Drought Tools, Monitoring, Interpretation, and Diagnostics

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Overview

- New Precipitation Dataset: CHIRPS
- Drought Monitoring Using Famine Early Warning Systems Network Web Resources
- Drought Diagnostics Using a Framework of Observations and Models

CHIRPS Precipitation Dataset

Where Can I Download CHIRPS?

chg.geog.ucsb.edu/data/chirps

Who Can I Contact?

Pete Peterson
geogpete@gmail.com

What is CHIRPS?

- CHIRPS = Climate Hazards Group Infrared Precipitation with Stations
- Available for Land Only 1981-Present
  - 0.05° x 0.05° for 50°S-50°N, 180°E-180°W
- Temporal Resolution: Day, Pentad, Month
- Release Date:
  - Day & Pentad: 2 days after a pentad ends
  - Month: By the middle of the following month

CHIRPS Recipe

1. Create a historical precipitation climatology called CHP_{clim}
2. Calculate a precipitation estimate using infrared data called IRP
   - IRP = a * % of CCD + b
3. Apply time variability of IRP to CHP_{clim} to create CHIRP
   - CHIRP = (CHP_{clim}) * IRP
4. Merge, Quality Control and blend stations (CHIRPS)

How Does CHIRPS Compare?

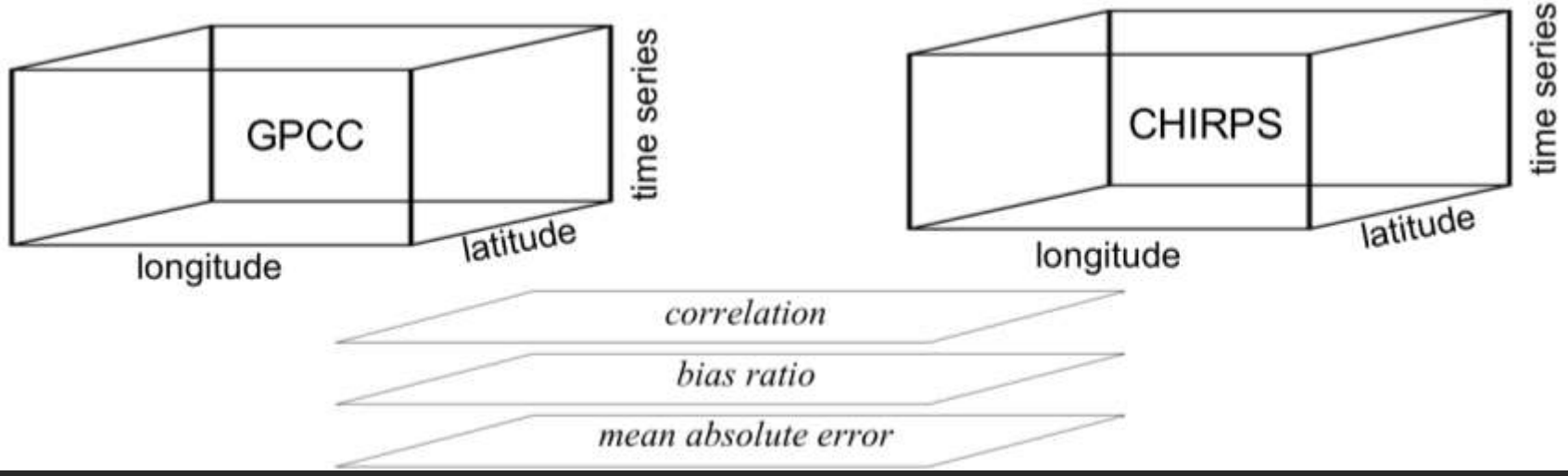
- for each data set, CFS, CPC-Unified, CHIRP(S), ECMWF, TRMM
- build cubes of Wet Season rainfall
- compare to GPCC

time series (1989 – 2010) of Wet Season rainfall

JFM $[JFM_{1989}, JFM_{1990}, \ldots, JFM_{2010}]$

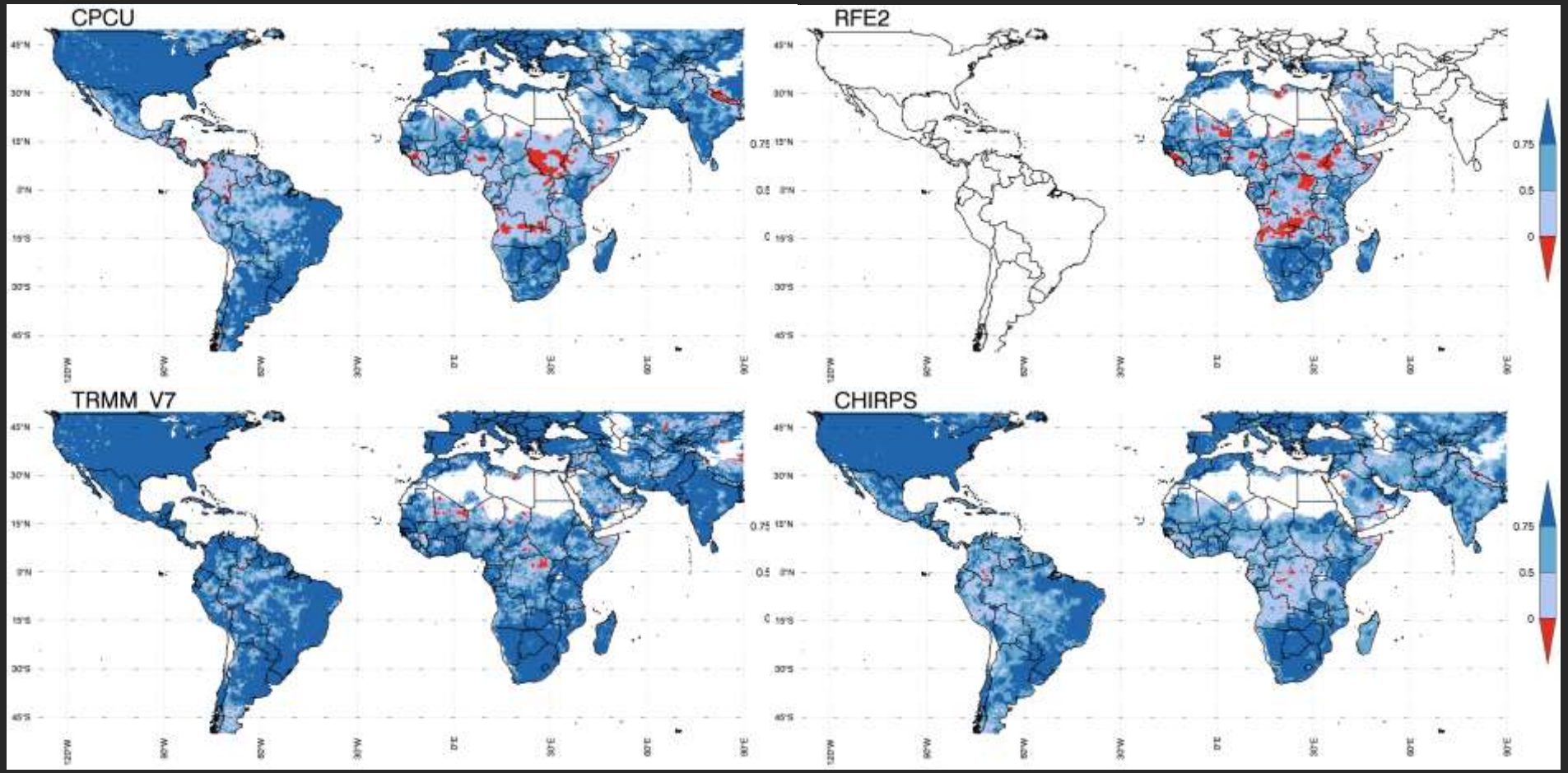
. . .

NDJ $[NDJ_{1989}, NDJ_{1990}, \ldots, NDJ_{2010}]$



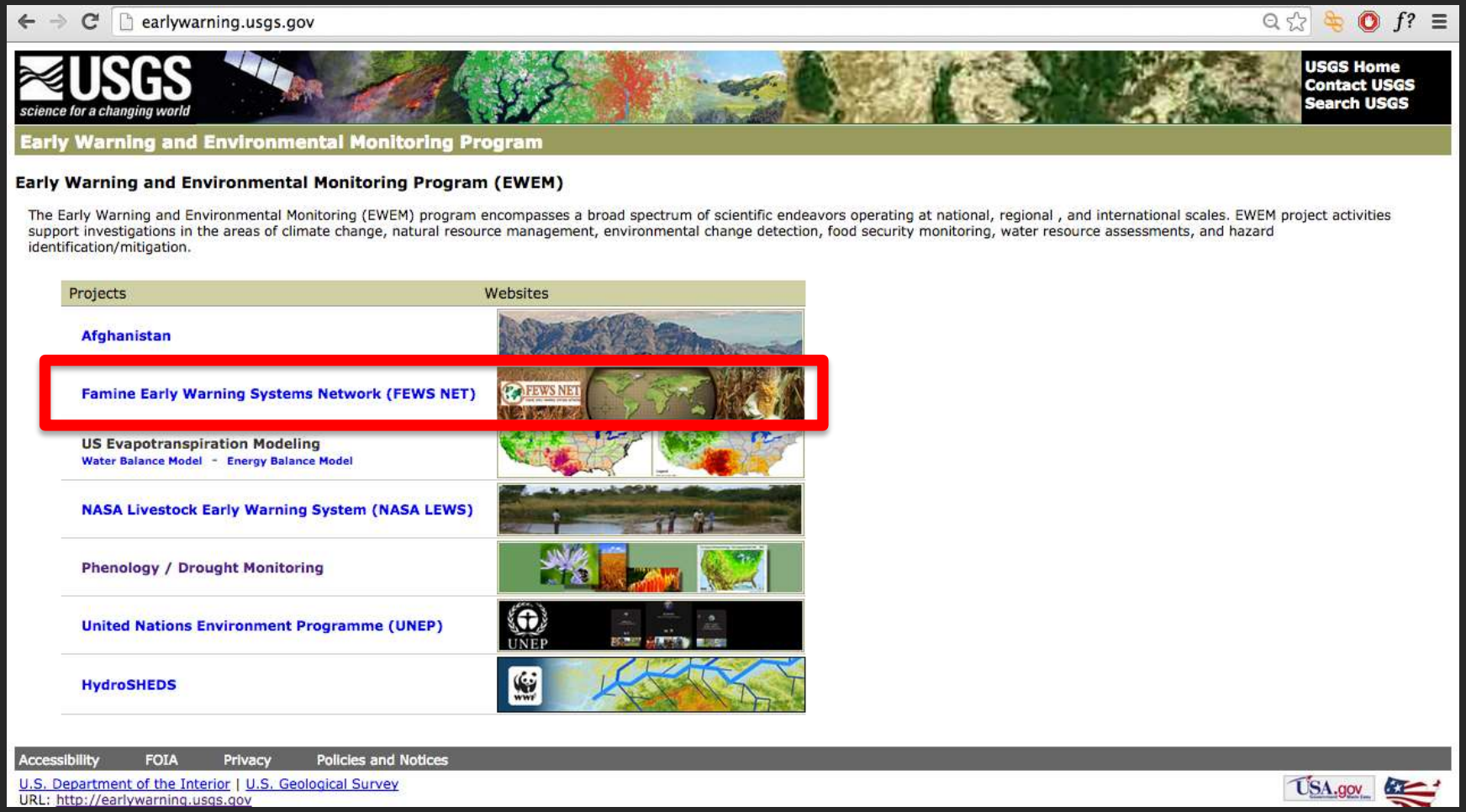
CHIRPS Comparison

Wet Season Comparisons to GPCC

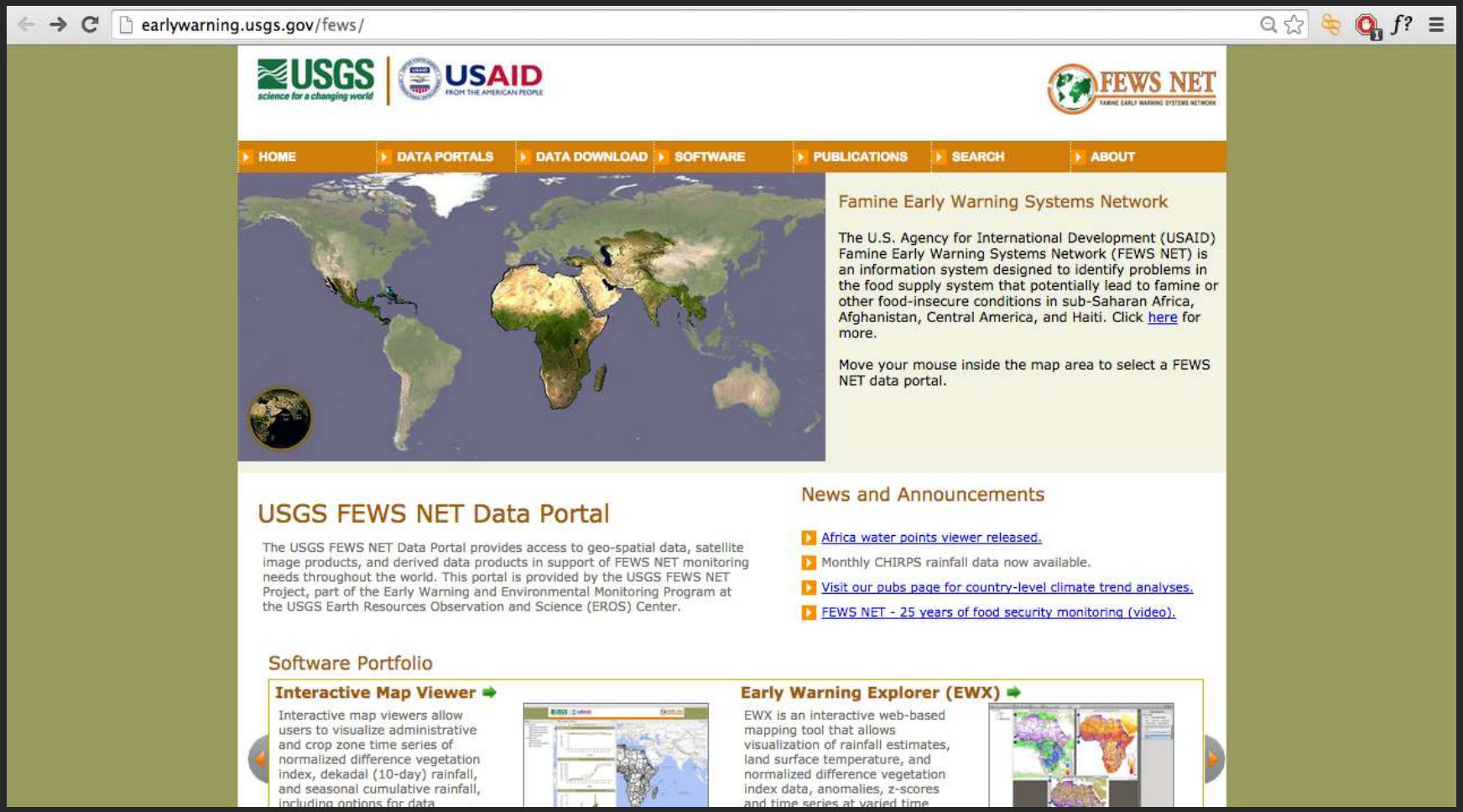


Famine Early Warning Systems Network Drought Monitoring

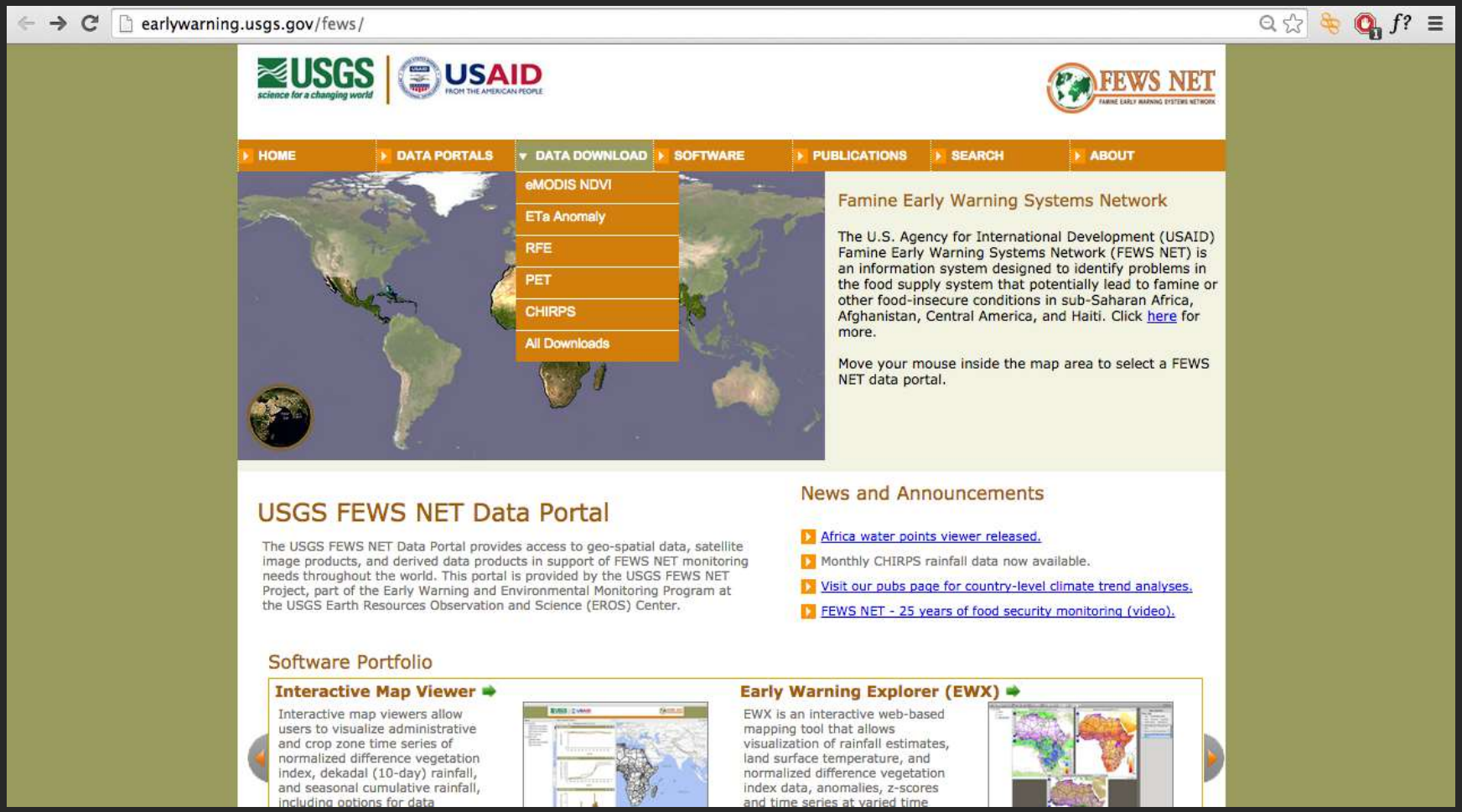
earlywarning.usgs.gov



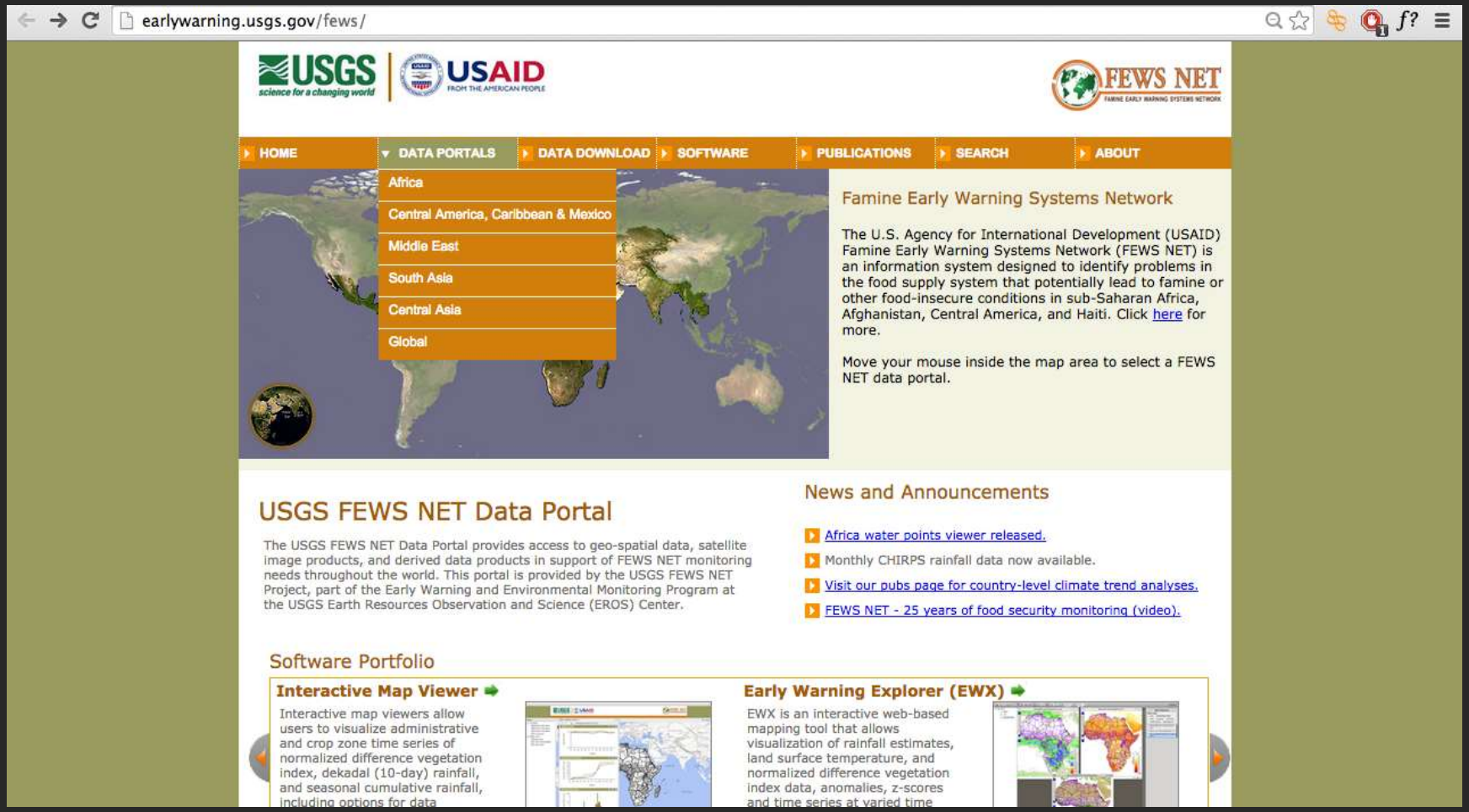
earlywarning.usgs.gov/fews



Data Downloads



Data Portals



Africa: Available Products

earlywarning.usgs.gov/fews/africa/index.php

FEWS NET Africa Data Portal

The FEWS NET Africa Data Portal provides access to spatial data, satellite imagery, and other data and graphic products in support of the FEWS NET project.

The expandable table below provides a quick summary of the products available, frequency of observation (i.e. daily, dekadal, etc.), and product format. Separate data tables are available for continental, regional, and national scales where applicable.

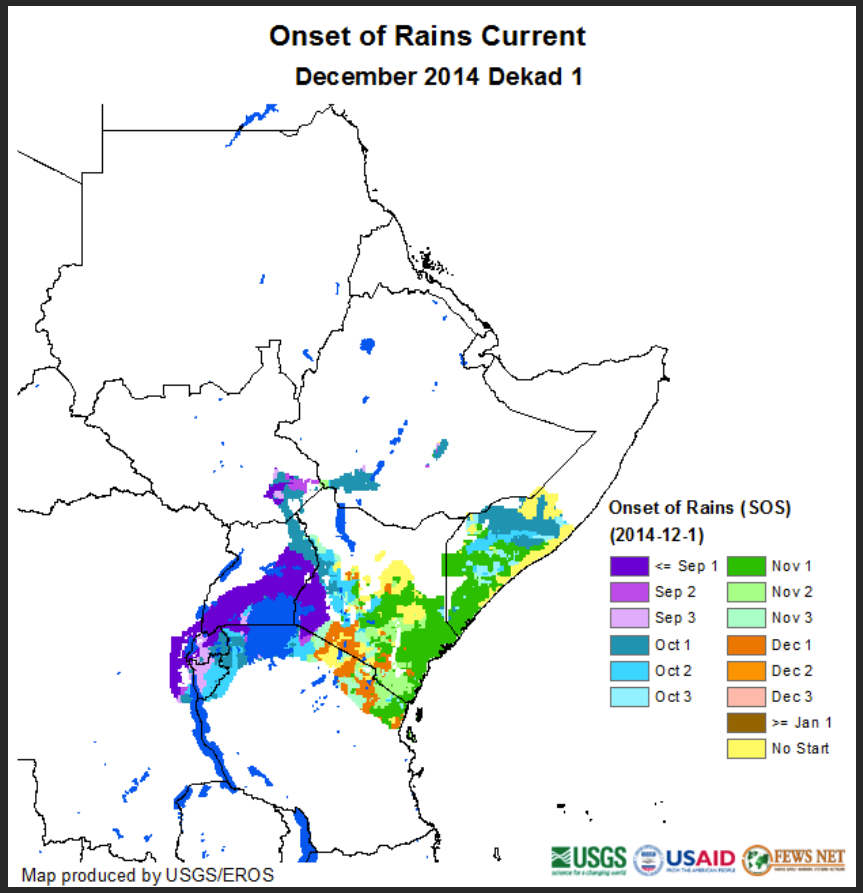
Open all Close all

Product	Time Period	Data Available	PDF	PNG	Map Viewer	Preview
eMODIS NDVI(Normalized Difference Vegetation Index)	Pentadal	X	X	X		
RFE (Rainfall Estimate)	Dekadal	X		X	X	
Vectorial Capacity Model -- Malaria (8-day)	Dekadal		X	X		
RFE Anomaly -- Malaria	Dekadal	X	X	X		
SPI (Standardized Precipitation Index)	Dekadal			X		
Moisture Index	Dekadal			X		
Moisture Index/Soil Water Index Anomaly	Dekadal			X		
BERM (Basin Excess Rainfall Map)	Dekadal			X		
Inter-Tropical Front (ITF) Position	Dekadal			X		
Croplands Water Requirement Satisfaction Index (WRSI)	Dekadal			X		
Rangelands Water Requirement Satisfaction Index (WRSI)	Dekadal			X		
Seasonal NDVI & Rainfall Charts - Interactive Viewer	Dekadal				X	
Seasonal Evapotranspiration (ETa) Anomaly	Dekadal		X	X		
Monthly Evapotranspiration (ETa) Anomaly	Monthly		X	X		
Past 6 days RFE & GFS 6-day Precipitation Forecast	Daily	X		X		
Daily 10-Day RFE Anomaly -- Malaria	Daily	X		X		
Daily 10-Day Moisture Index	Daily			X		

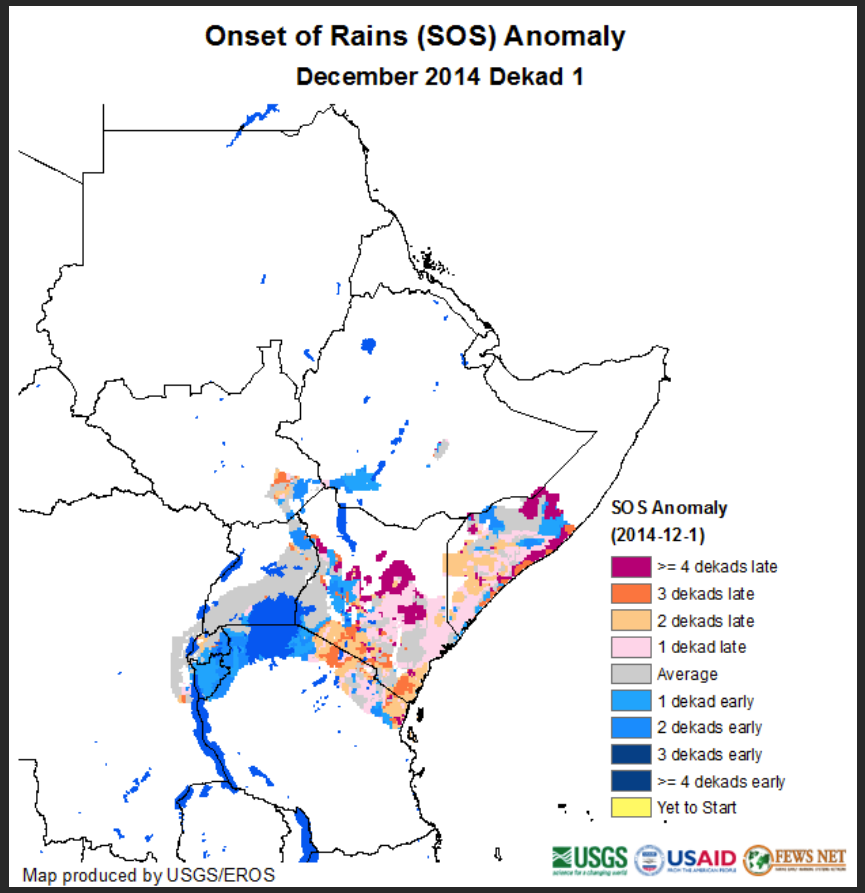
Consider the Performance of the 2014 October-December "short rains" over Eastern Africa during the First Dekad of December

Seasonal Progression

Start of Season

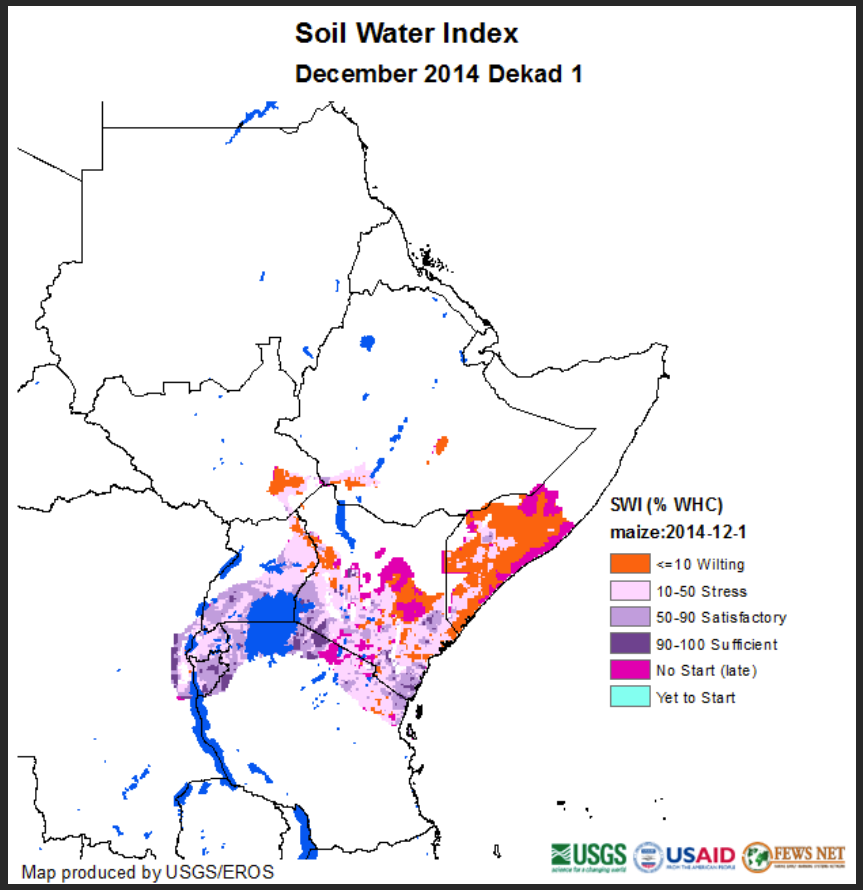


Start of Season Anomaly

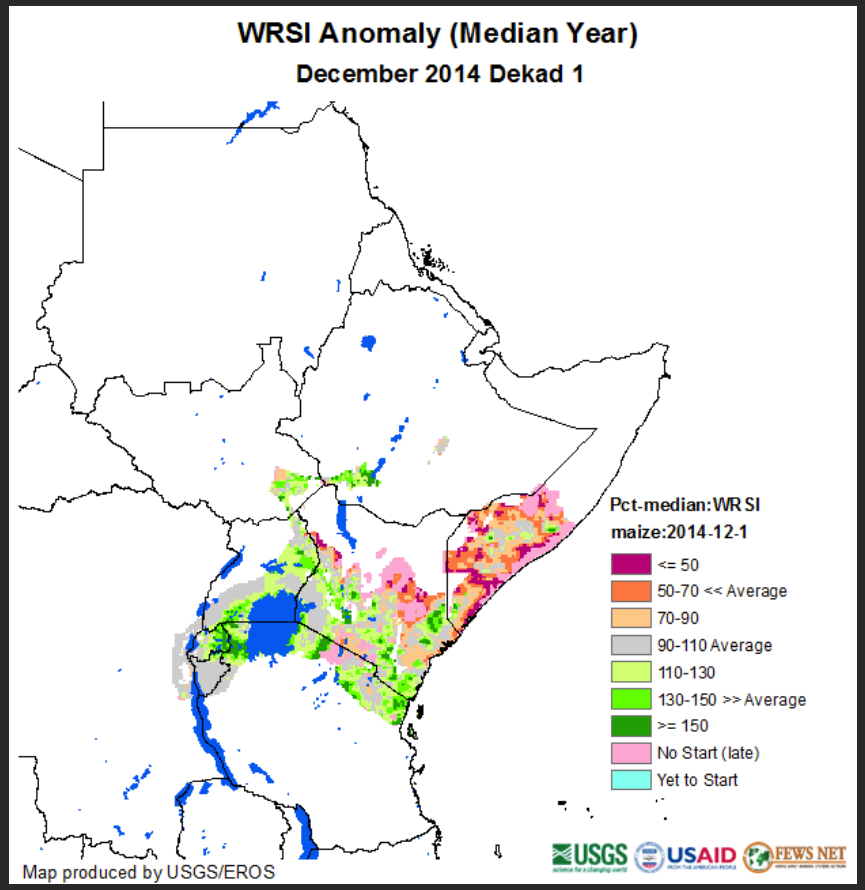


Water Availability and Requirement

Soil Water Index

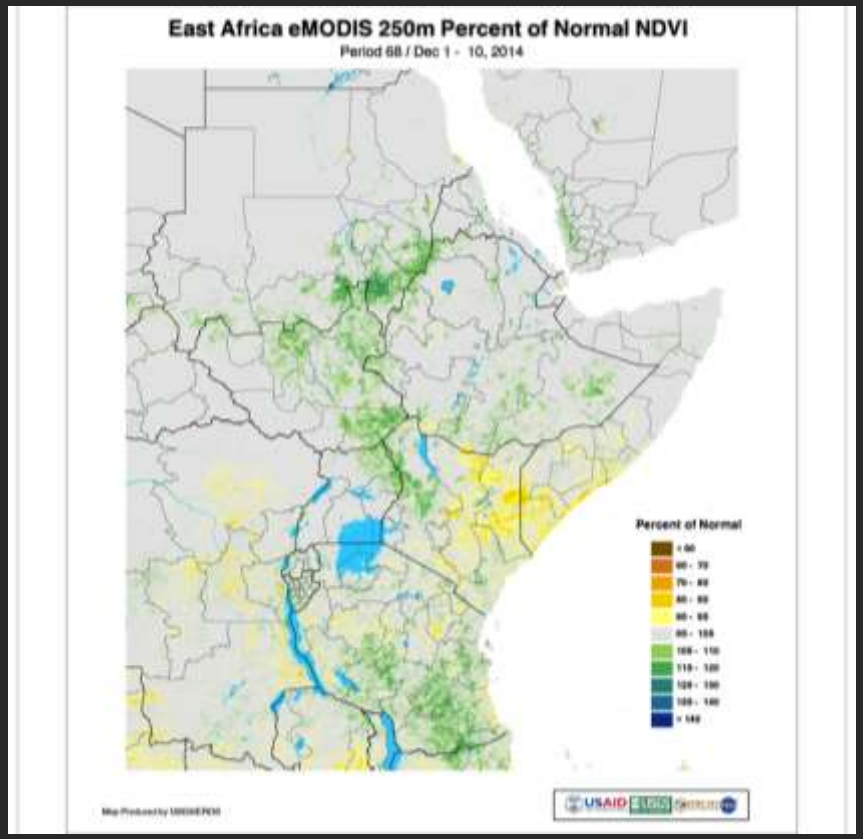


WRSI

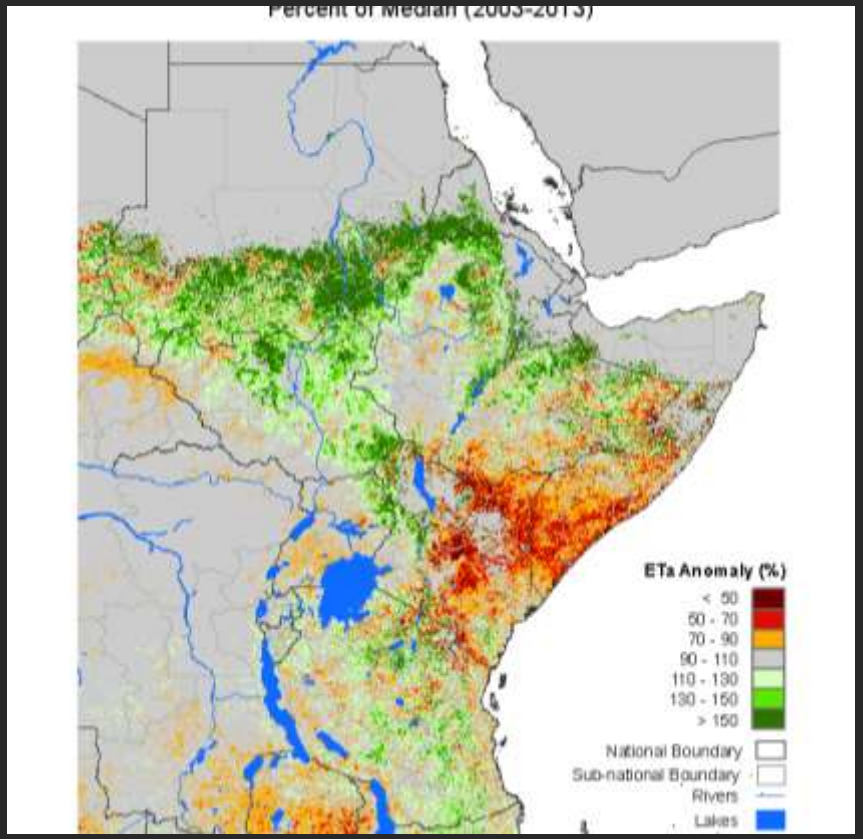


Vegetation Health

NDVI



Evapotranspiration Anomaly



Central Asia: Available Products

earlywarning.usgs.gov/fews/sca/index.php

Central Asia Data Portal

The Central Asia Data Portal provides access to spatial data, satellite imagery, and other data and graphic products in support of the FEWS NET project.

The expandable table below provides a quick summary of the products available, frequency of observation (i.e. daily, dekadal, etc.), and product format. Separate data tables are available for continental, regional, and national scales where applicable.

Countries/Regions:
Central Asia | South Central Asia | Afghanistan | Pakistan | Tajikistan | Kazakhstan

Central Asia

Open all | Close all

Product	Time Period	Data Available	PDF	PNG	Map Viewer	Preview
eMODIS NDVI(Normalized Difference Vegetation Index)	Pentadal	X	X	X		▼
Dekadal RFE (Rainfall Estimate)	Dekadal		X	X		▼
Dekadal RFE & Anomaly	Dekadal		X	X		▼
Temperature Products	Dekadal		X	X		▼
Seasonal Evapotranspiration (ETa) Anomaly	Dekadal		X	X		▼
Monthly Evapotranspiration (ETa) Anomaly	Monthly	X	X	X		▼
Daily RFE & Forecast	Daily		X	X		▼
Daily 30-Day Rain and Dry Days	Daily		X	X		▼

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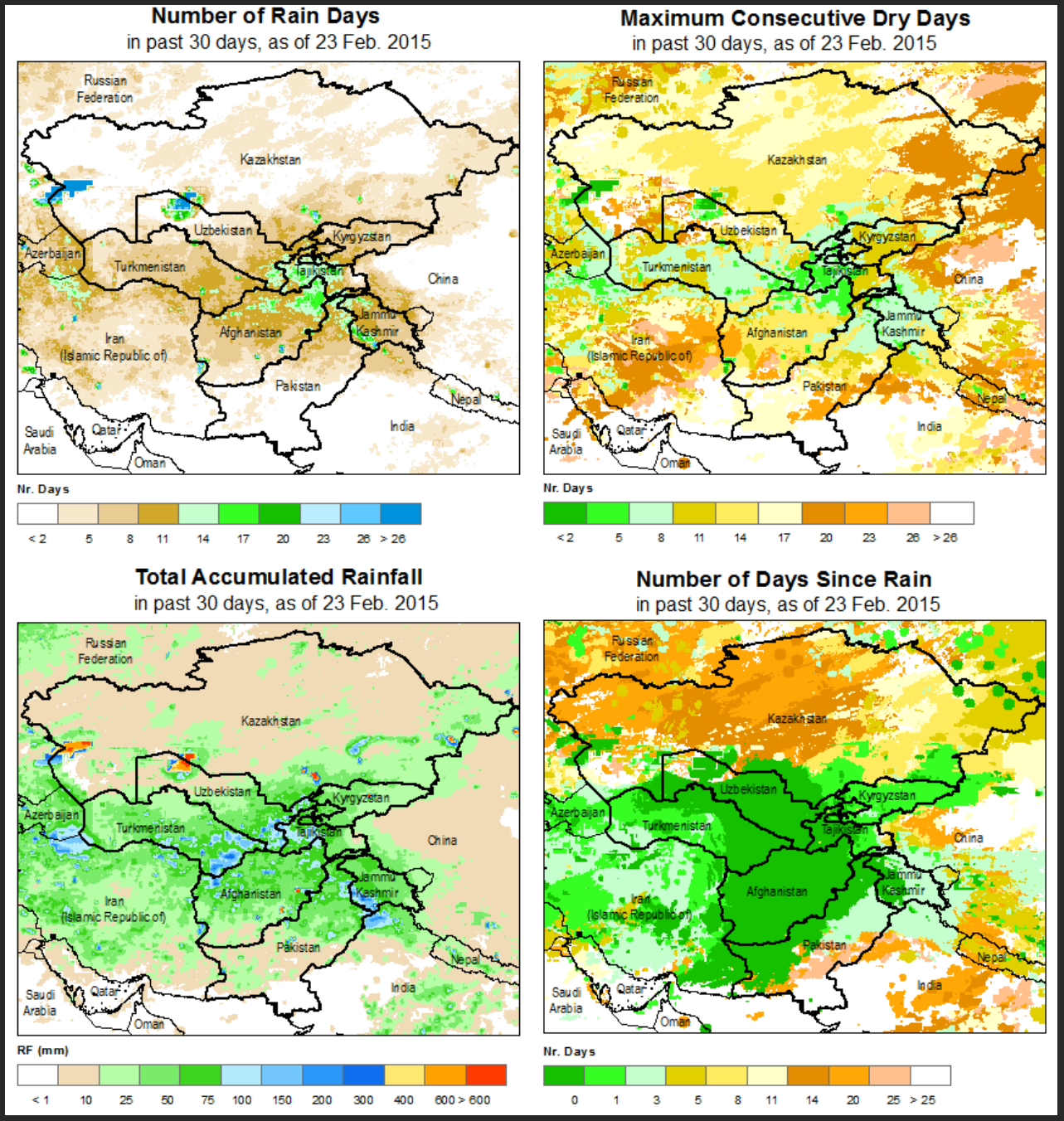
South Central Asia

Open all | Close all

Product	Time Period	Data Available	PDF	PNG	Map Viewer	Preview
eMODIS NDVI(Normalized Difference Vegetation Index)	Pentadal	X	X	X		▼

Consider the Performance of the 2014 November-April Rainy Season during the third dekad of February



Recent Rainfall

Afghanistan Snow Cover

earlywarning.usgs.gov/fews/sca/afghanistan/web/imgbrowsc2.php?snw=r3&extent=agso

Snow Cover Products

Product Documentation

MODIS 8-day Snow Cover Extent

Current vs Average Period
PNG (pdf available)

Current vs Previous Year
PNG (pdf available)

Current vs Previous Period
PNG (pdf available)

EROS Snow Water Equivalent

Daily Snow Water Equivalent

with provinces
PNG (pdf available)

with basins
PNG (pdf available)

NOHRSC Snow Water Equivalent

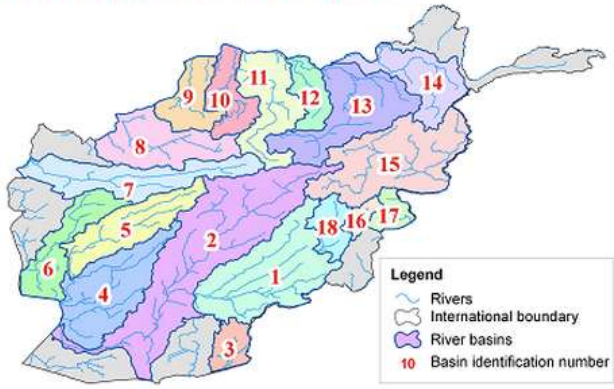
Daily Snow Water Equivalent

NOHRSC Snow Water Equivalent Anomaly

Daily Snow Water Equivalent Anomaly

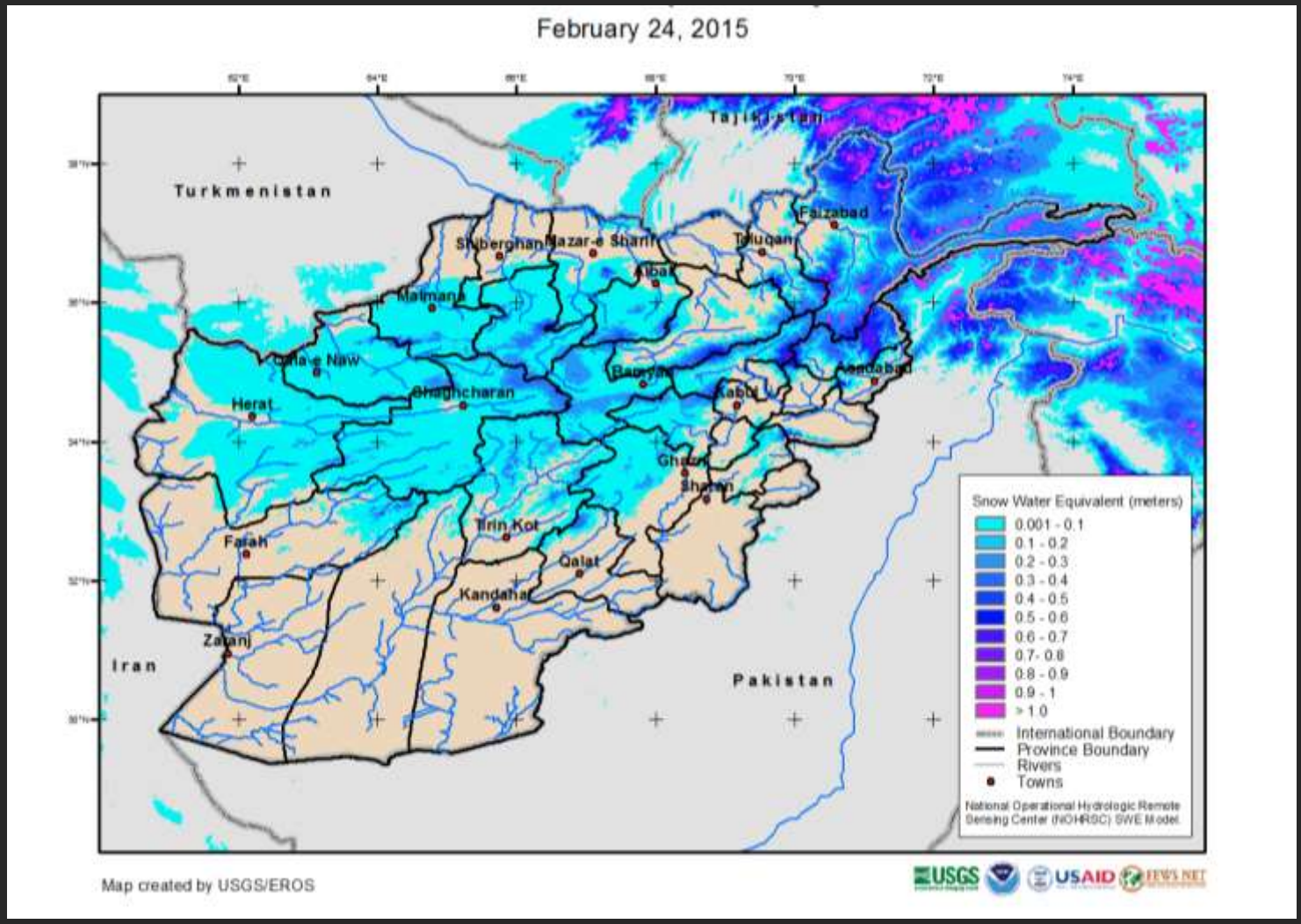
Summarized by Basin

Click on the ID number to view the chart for that basin

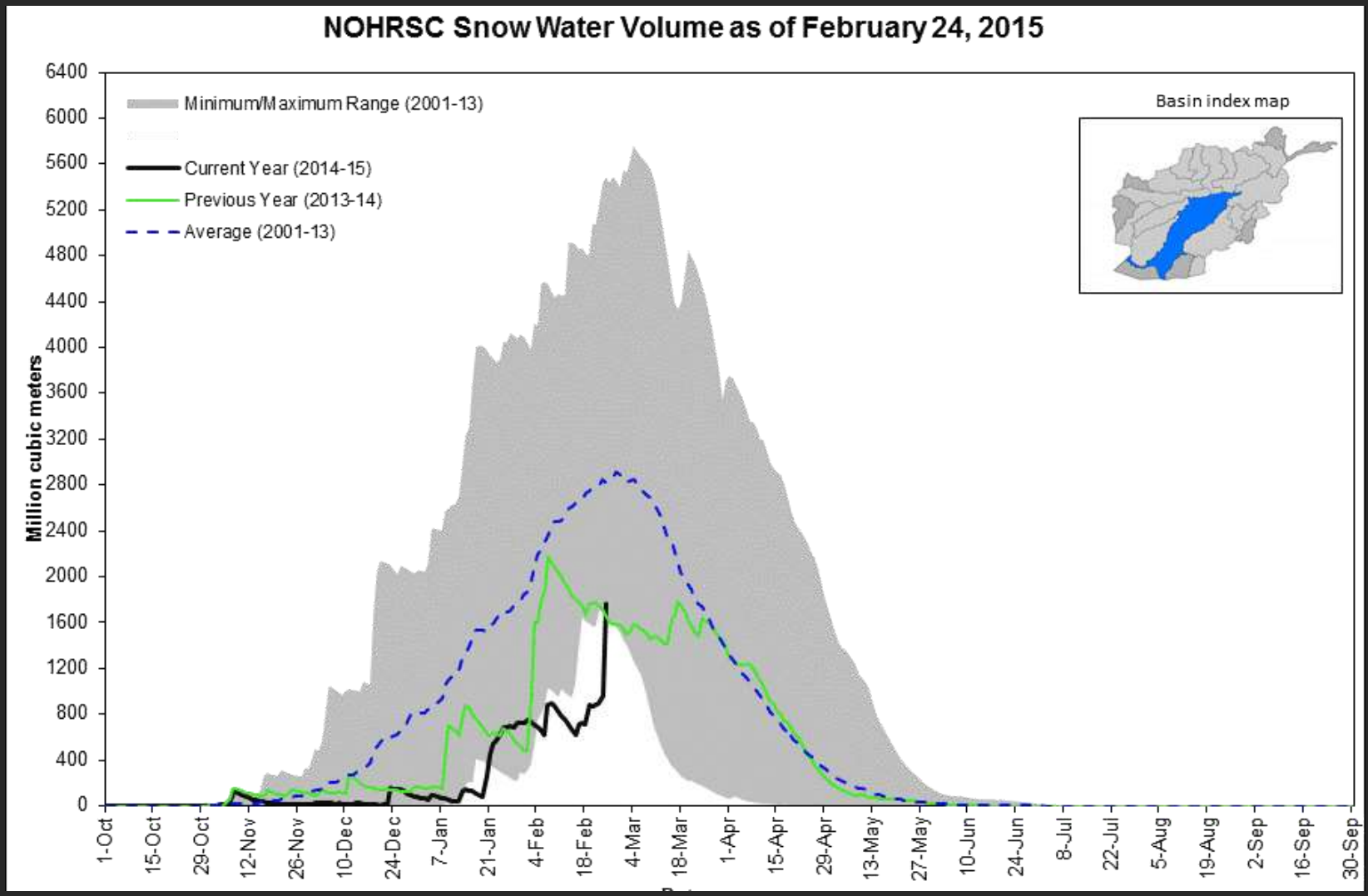


Select a product type at left and click on a basin to display snow cover accumulation/depletion or snow water volume charts.

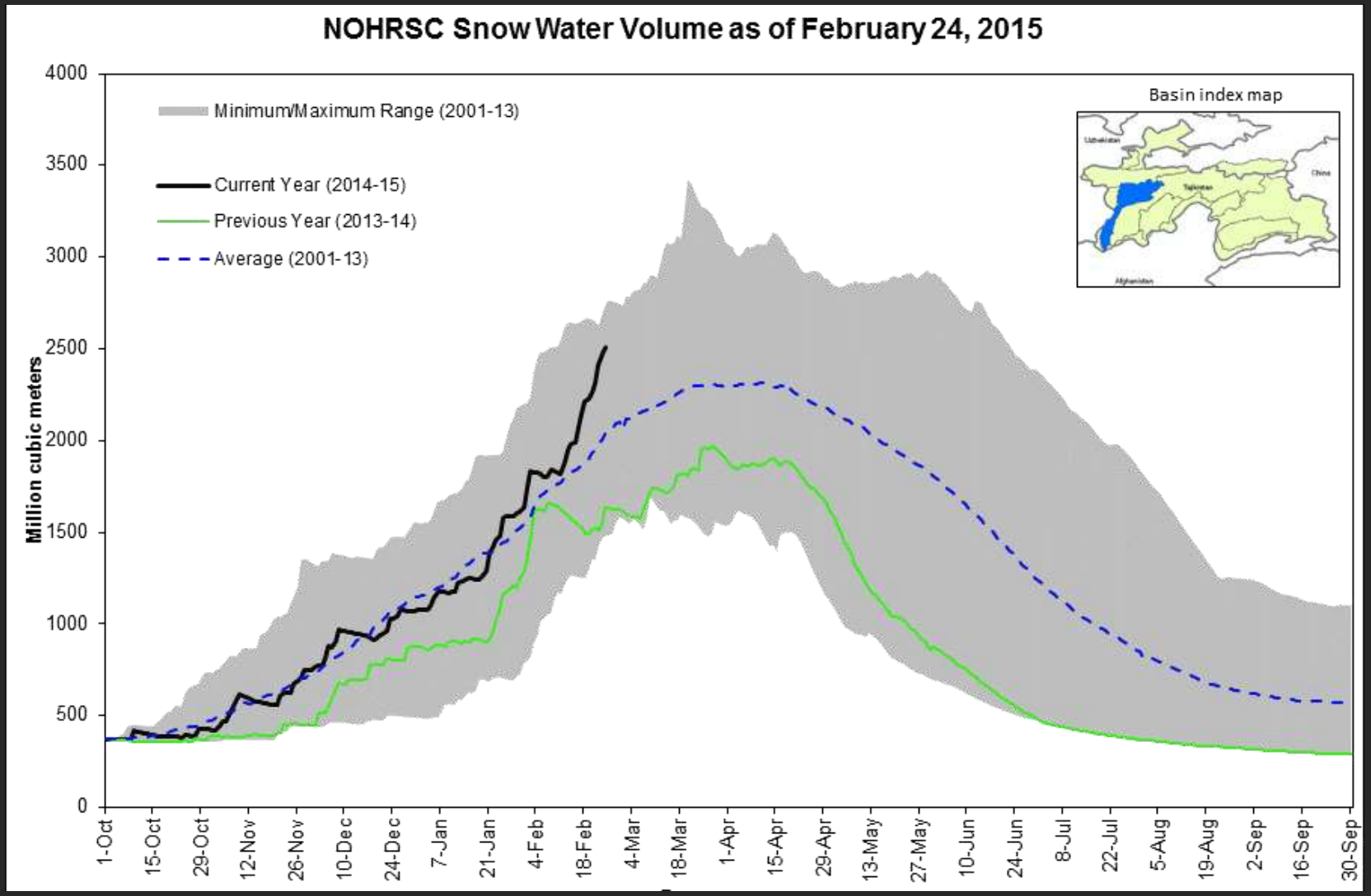
Snow Water Equivalent



Afghanistan Snow Cover



Tajikistan Snow Cover

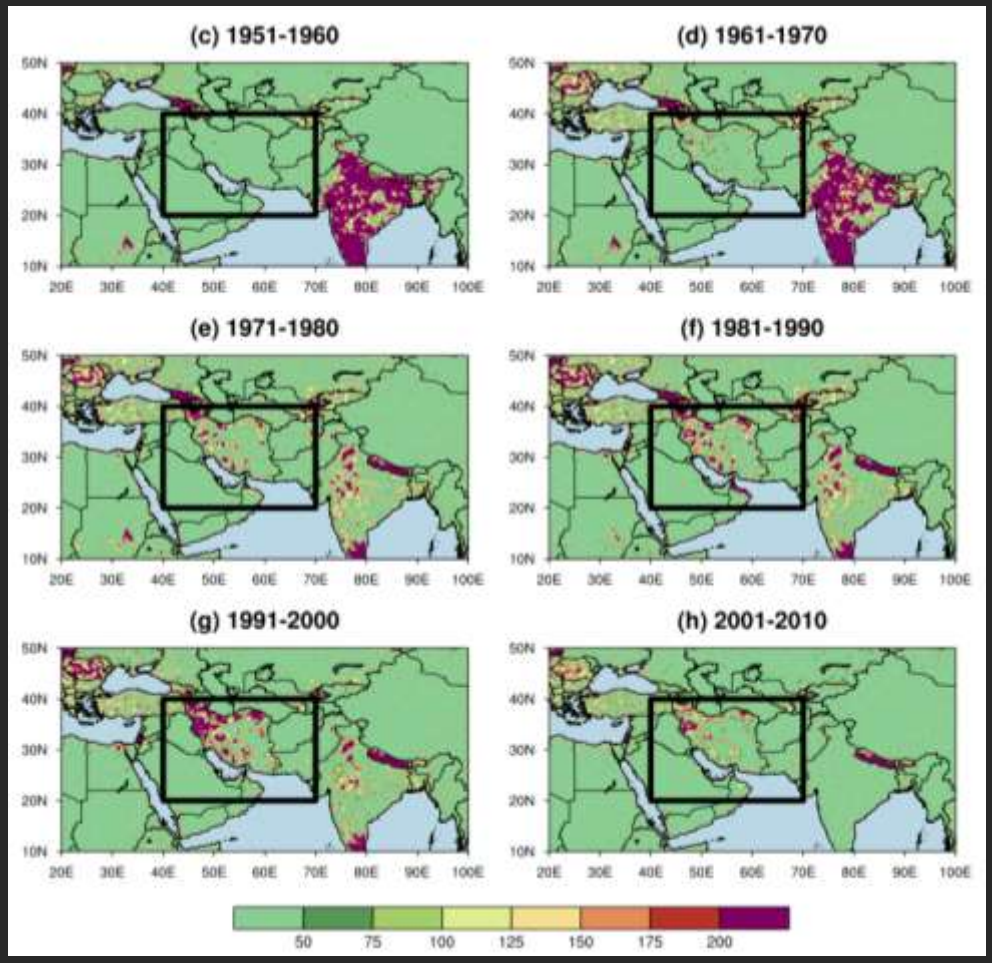


Drought Diagnostics: Observations and Models

Data Scarcity

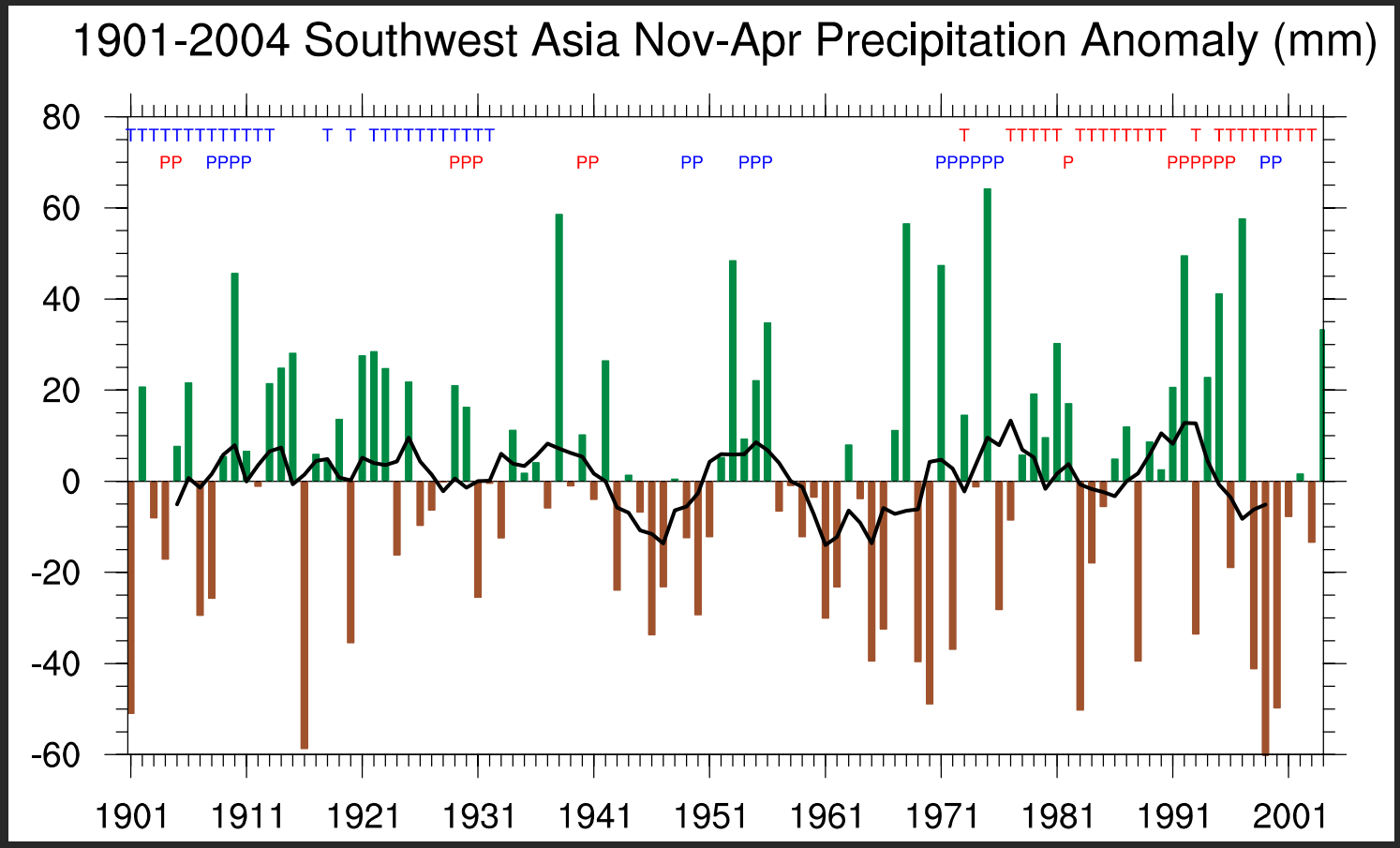
Robust Observed Diagnostics Are Difficult

Number of monthly observations in GPCC dataset in each 10 year period



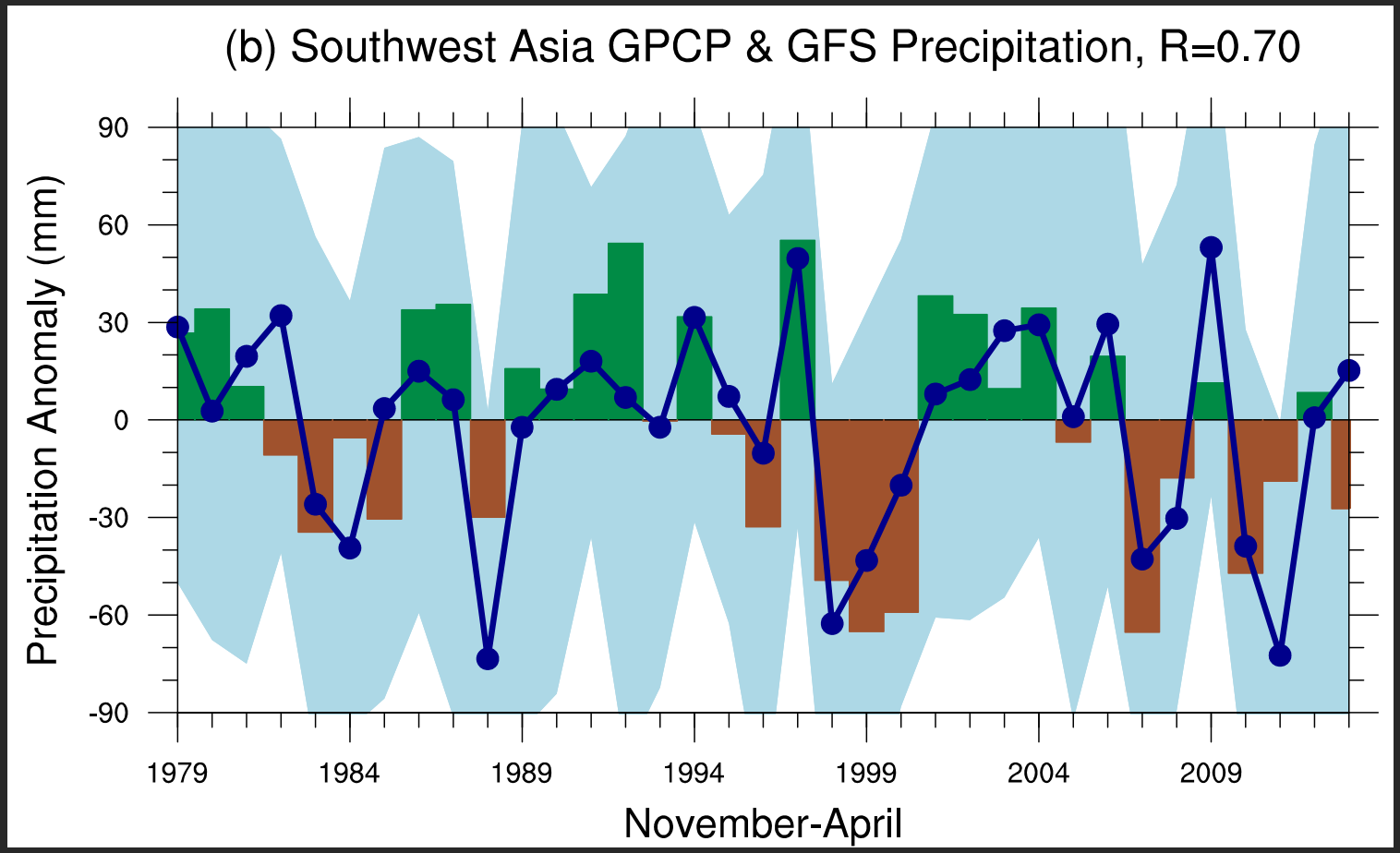
“Long Term” Southwest Asia Precipitation

Poor Sampling Results in Poor Record



Diagnosis With Data Difficulties

Use Simultaneous Observed and Modeling Approach



La Nina-related Drought

Test Response to an SST Pattern