

Remote Sensing of Extreme Events

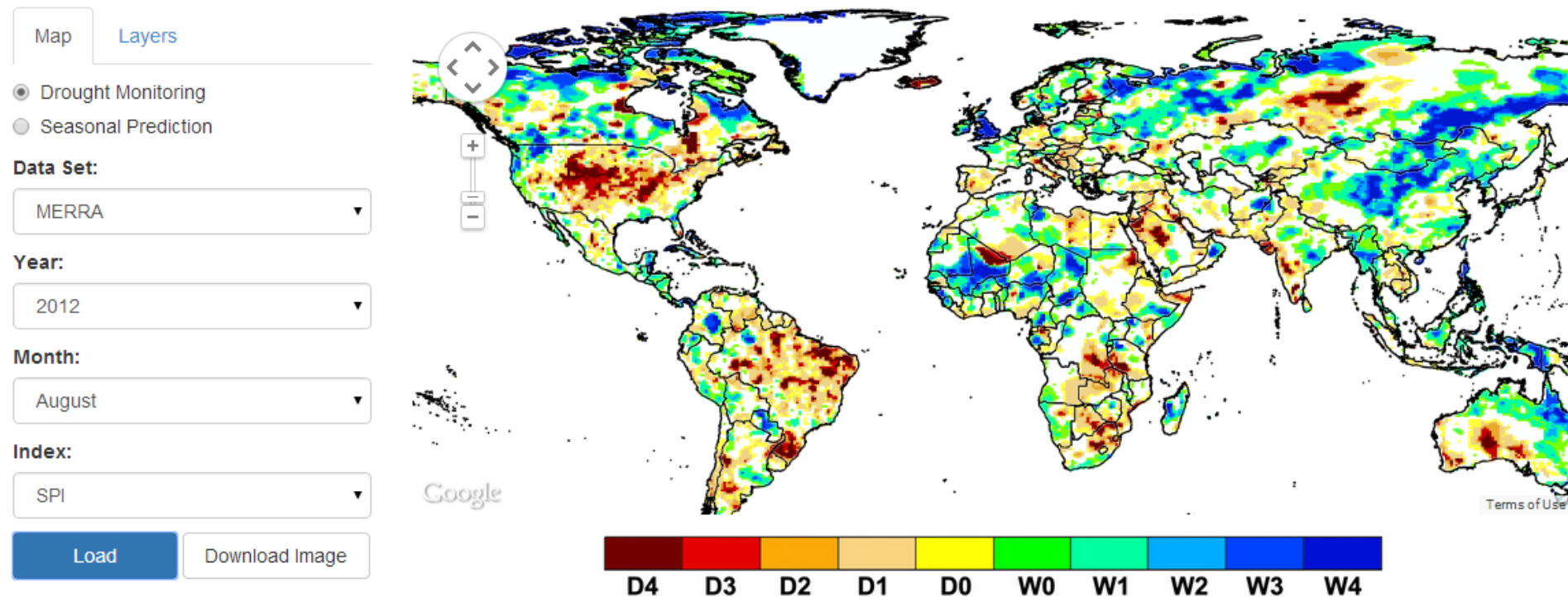
Amir AghaKouchak,
University of California, Irvine





<http://drought.eng.uci.edu/>

Global Integrated Drought Monitoring and Prediction System (GIDMaPS)



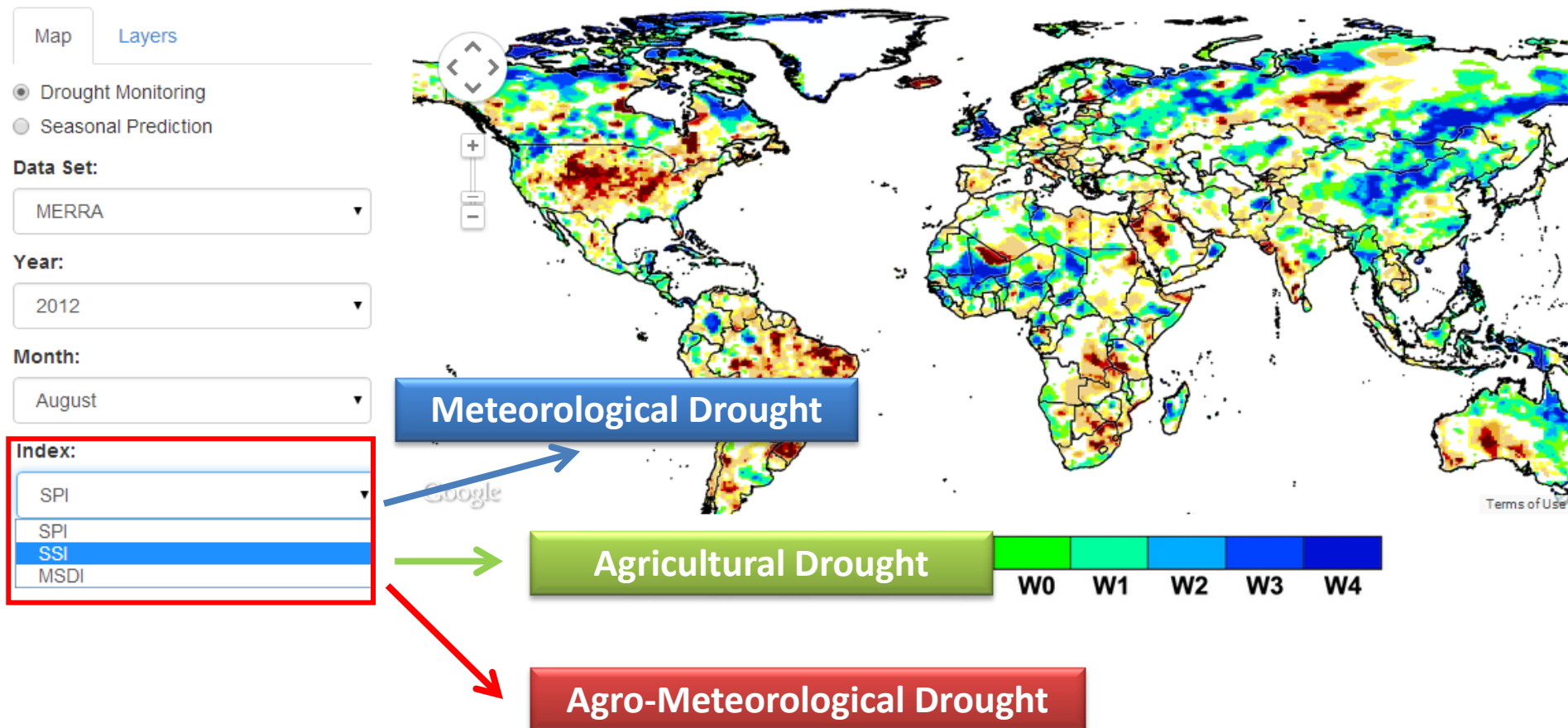
Hao Z., AghaKouchak A., Nakhjiri N., Farahmand A., 2014, Global Integrated Drought Monitoring and Prediction System, *Scientific Data*, 1:140001, 1-10, doi: 10.1038/sdata.2014.1.

<http://www.nature.com/articles/sdata20141>



<http://drought.eng.uci.edu/>

Global Integrated Drought Monitoring and Prediction System (GIDMaPS)

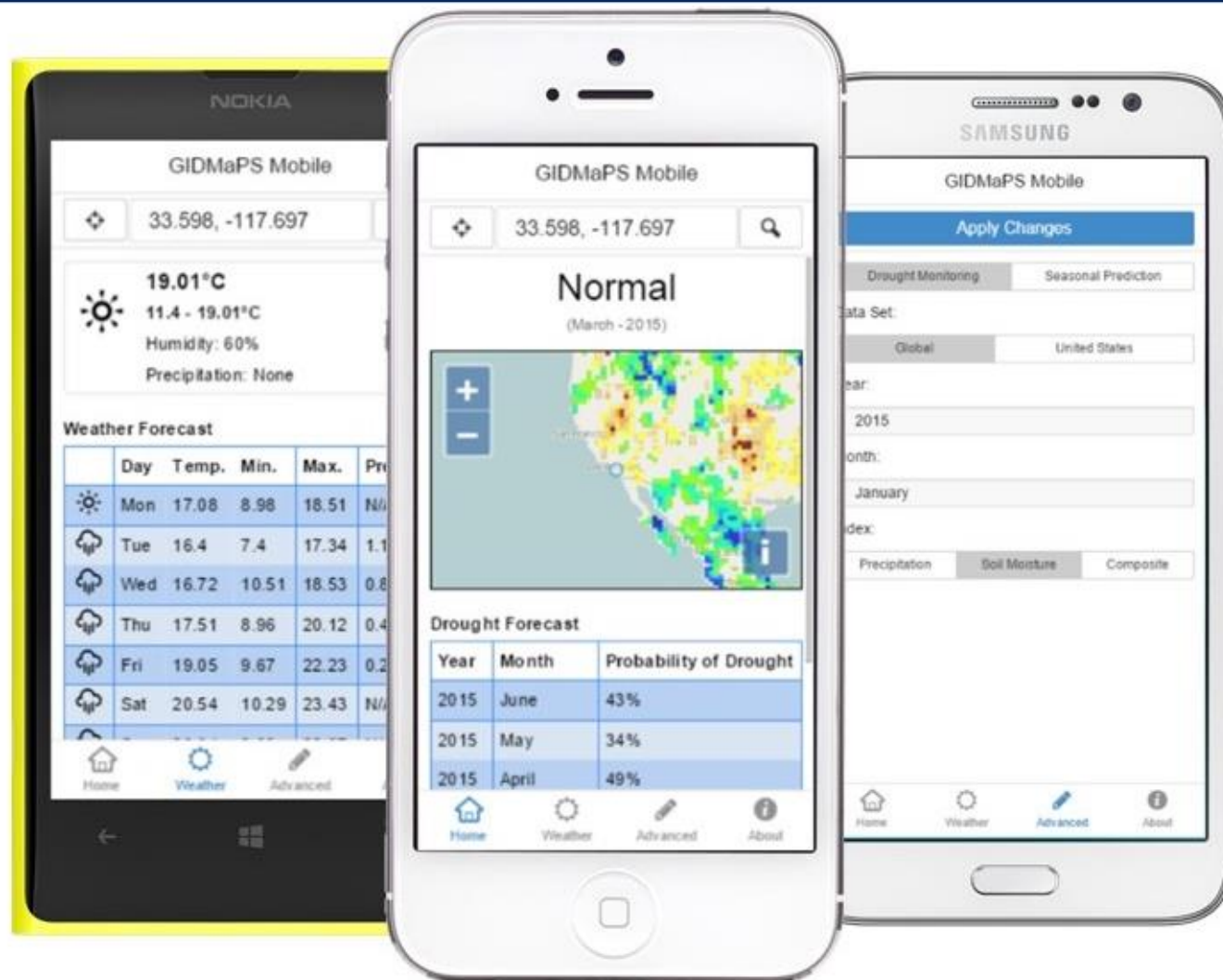


Hao Z., AghaKouchak A., Nakhjiri N., Farahmand A., 2014, Global Integrated Drought Monitoring and Prediction System, *Scientific Data*, 1:140001, 1-10, doi: 10.1038/sdata.2014.1.

<http://www.nature.com/articles/sdata20141>



GIDMaPS: Global Integrated Drought Monitoring and Prediction System



Android: <https://play.google.com/store/apps/details?id=edu.eng.drought>

Windows: <https://www.microsoft.com/en-us/store/apps/gidmaps-mobile/9nblggh3sw4w>

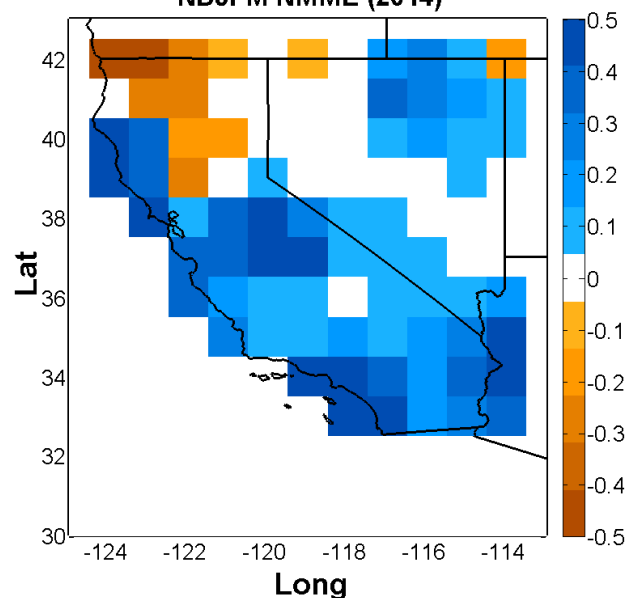


NMME Forecasts

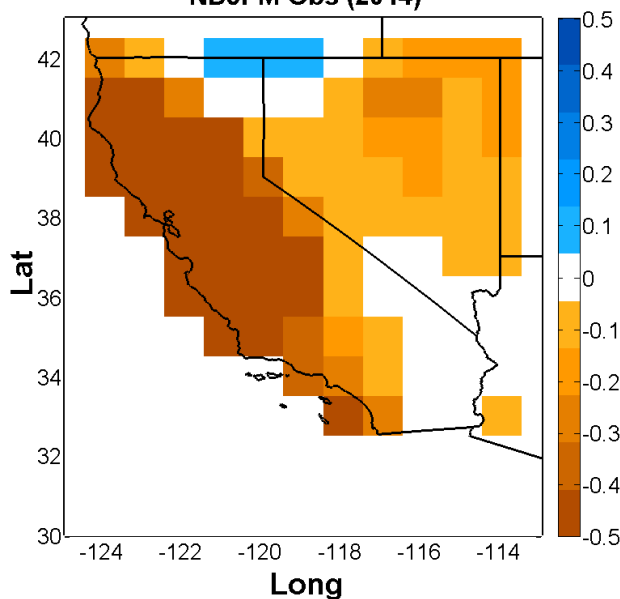
Observed Conditions

Hybrid Dynamical-Statistical Forecasts

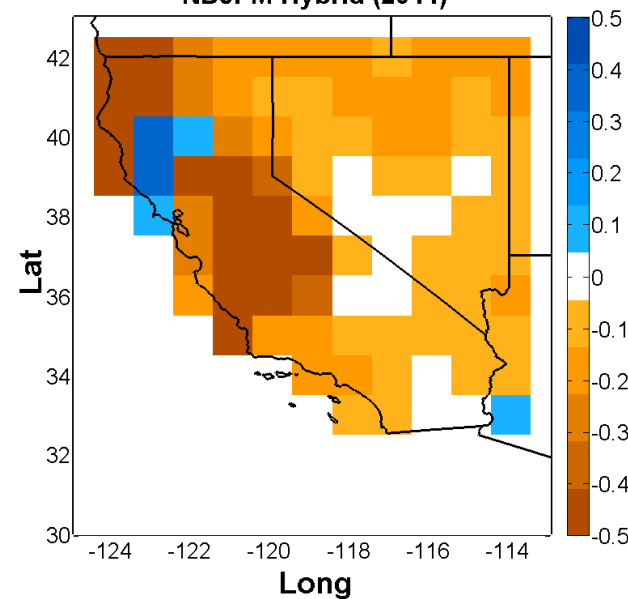
NDJFM NMME (2014)



NDJFM Obs (2014)



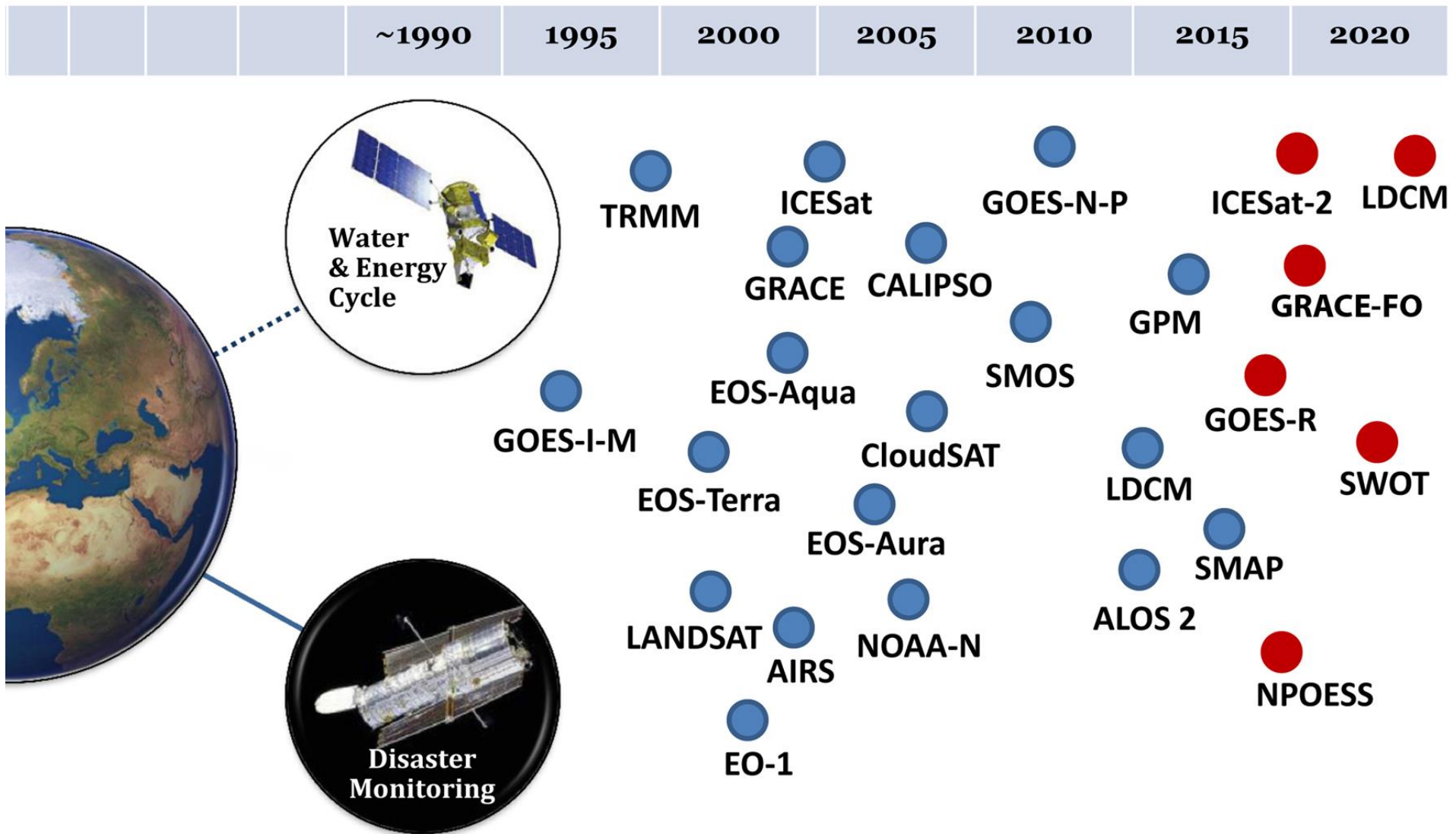
NDJFM Hybrid (2014)



Nov. 2013-March-2015 (NDJFM) forecasts initialized Oct. 2013

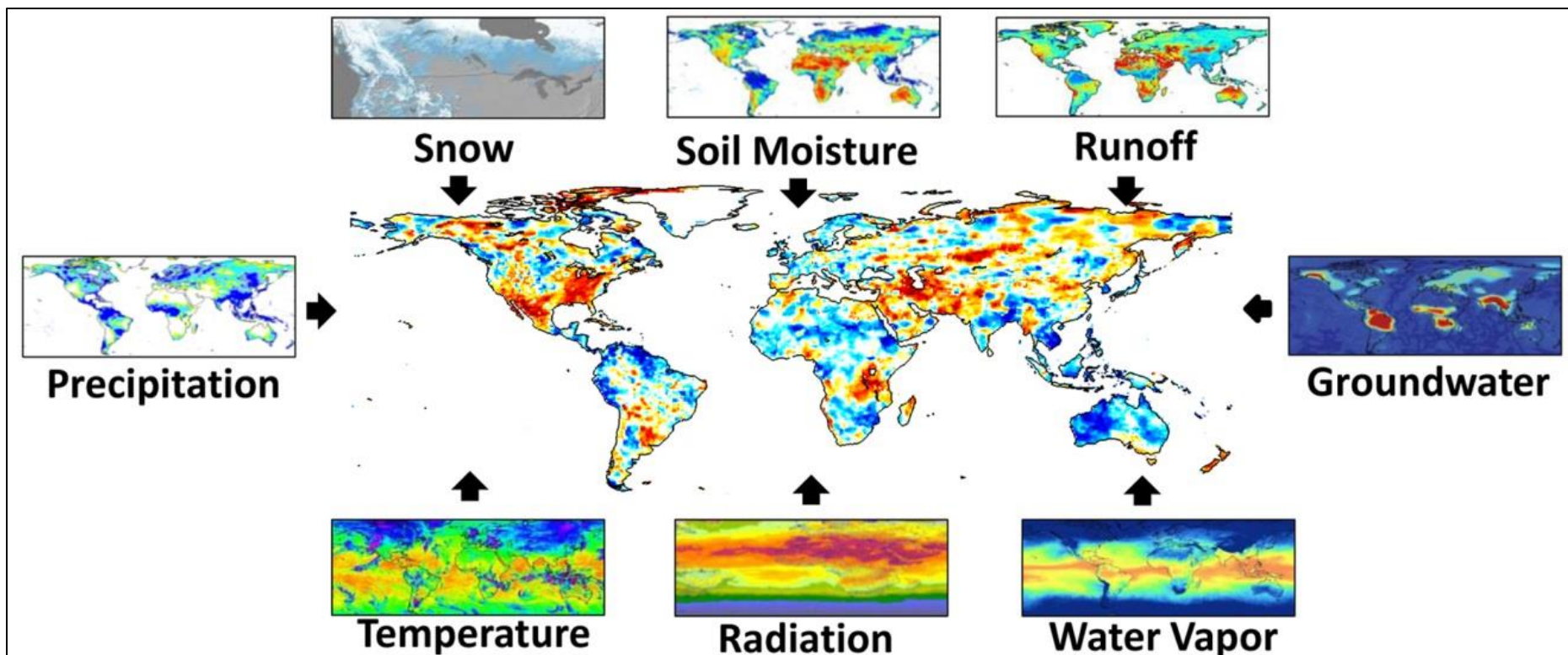


Remote Sensing of Drought





Remote Sensing of Drought



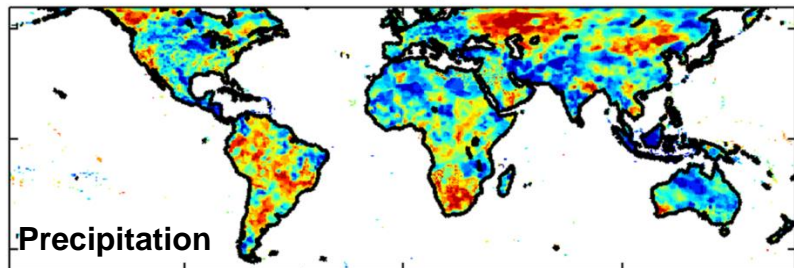
Multi-sensor (multi-index) composite drought monitoring using remote sensing observations



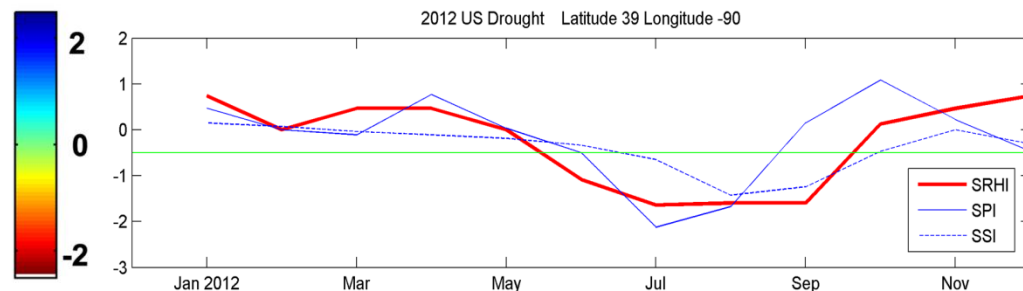
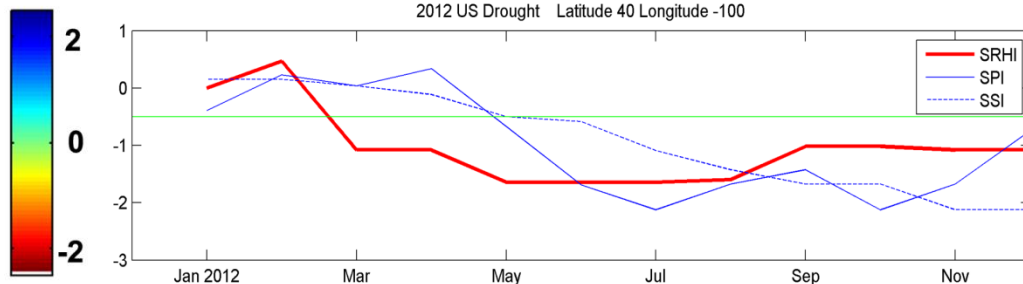
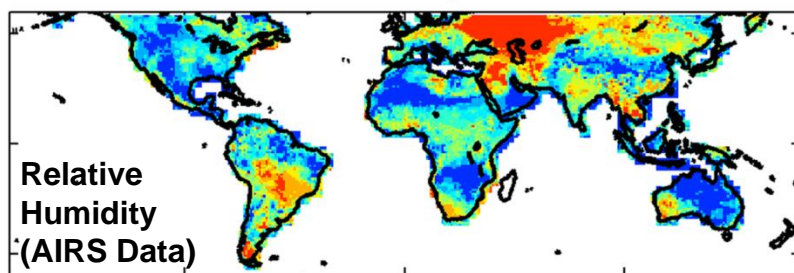
Early Drought Onset Detection Using Satellite Observations



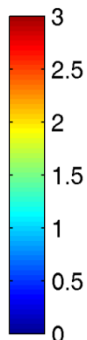
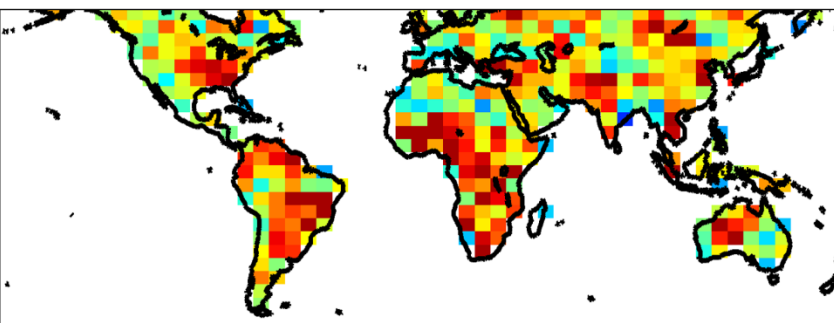
3-month SPI August 2010



3-month SRHI August 2010



(b) Mean Lead Time of SRHI Relative to SPI (months)



- Integrates satellite-based relative humidity and water vapor information for drought monitoring
- Improves drought early onset detection



Near Real-Time Remote Sensing of Precipitation



Center for Hydrometeorology and Remote Sensing University of California, Irvine

<http://hydis.eng.uci.edu/gwadi/>

Map Layer Control

Geographic

- ☒ Country
- ☐ Urban Areas
- ☐ Streams
- ☐ Pol. Divisions
- ☐ GRDC Gauges
- ☐ Water Bodies

Basins

- ☐ Continental
- ☐ Tributary
- ☐ Major Rivers
- ☐ Watershed

PERSIANN/NEOIS Data

Image Time: Tue, 13 Oct 2015 12:00:00 GMT
Current Lagtime: 1 Hours and 27 Minutes

Latest Rain Totals (Hours)

☐ 3 ☐ 6 ☐ 12 ☒ 24 ☐ 48 ☐ 72

Latest Heavy Rain (Hours)

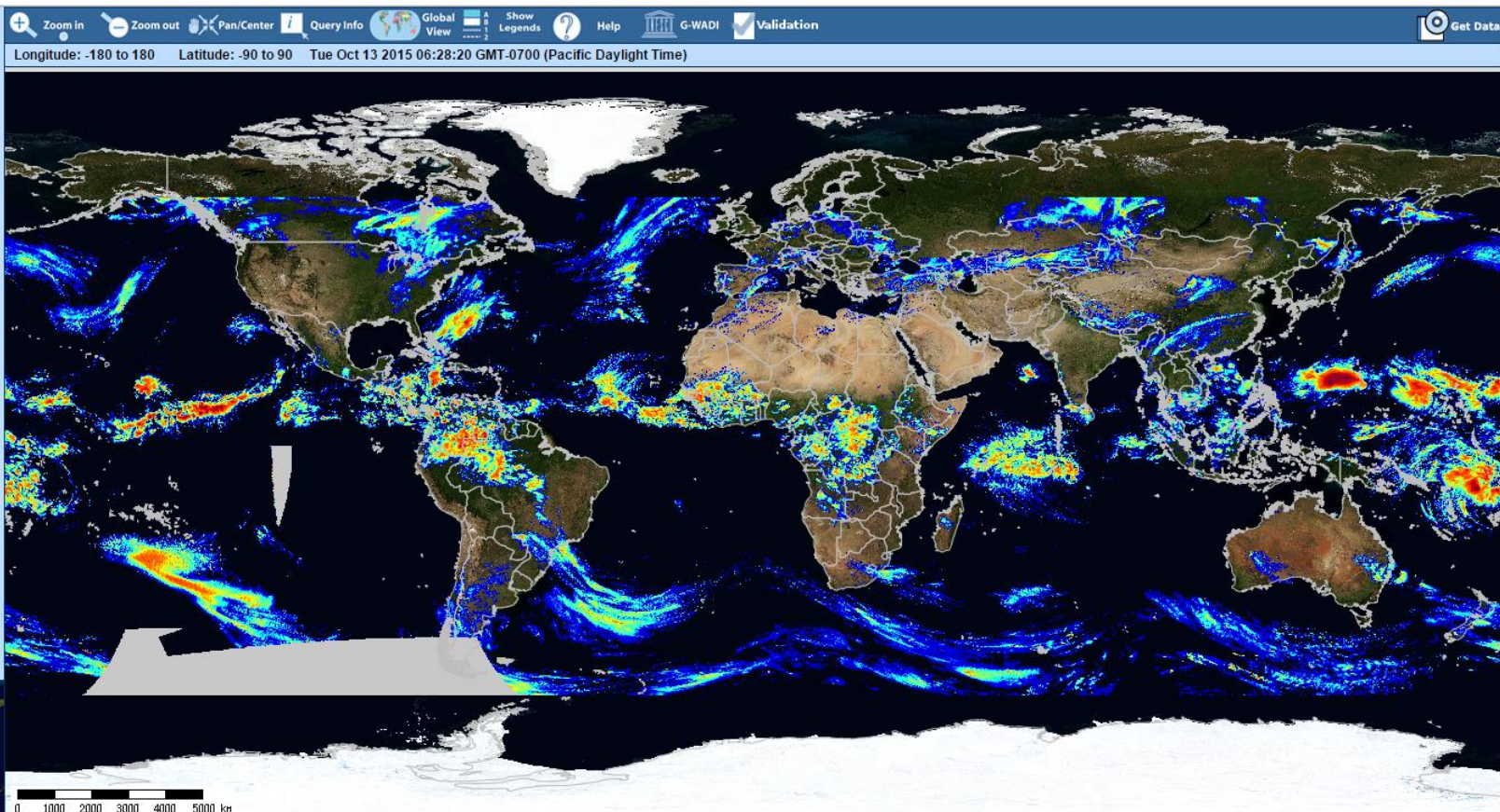
☐ 3 ☐ 6 ☐ 12 ☒ 24 ☐ 48 ☐ 72

☐ No Precip Layer

Baseline Images

- ☒ Satellite Image
- ☐ IGBP Land Use
- ☐ No Basemap
- ☐ Aridity
- ☐ Elevation

QUERY BY:



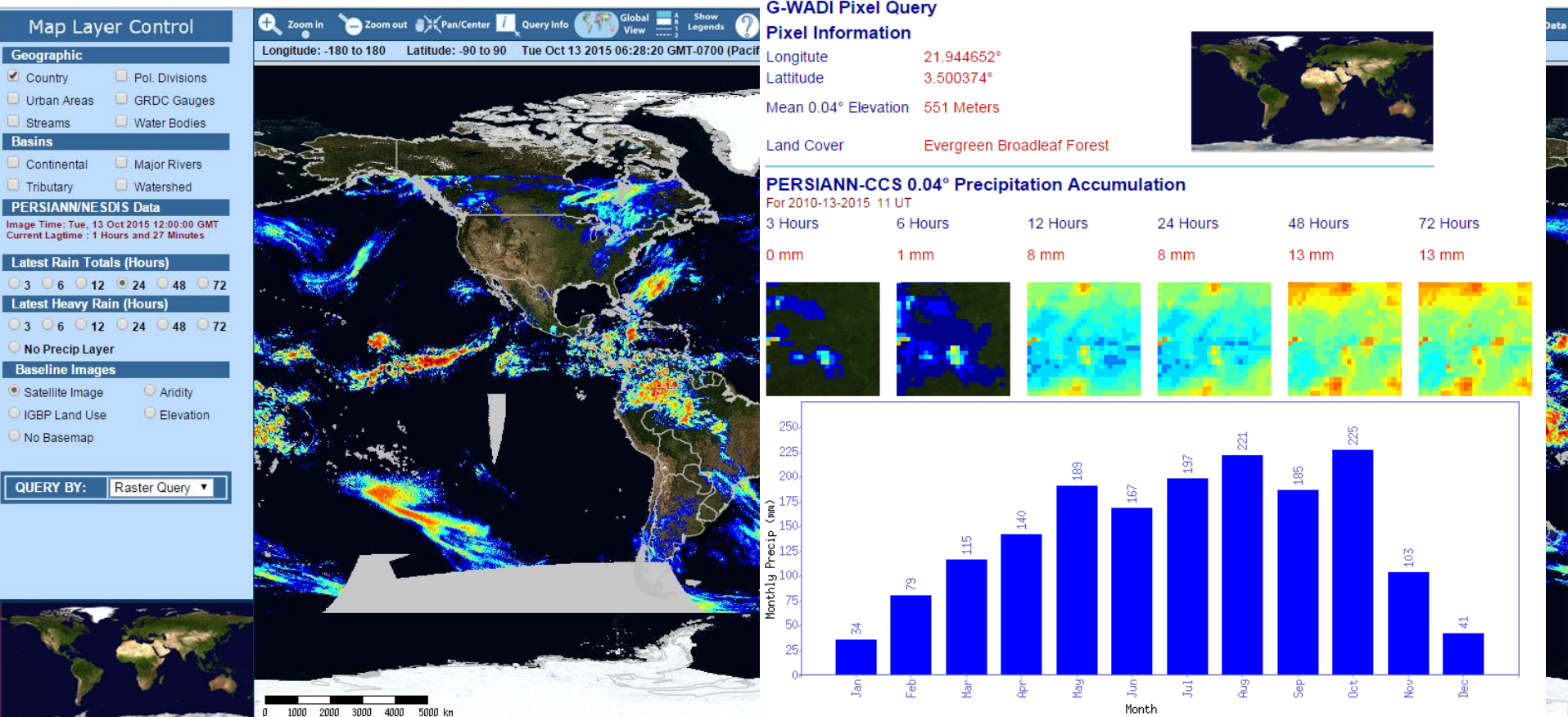


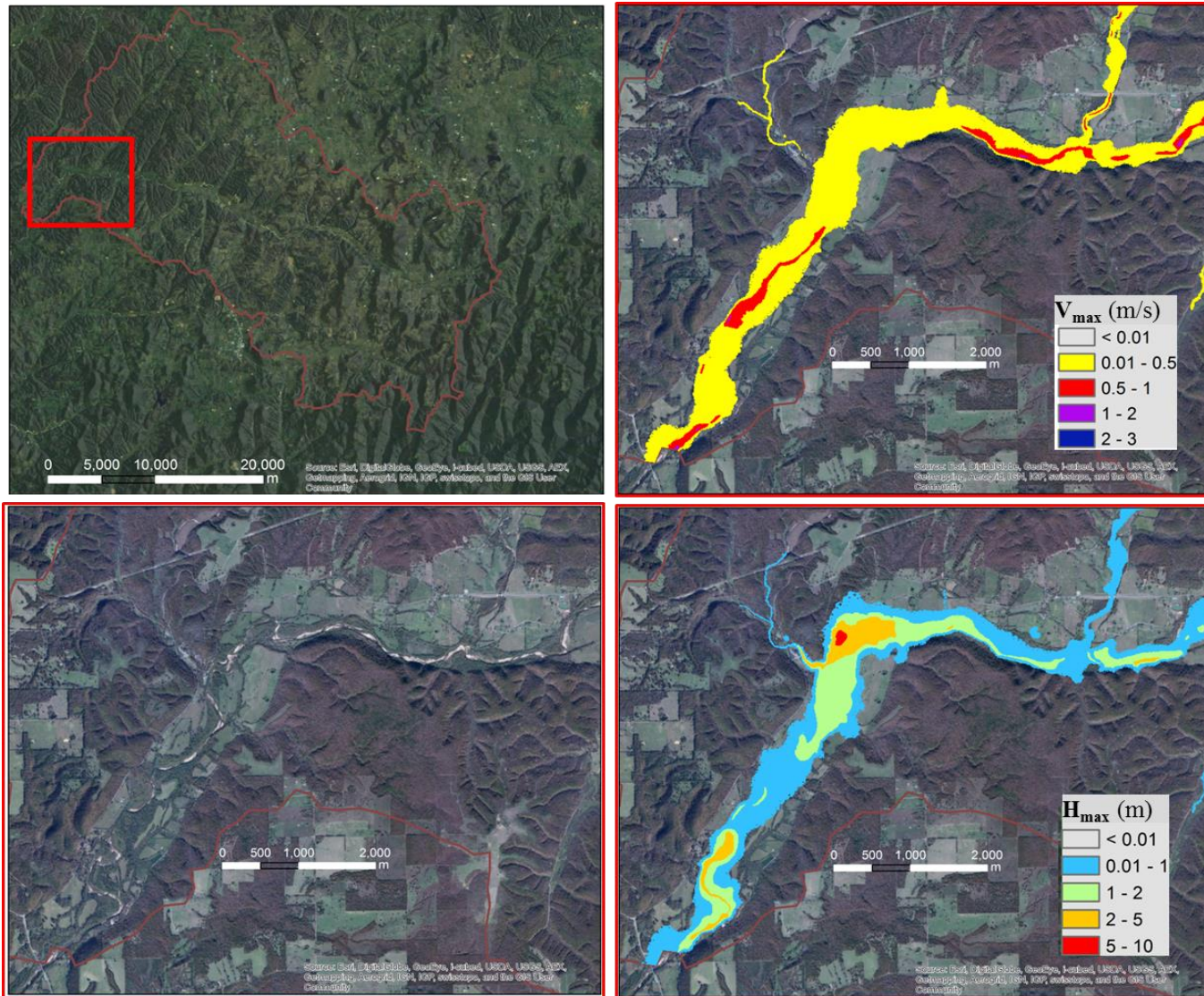
Near Real-Time Remote Sensing of Precipitation



Center for Hydrometeorology and Remote Sensing University of California, Irvine

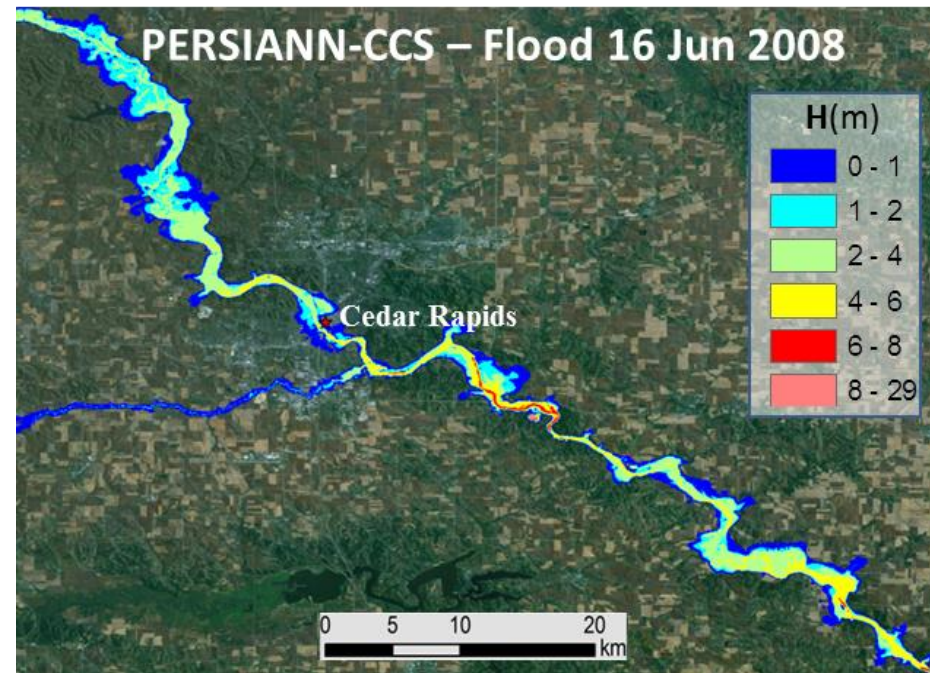
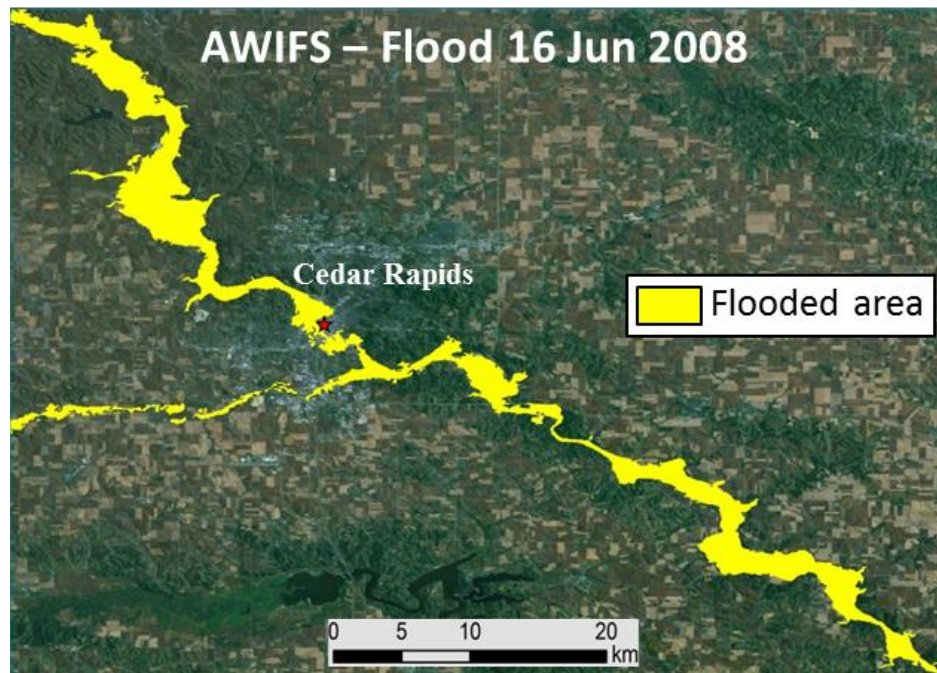
<http://hydri.eng.uci.edu/gwadi/>





Flood inundation and flow velocity in ELDO2 watershed (April) 2011 using HiResFlood-UCI (Nguyen et al., 2015 Journal of Hydrometeorology, Nguyen et al., 2015 Journal of Hydrology)

Iowa 2008 Flood



Advanced Wide Field Sensor (AWiFS) areal image (left) versus flood inundation and flow velocity using HiResFlood-UCI (right)

Nguyen et al., 2015 Journal of Hydrometeorology, Nguyen et al., 2015 Journal of Hydrology



Extreme Events and Construction Management



WARD

File Project

Generate Reset Excel PDF

Values Export

Project Information Activities Constraints

Constraint Name

<input checked="" type="checkbox"/> Precipitation Intensity	Threshold (mm):	2	
<input checked="" type="checkbox"/> Temperature	Max (°F):	100	Min (°F): 10
<input type="checkbox"/> Relative Humidity	Threshold (%):		
<input checked="" type="checkbox"/> Wind	Threshold (mph):	20	
<input type="checkbox"/> Solar Radiation	Threshold (kW/m2):		
<input type="checkbox"/> Soil Moisture	Threshold (%):		

WARD

File Project

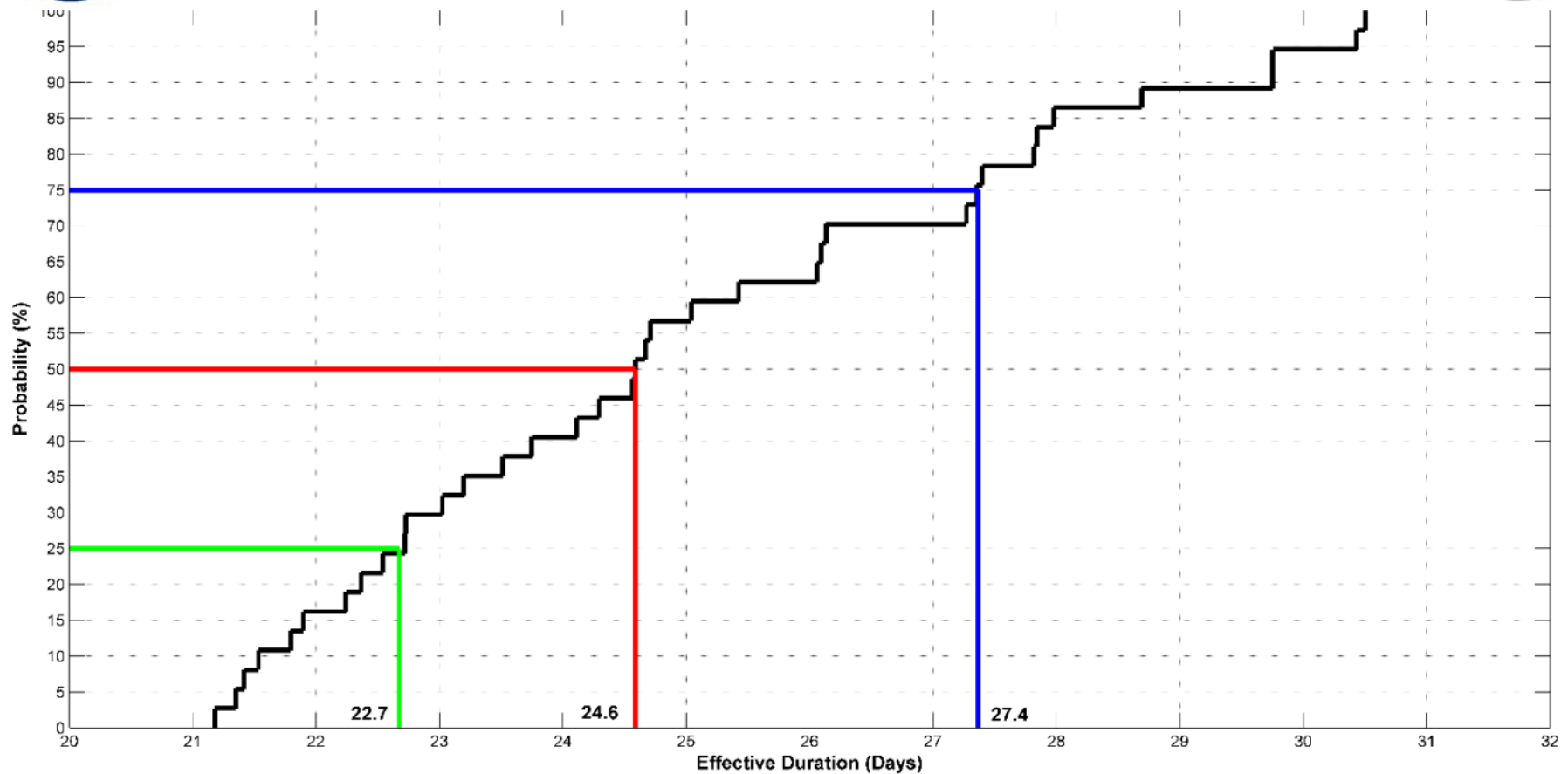
Generate Reset Excel PDF

Values Export

Project Information Activities Constraints

Constraint Name

<input checked="" type="checkbox"/> Wind	Threshold (mph):	20	
<input type="checkbox"/> Solar Radiation	Threshold (kW/m2):		
<input type="checkbox"/> Soil Moisture	Threshold (%):		
<input type="checkbox"/> 12-Hr Cumulative Precipitation	Threshold (mm):		
<input checked="" type="checkbox"/> Minimum Work Hour/ Shift	Minimum (Hr):	4	
<input checked="" type="checkbox"/> Labor Productivity			



Effective duration for a 20-day (January 5-24) construction project in Washington DC considering weather-related work stoppage and labor productivity. The 20-day task is expected to take 23 days or less with 25% probability, 25 days or less with 50% probability, and 28 days or less with 75% probability.

Questions?

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CA Dept. Water Resources,
NASA, NOAA, NSF, JPL*

