CICS Science Conference
November 29, 30 & December 1, 2016
College Park, MD, USA

Abstract: **A Global Blended Drought Index (BDI) from Merging Satellite Observations and Land Surface Model Simulations**

Jifu Yin[1, 2*], Xiwu Zhan[2], Christopher R. Hain[1, 2], Jicheng Liu[1, 2], and Martha C. Anderson[3]

[1] ESSIC/CICS, University of Maryland College Park, College Park 20740, MD, USA.
[2] NOAA NESDIS Center for Satellite Applications and Research, College Park 20740, MD, USA.
[3] USDA-ARS, Hydrology and Remote Sensing Laboratory, Beltsville 20704, MD, USA.

Agricultural drought occurs when soil moisture (SM) deficits reach levels where crop water demands cannot be met. With satellite SM retrievals becoming widely and continuously available in the recent decade, it is desirable to use the remote sensing SM data to develop tools to improve agricultural drought monitoring. In this study, a blended drought index (BDI) is introduced by merging various satellite SM retrievals, including SM data derived from thermal infrared observations of land surface temperature observations, L/C/X- band microwave SM products, and land surface model simulations based on error statistics assessed using the Triple Collocation Error Model (TCEM). Using the TIR and LSM based SM datasets, the TCEM can estimate the root mean square errors of all other individual or merged microwave satellite SM retrievals. Based on these uncertainty estimates, the BDI is thus capable of merging the optimal SM retrievals with the lowest root mean square errors. The SM-based BDI demonstrated reasonable agreement with the U.S. Drought Monitor, the Palmer Drought Severity Index, and the standardized precipitation evapotranspiration index in terms of time evolution and spatial patterns of agricultural drought occurrences. Because it is adaptable to new observations as they become available, BDI has the opportunity to be a robust operational product and also has the advantage of providing timely and high spatial resolution drought monitoring at both regional and global scales.