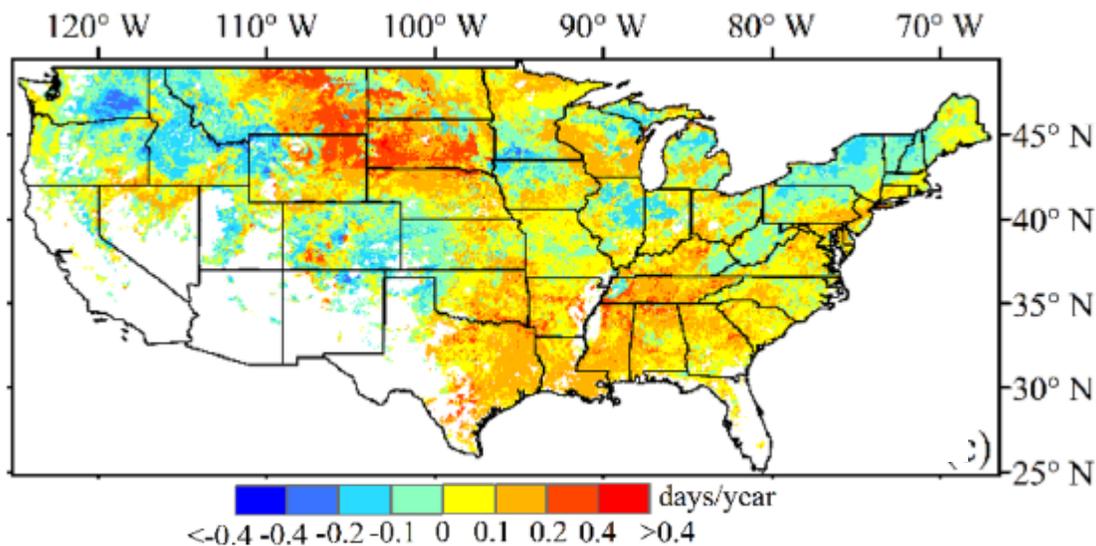


Figure: This map shows regions that had statistically significant increases in the interannual variability of green-up onset from 1982 to 2016. The white color represents water or pixels where green-up onset was not continuously detected or was without significant trends during 1982–2016.

Liu, Lingling, and Zhang, Xiaoyang, 2020: Effects of temperature variability and extremes on spring phenology across the contiguous United States from 1982 to 2016. *Sci Rep* **10**, 17952, <https://doi.org/10.1038/s41598-020-74804-4>.

(POC: Xiaoyang Zhang, xiaoyang.zhang@sdstate.edu, Funding: NWS)

Online publication of SST improvements: A paper describing improvements in the operational NOAA daily SST analysis was published online in *J. Climate*. The article describes significant improvement in the NOAA analysis and shows that the quality of the analysis is comparable to other analyses for the overlap period. The NOAA analysis begins in late 1981, giving it a much longer record length than most of the other analyses. The figure summarizes the data quality relative to buoy SST for the improved analysis (DOISST) and for a number of other products. The others SST analyses are: NASA MUR25; Group High Resolution SST (GHRSSST) Multi-Product Ensemble (GMPE); Bureau of Meteorology (BoM) Global Australian Multi-Sensor SST Analysis v1 (GAMSSA); UK Met Office Operational Sea Surface Temperature and Sea Ice Analysis (OSTIA); NOAA Geo-Polar Blended v1 (GPB); European Space Agency (ESA) Climate Change Initiative (CCI); Canada Meteorological Center (CMC). This paper documents improvements in the current operational analysis and shows that past errors that had occurred in the analysis have been greatly reduced. Further improvements should be obtainable from the STAR-NCEI SST team project, now in progress.

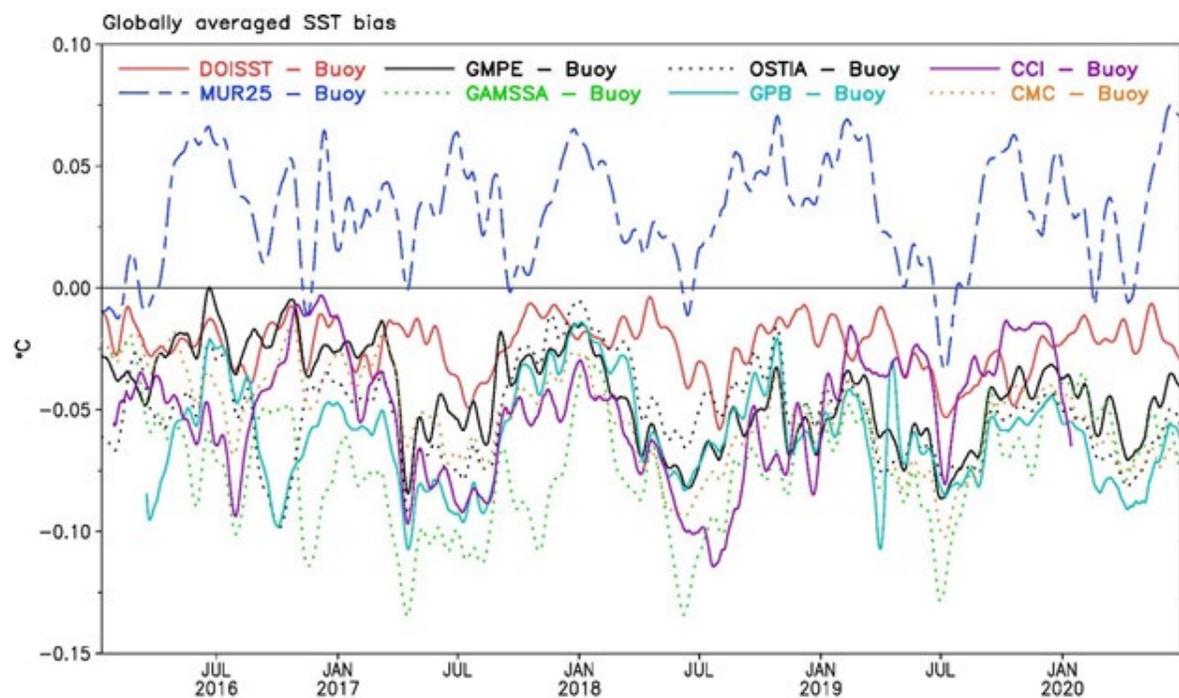


Figure: Collocated and globally averaged SST biases of DOISST (solid red), MUR25 (dashed blue), GMPE (solid black), GAMSSA (dotted green), OSTIA (dotted black), GPB (solid light green), CCI (solid purple), and CMC (dotted orange) against buoy observations. A 15-day filter is applied to all curves.

Huang, B., C. Liu, E. Freeman, G. Graham, T. Smith, and H.-M. Zhang, 2020: Improvements of the Daily Optimum Interpolation Sea Surface Temperature (DOISST) Version 2.1. *J. Clim.*, accepted for publication, <https://doi.org/10.1175/JCLI-D-20-0166.1>.

(POC: Thomas Smith, tom.smith@noaa.gov, Funding: PDRA)

Training and Education

AGU Early Career Scientists (ESC) Hydrology Panel: On December 1, R. Ferraro participated in a panel discussion organized by L. Milani (ESSIC) and D. Ciero (Univ. of Connecticut) as part of the AGU ESC Hydrology Panel. The discussion was part of the ongoing (virtual) AGU Fall Meeting.

The ESC provides emerging young scientists within the AGU community an opportunity to engage with the broader hydrology community to pursue professional opportunities upon graduation. The five panelists featured two U.S. Federal Scientists, one U.S. senior faculty member, and two international research scientists. All of us described our career paths, what it is liked to work at our institution, opportunities for the students upon graduation, and also our views on what it takes to become a successful scientist. Overall, it was quite a gratifying experience.

(POC: Ralph Ferraro, Ralph.R.Ferraro@noaa.gov, Funding: PDRA)

