2014 NASA missions of potential interest to USDA
(GPM, OCO-2, and SMAP)
(Also past and ongoing missions)

Bill Teng, NASA GES DISC (ADNET)
Barry Weiss (NASA JPL)

The Rain to Climate Connection: Exploring Earth's Water Cycle with the Global Precipitation Measurement (GPM) Mission

Dalia Kirschbaum

GPM Applications Scientist and Education and Outreach Coordinator

Dorian Janney

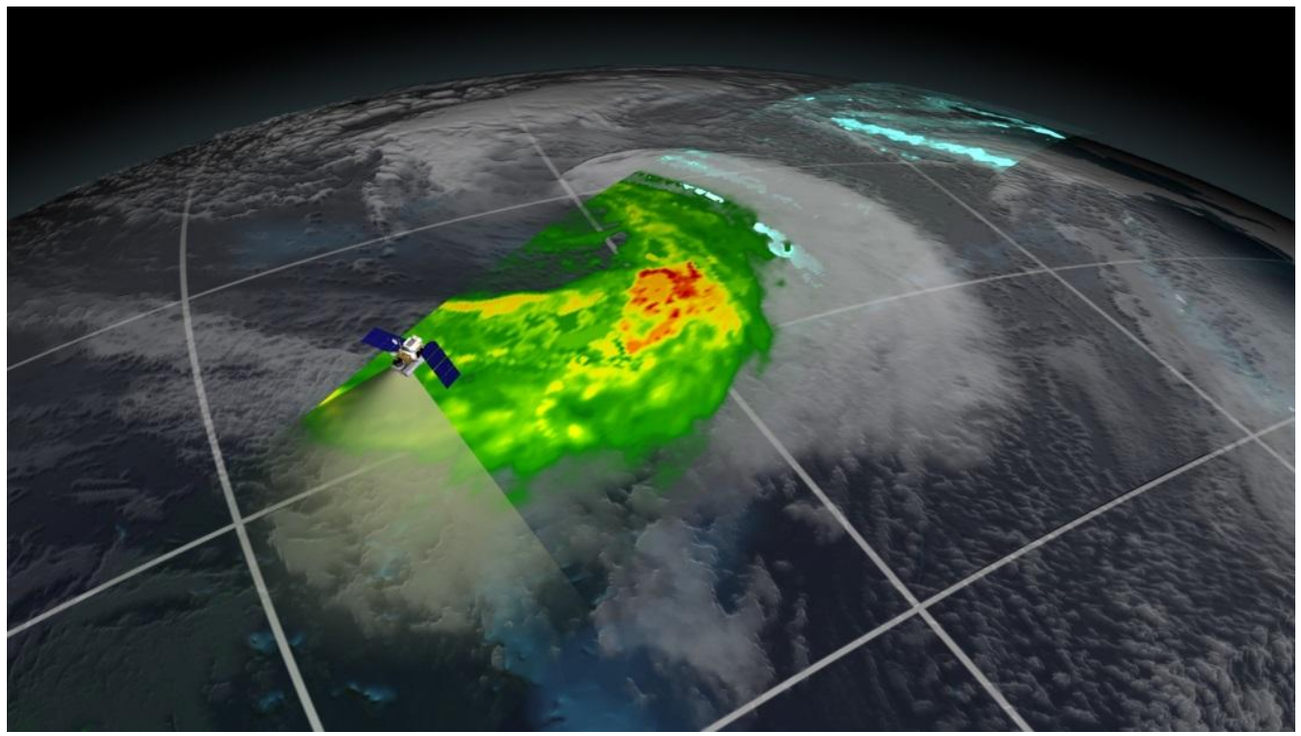
GPM Education Specialist

NASA Goddard Space Flight Center

February 27th, 2013

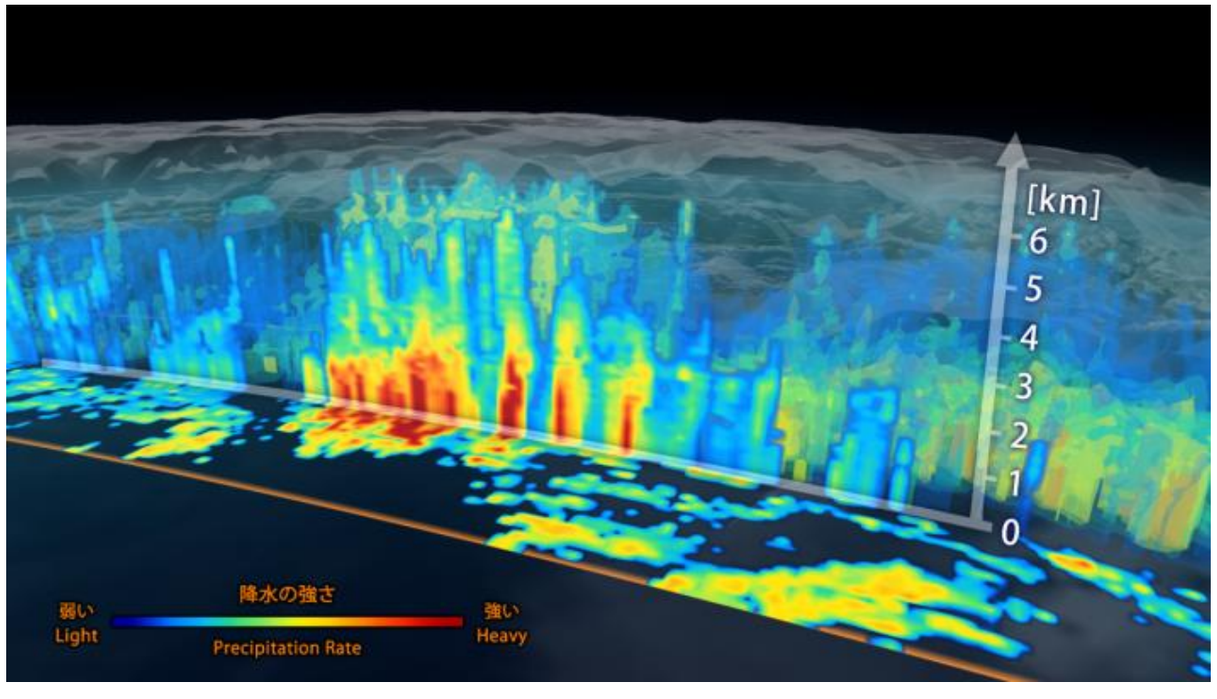
- Feb. 27, 2014 - GPM Launched
- **June 16** – GMI Level 1 Brightness Temperature data released.
- **July 14** – GMI Level 2 Precipitation Rate data will be released.
- **Early Sep.** – DPR Level 2 precipitation rate data will be released via PPS (NASA) and JAXA.
- **Mid-Sep.** - DPR-GMI Level 2 combined product will be released.
- **Dec.** – NASA's Level 3 Integrated Multi-Satellite Retrievals for GPM (IMERG) will be released with all available data. IMERG gridded product will have a resolution of 0.1 deg. and updated every 30 min. from 60^0N-60^0S.

Precipitation falling inside a March 10 cyclone over the northwest Pacific Ocean, approximately 1,000 miles east of Japan.

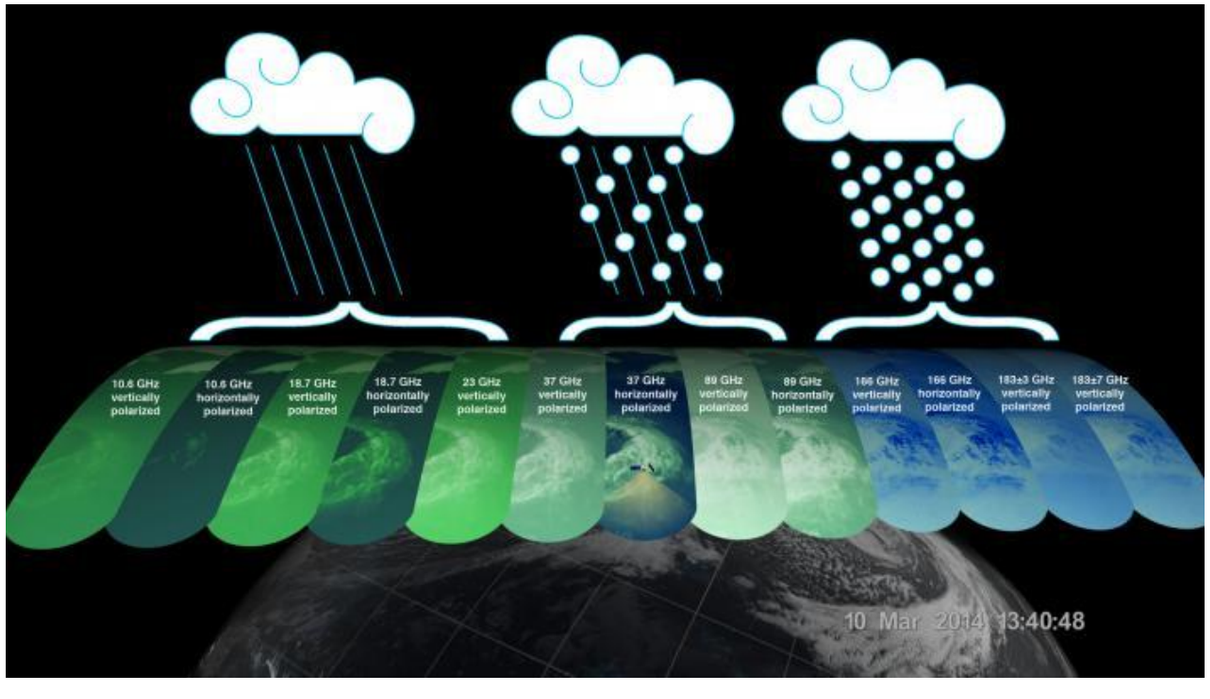


***Above*:** Image from GMI showing rain rates across a 885 kilometer swath of an extra-tropical cyclone observed on March 10, 2014.

Below: 3D view of precipitation rate inside the extra-tropical cyclone as viewed by the DPR.



Bottom Right: The GMI instrument has 13 channels, each sensitive to different types of precipitation.



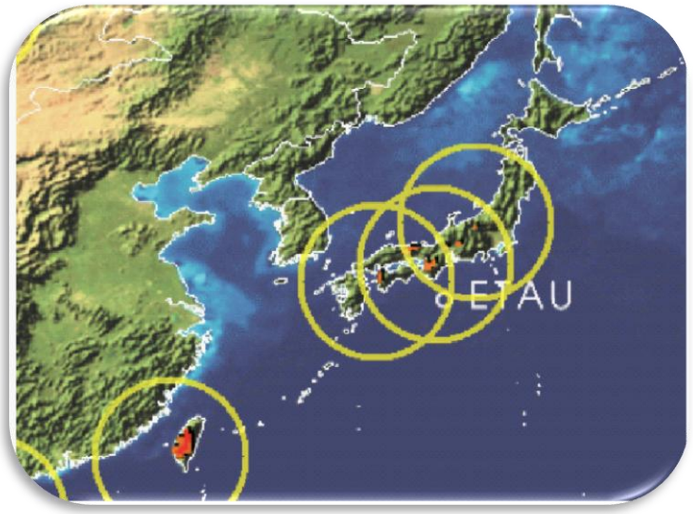
GPM Data Products

Product Level	Description	Coverage
Level 1B GMI, GMI-2 Level 1C GMI, GMI-2 *Latency ~ 1 hour*	Geolocated Brightness Temperature and intercalibrated brightness temperature	Swath, instrument field of view (IFOV)
Level 1B DPR	Geolocated, calibrated radar powers	Swath, IFOV (produced at JAXA)
Level 1C, partner radiometers	Intercalibrated brightness temperatures	Swath, IFOV
Level 2 GMI, GMI2 *Latency ~1 hour*	Radar enhanced (RE) precipitation retrievals	Swath, IFOV
Level 2 partner radiometers	RE precipitation retrievals from 1C	Swath, IFOV
Level 2 DPR *Latency ~3 hours*	Reflectivities, Sigma Zero, Characterization, DSD, Precipitation with vertical structure	Swath, IFOV (Ku, Ka, combined Ku/Ka)
Level 2 combined GMI/DPR *Latency ~3 hours*	Precipitation	Swath, IFOV (initially at DPR Ku swath and then at GMI swath)
Level 3 Latent Heating (GMI, DPR, Combined)	Latent Heating and associated related parameters	0.5 x 0.5 daily and monthly grid
Level 3 Instrument Accumulations	GMI, partner radiometers, combined and DPR	0.1 x 0.1 daily and monthly grid
Level 3 Merged Product	Merger of GMI, partner radiometer, and IR	0.1 x 0.1 hourly grid
Level 4 Products	Model assimilated data	Fine temporal and spatial scale TBD

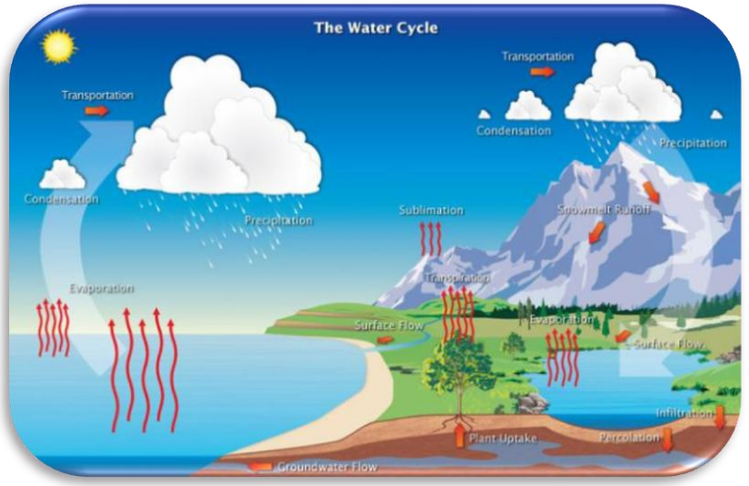
Applications Overview

Flooding

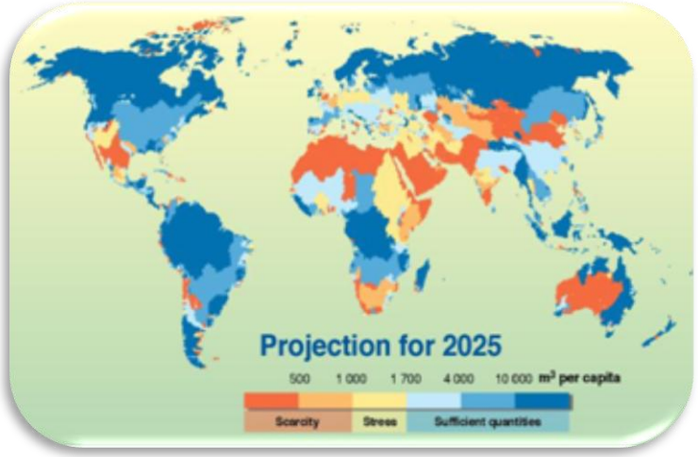
Landslides



Land surface and climate modeling

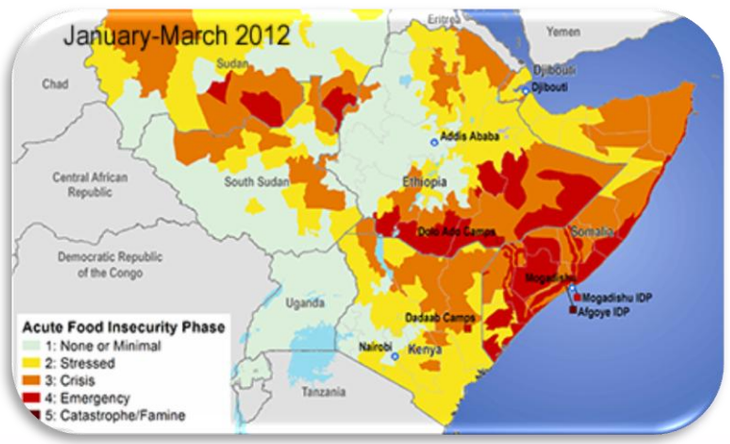


Freshwater Availability



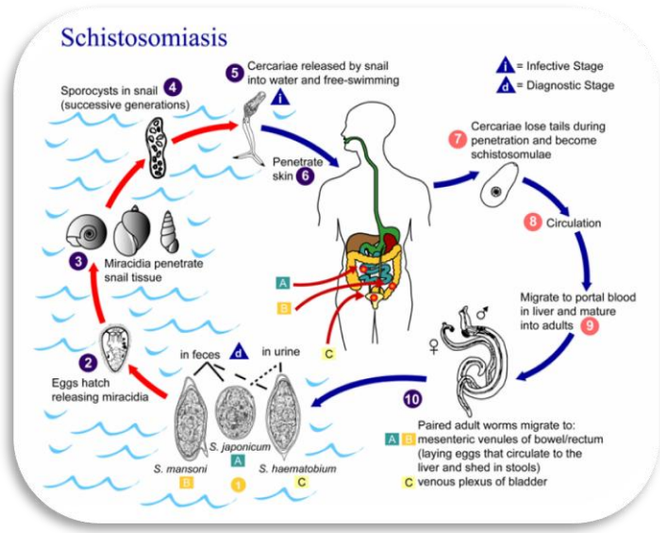
Extreme Events

Agriculture/Famine Early Warning



The rain and snow data gathered from the TRMM and GPM missions already provide and will extend our capabilities to study a wide range of applications for scientific research and societal benefit.

World Health

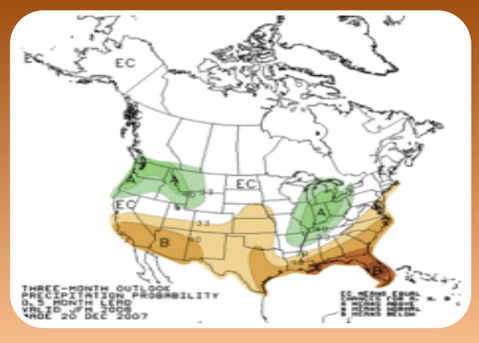


Societal Benefit Areas

Extreme Events and Disasters

- Landslides
- Tropical cyclones
- Floods
- Re-insurance

Water Resources and Agriculture



Weather, Climate & Land Surface Modeling

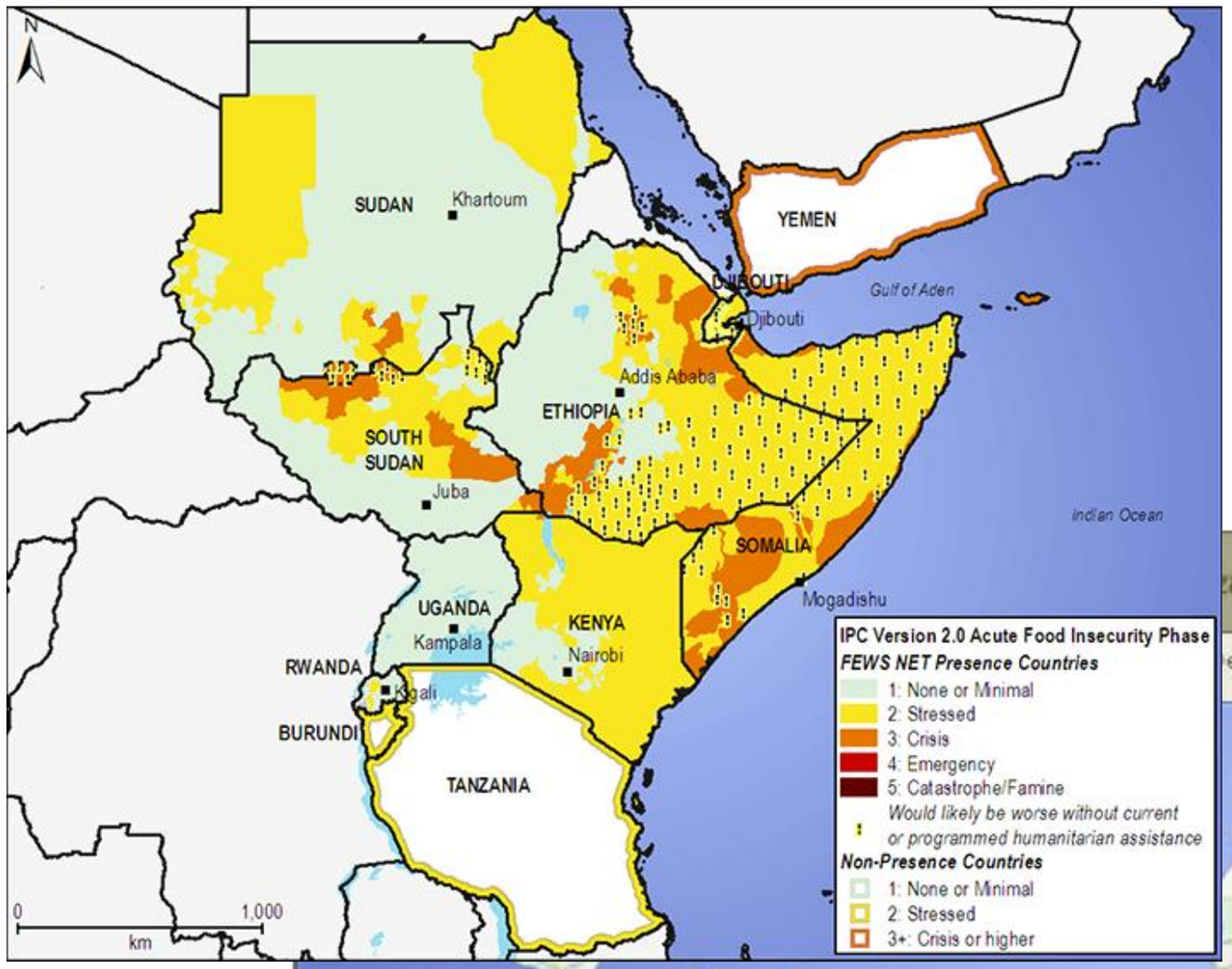
- Numerical Weather Prediction
  Global Climate Modeling
- Land System Modeling
-

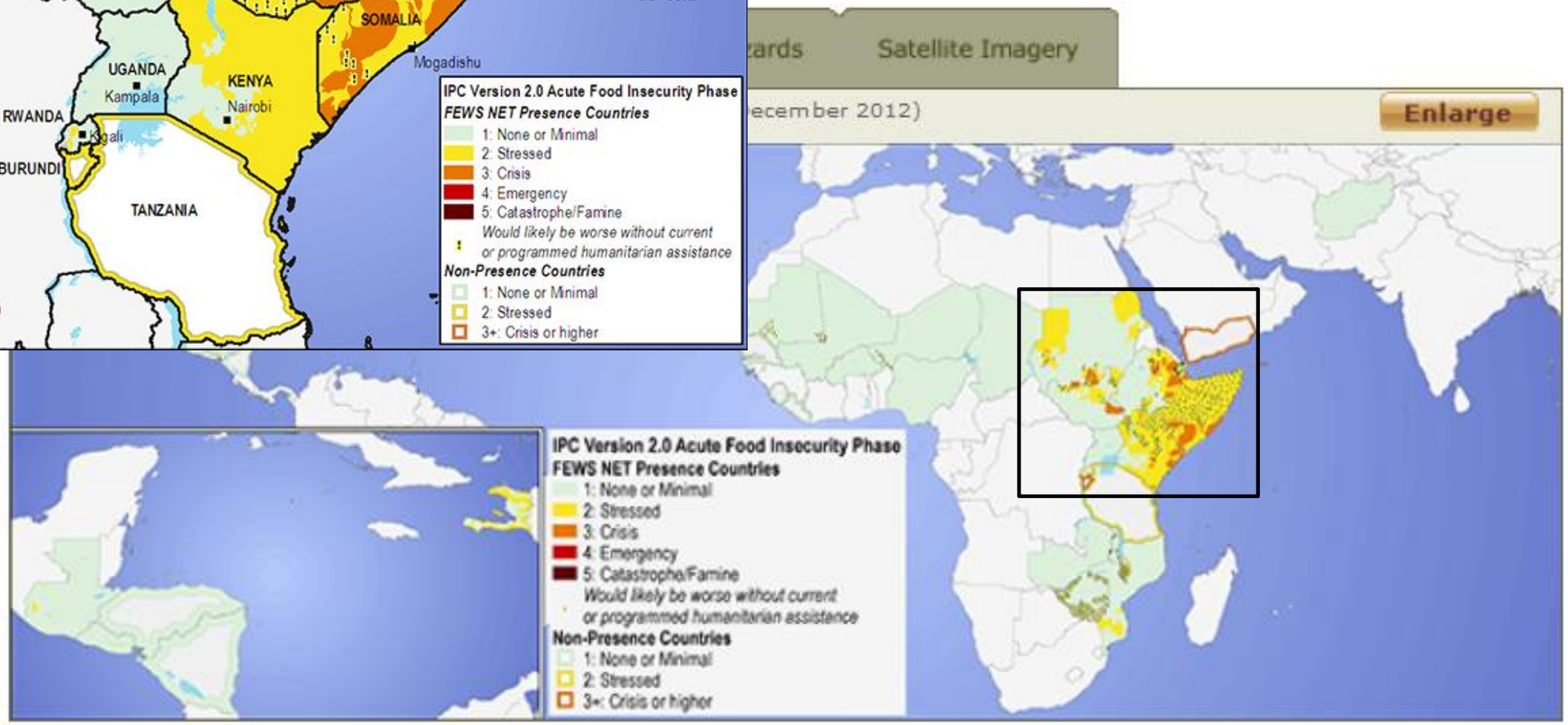
Public Health and Ecology

- Disease tracking
- Food Security
- Animal migration

Agricultural Forecasting

Accurate satellite precipitation estimates are critical to crop forecasts. Famine Early Warning System (FEWS) relies on TRMM and other satellite estimates for anticipating poor growing seasons.



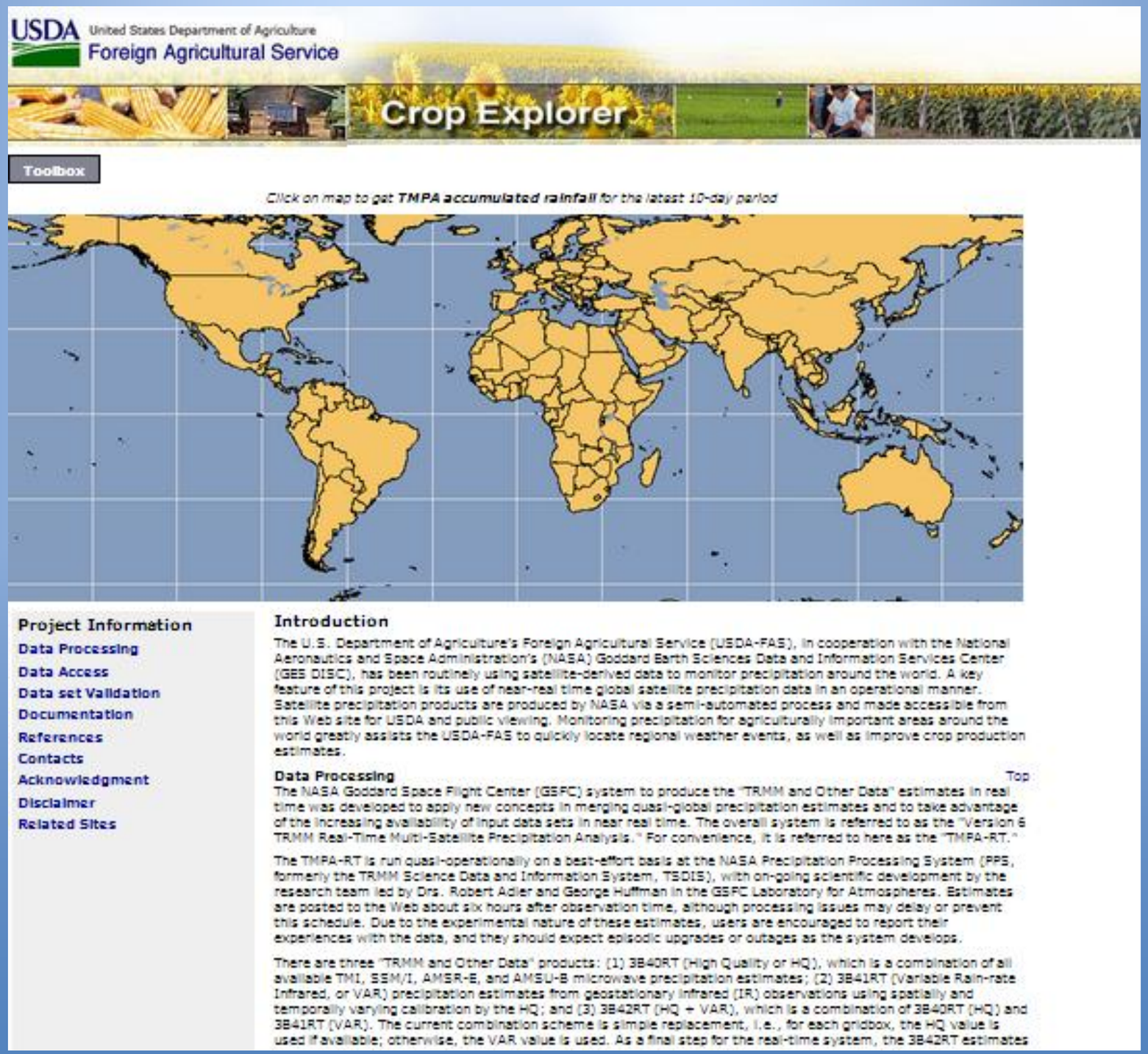


http://www.fews.net

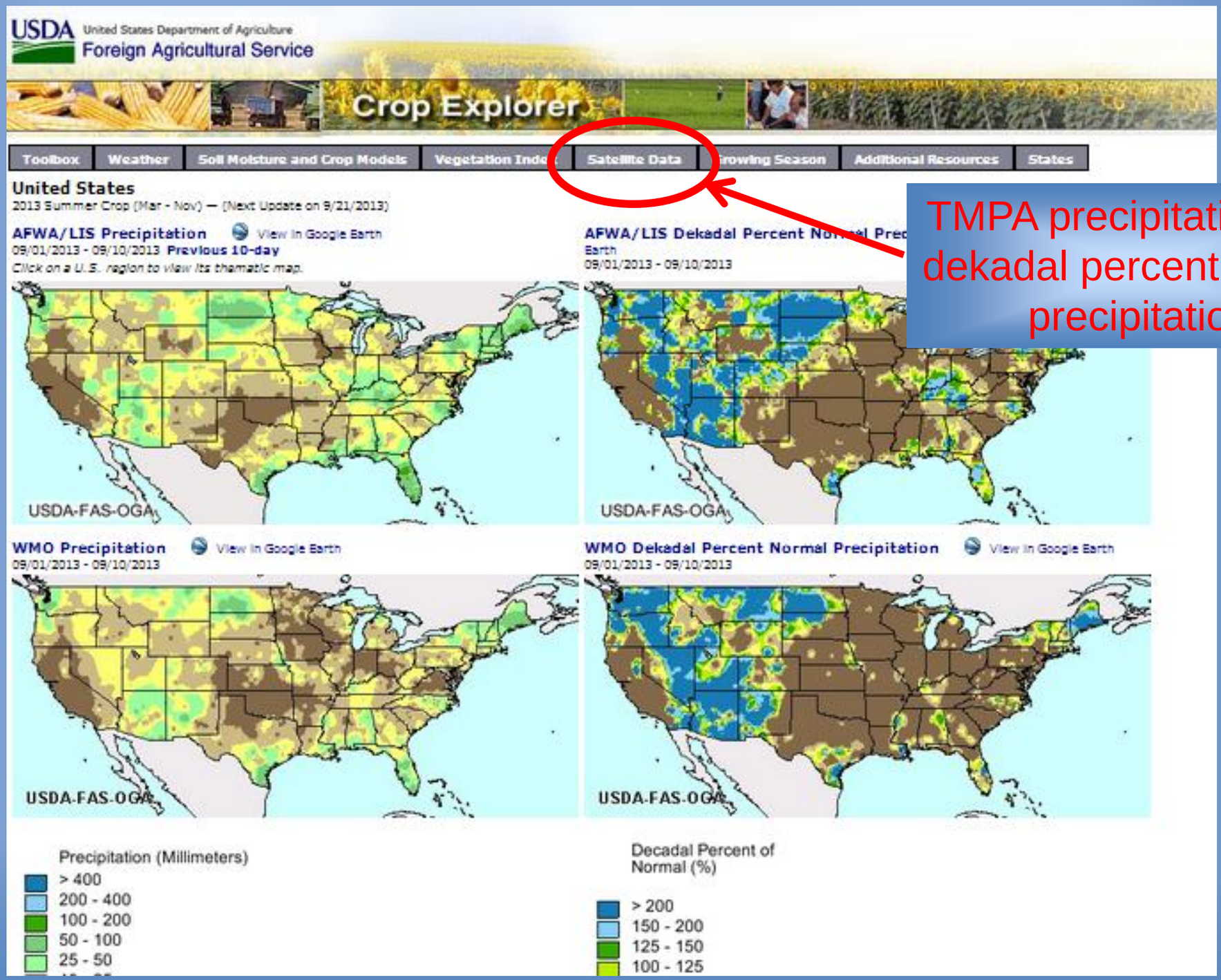
Examples of Collaborative Projects between ESIP Members and USDA

- Foreign Agricultural Service (FAS)
- World Agricultural Outlook Board (WAOB)

USDA FAS Crop Explorer & NASA TMPA (Precipitation)



USDA FAS Crop Explorer & NASA TMPA (Precipitation)



TMPA precipitation and dekadal percent normal precipitation

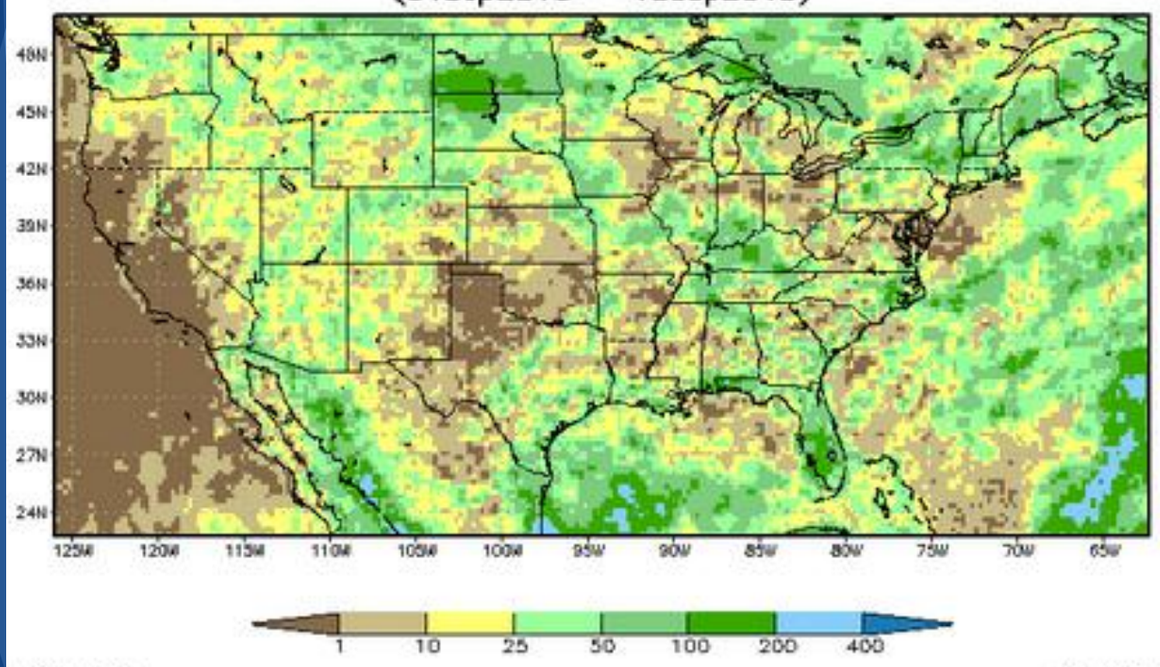
USDA FAS Crop Explorer & NASA TMPA (Precipitation)

USDA United States Department of Agriculture
Foreign Agricultural Service

Crop Explorer

Home | Return to Previous Page (Note: This is a Beta version)

TMPA-RT Precipitation [mm]
(01sep2013 - 10sep2013)

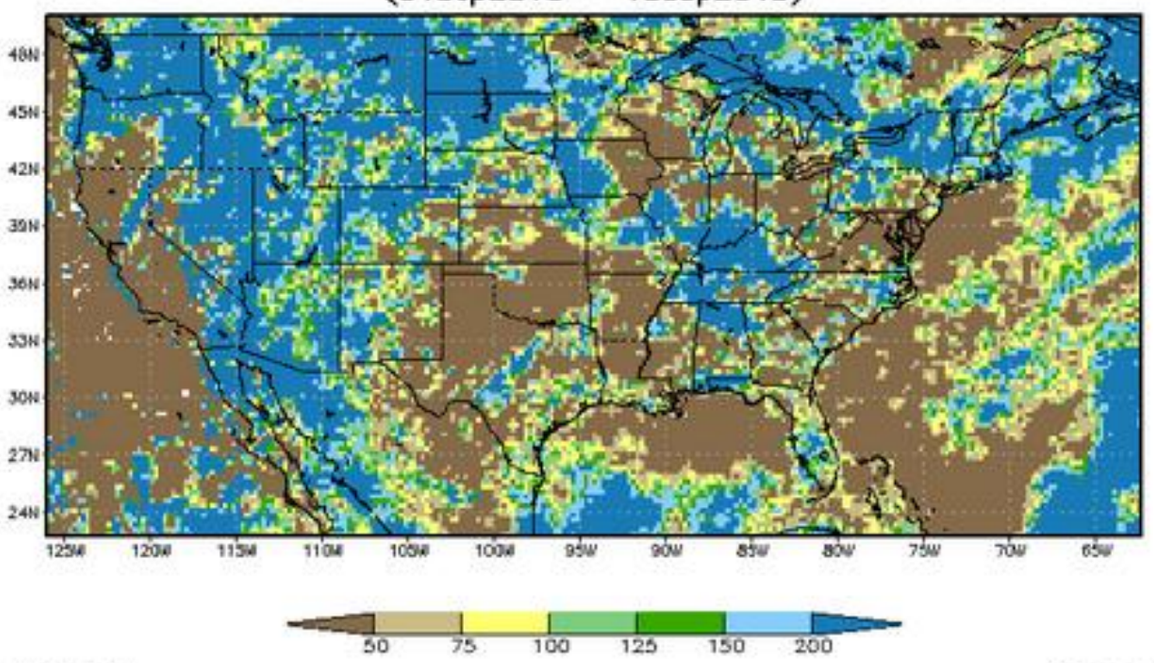


GrADS: COLA/IGES

2013-09-11-19:26 GrADS: COLA/IGES

Generated by NASA's Giovanni (giovanni.gsfc.nasa.gov)

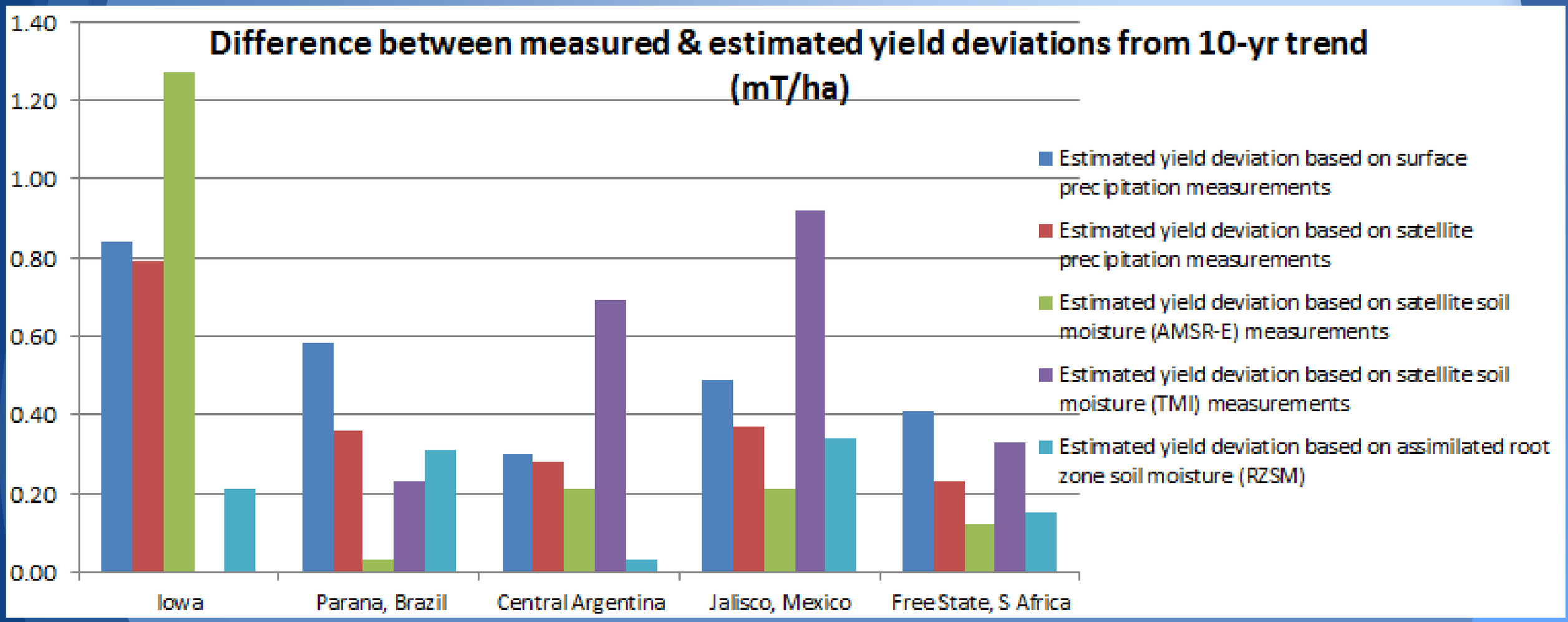
TMPA-RT Decadal Percent Normal Precipitation [%]
(01sep2013 - 10sep2013)



2013-09-11-19:26

Generated by NASA's Giovanni (giovanni.gsfc.nasa.gov)

USDA WAOB & NASA Satellite Data



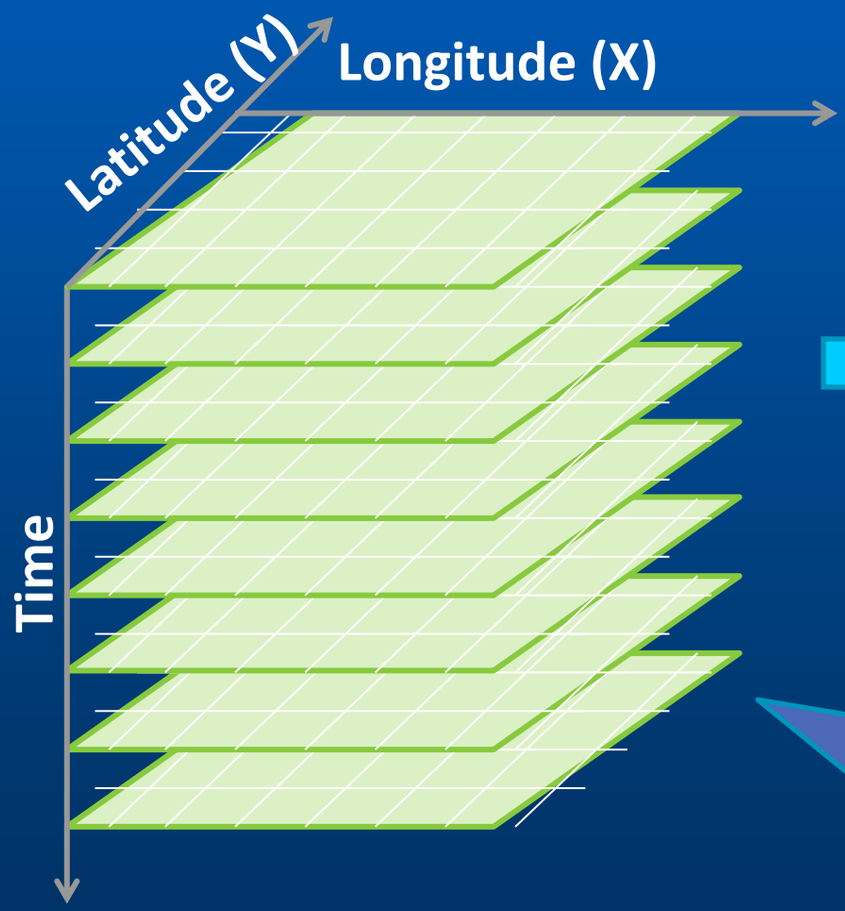
CUAHSI HIS

(Consortium of Universities for the Advancement of Hydrologic Science, Inc. Hydrologic information System)

ESIP Summer Meeting 2014

ACCESS Project Solution for Bridging the Digital Divide

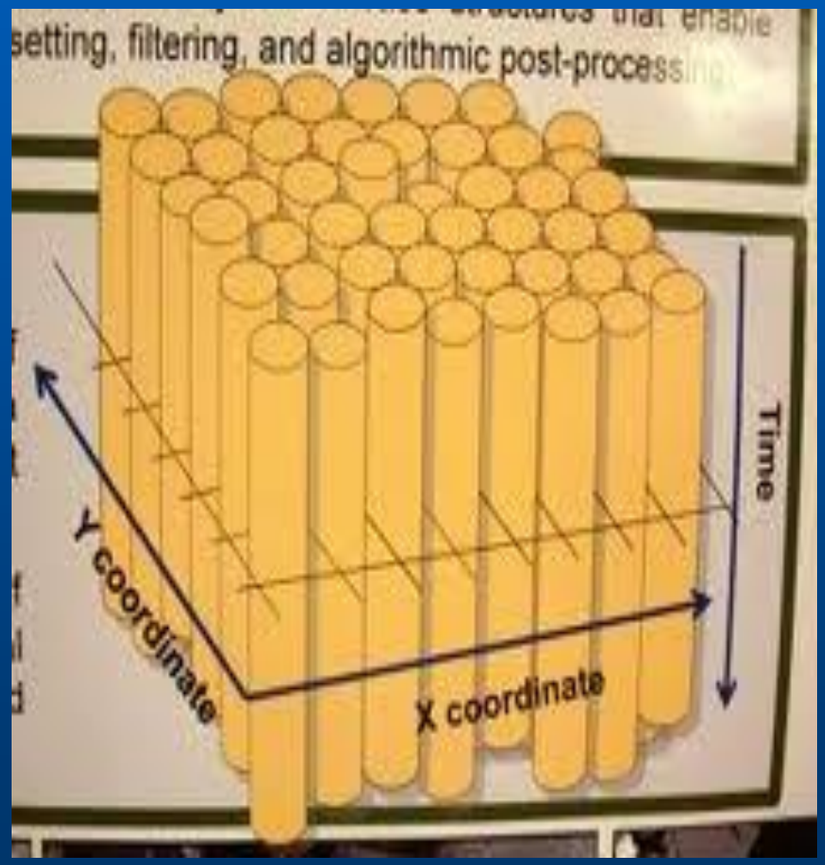
Original Data Archive

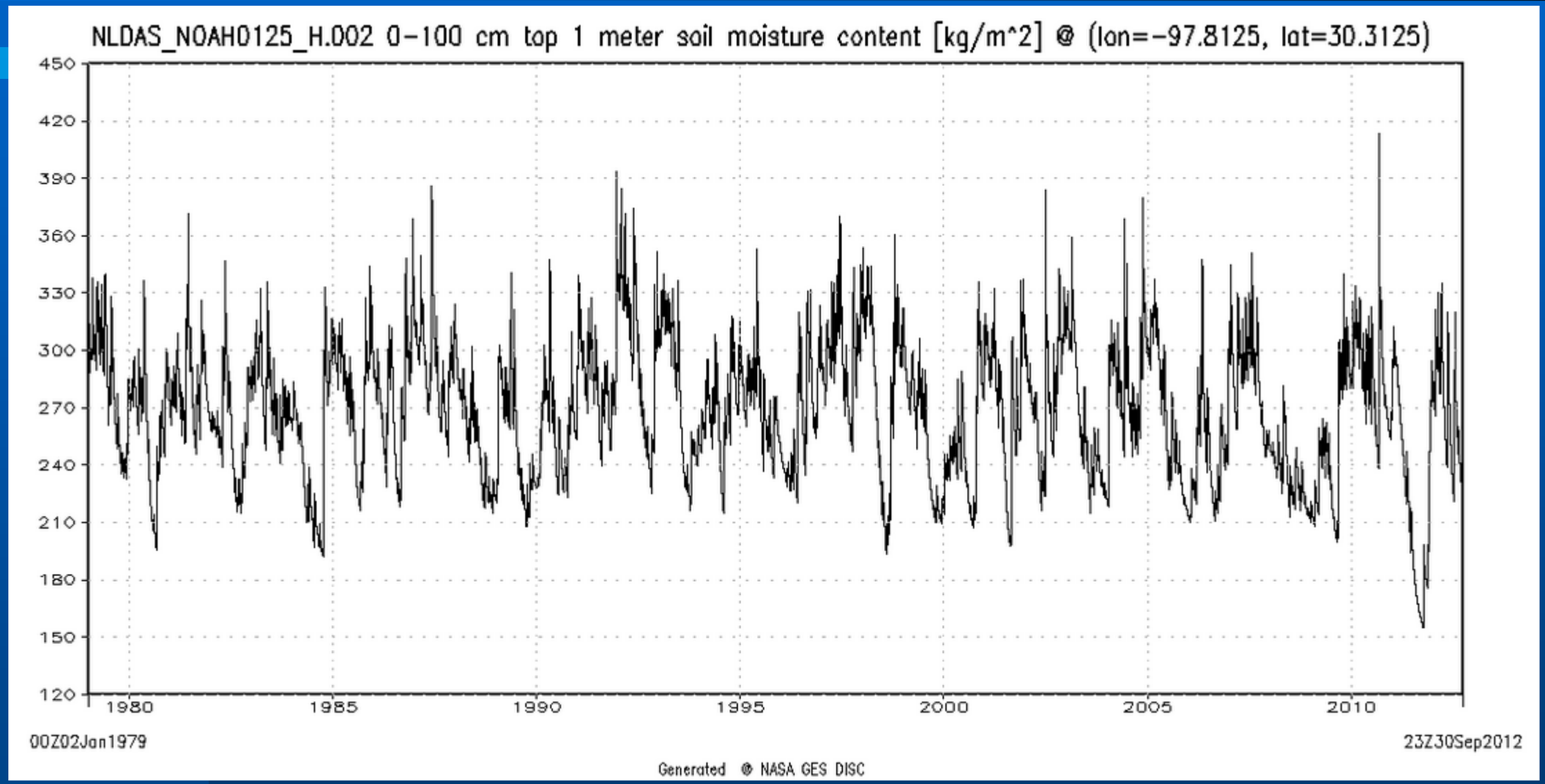


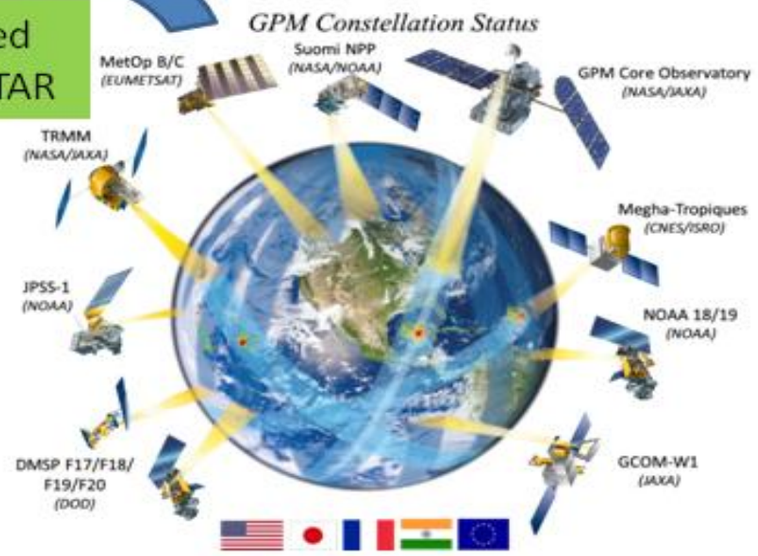
One variable
one grid point
all time steps
per file

All variables
all grid points
one time step
per file

Reorganized Data Archive





ESIP Summer Meeting 2014

Customized data for LTAR