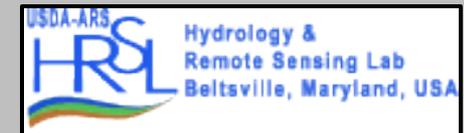


# Evapotranspiration and Drought Monitoring Using GOES-R Products for NIDIS

Co-PI: Christopher Hain (UMD/ESSIC)  
Co-PI: Xiwu Zhan (NESDIS/STAR)  
Co-Is: Martha Anderson (USDA)  
John Mecikalski (UAH)  
Collaborators: Mark Svoboda (NDMC)  
Brian Wardlow (NDMC)  
Yunyue Yu (NESDIS/STAR)  
Istvan Laszlo (NESDIS/STAR)  
Felix Kogan (NESDIS/STAR)



# Evapotranspiration and Drought Monitoring Using GOES-R Products for NIDIS

**Purpose:** Use a thermal infrared-based surface energy balance modeling system (ALEXI) to demonstrate the utility of GOES-R products for routine mapping of evapotranspiration and drought (ALEXI Evaporative Stress Index [ESI]).

## **Strengths of ALEXI in ET and Drought Monitoring**

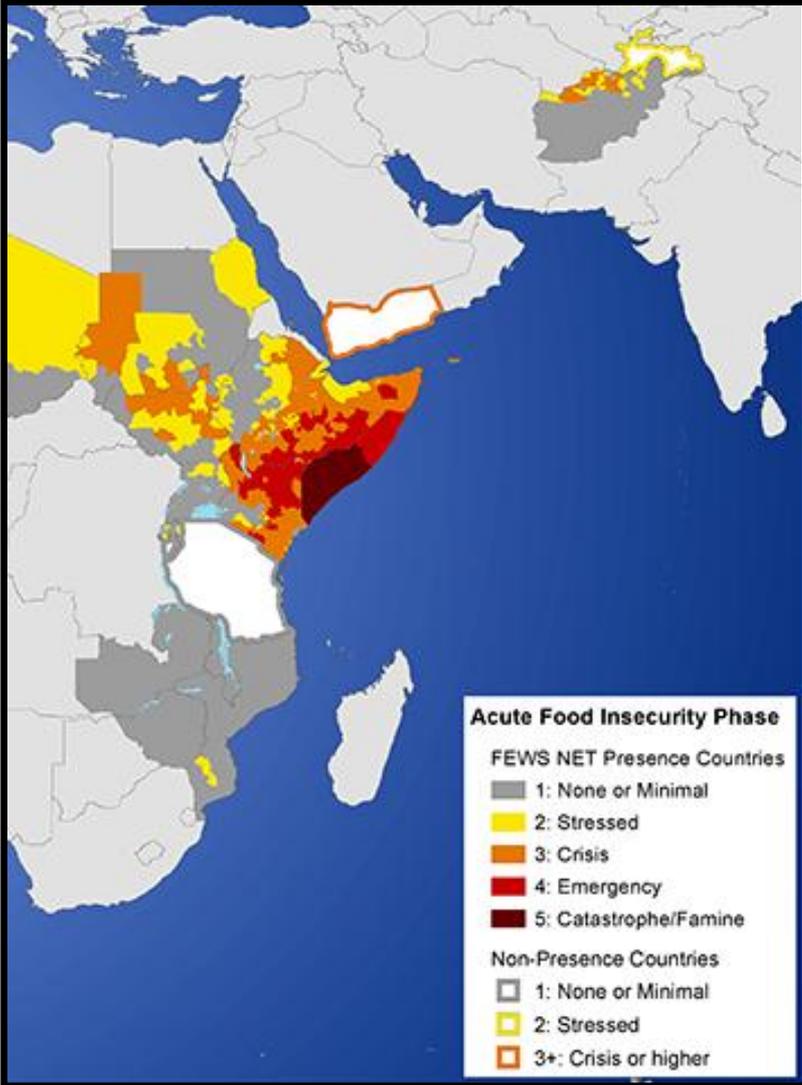
Diagnostic LSMs based on TIR remote sensing like ALEXI, **require no information regarding antecedent precipitation or soil moisture storage capacity** – *the current surface moisture status is deduced directly from the remotely sensed radiometric temperature signal.*

Vegetation-based indices (such as NDVI and VHI) are relatively slow response variables to moisture deficits, showing decline only after damage has been done, while **ALEXI is able to determine potential vegetation stress** and provide early warning preceding detectable degradation in vegetation indices.

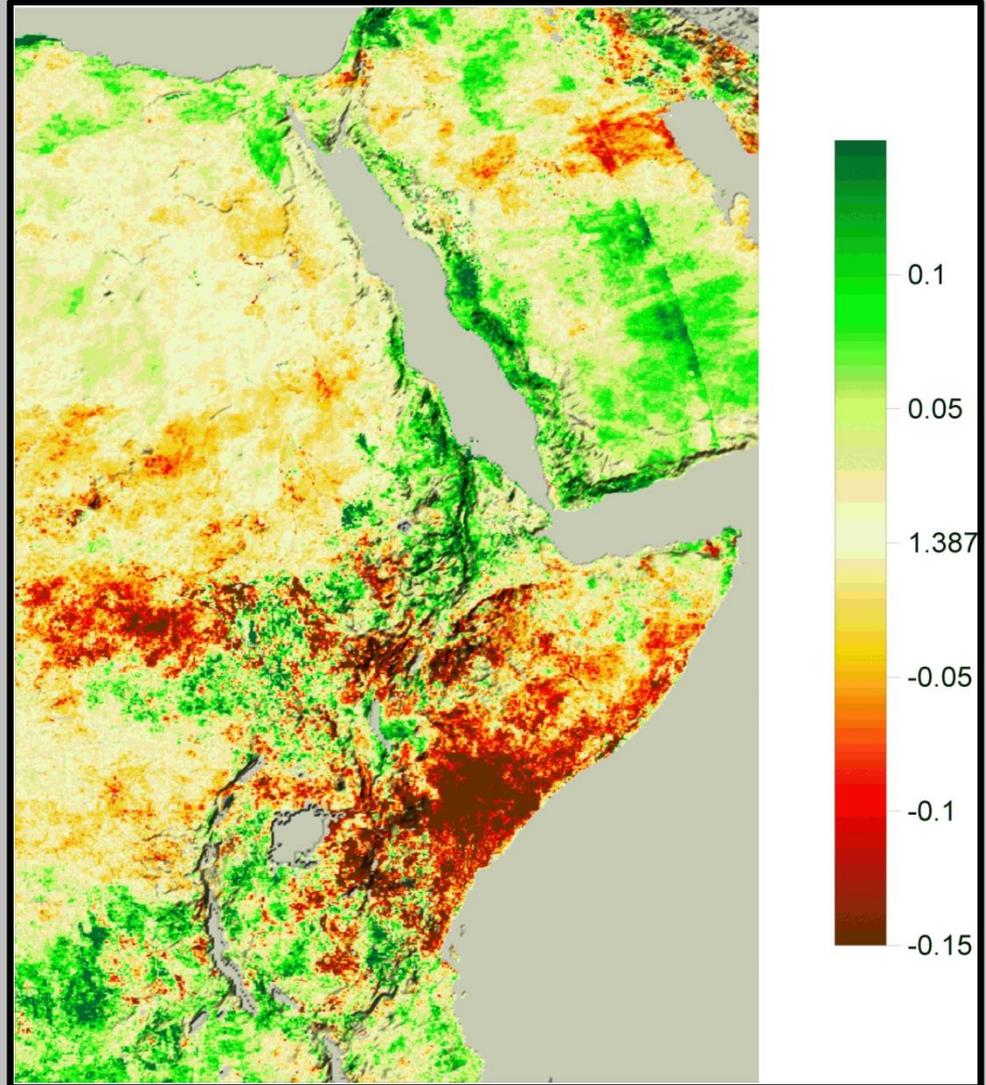
## **Project Objectives:**

- 1) Implement ALEXI at 3-km resolution over Europe and/or Africa using LSA SAF SEVIRI products, building a climatological database from 2007 to present.
- 2) Evaluate ALEXI surface flux estimates in comparison with ground-base observations.
- 3) Generate 3-km ALEXI Evaporative Stress Index maps over the 2007 to present period.
- 4) Evaluate ESI in comparison with standard drought indices and historical drought records.
- 5) Prepare ALEXI system to ingest GOES-R product as they become available.

# Initial Implementation over Africa (Horn of Africa Drought 2011)



FEWS-NET Food Insecurity Phase



ALEXI ESI Anomalies  
[Red shading denotes ET deficits]