CPC Drought Monitoring

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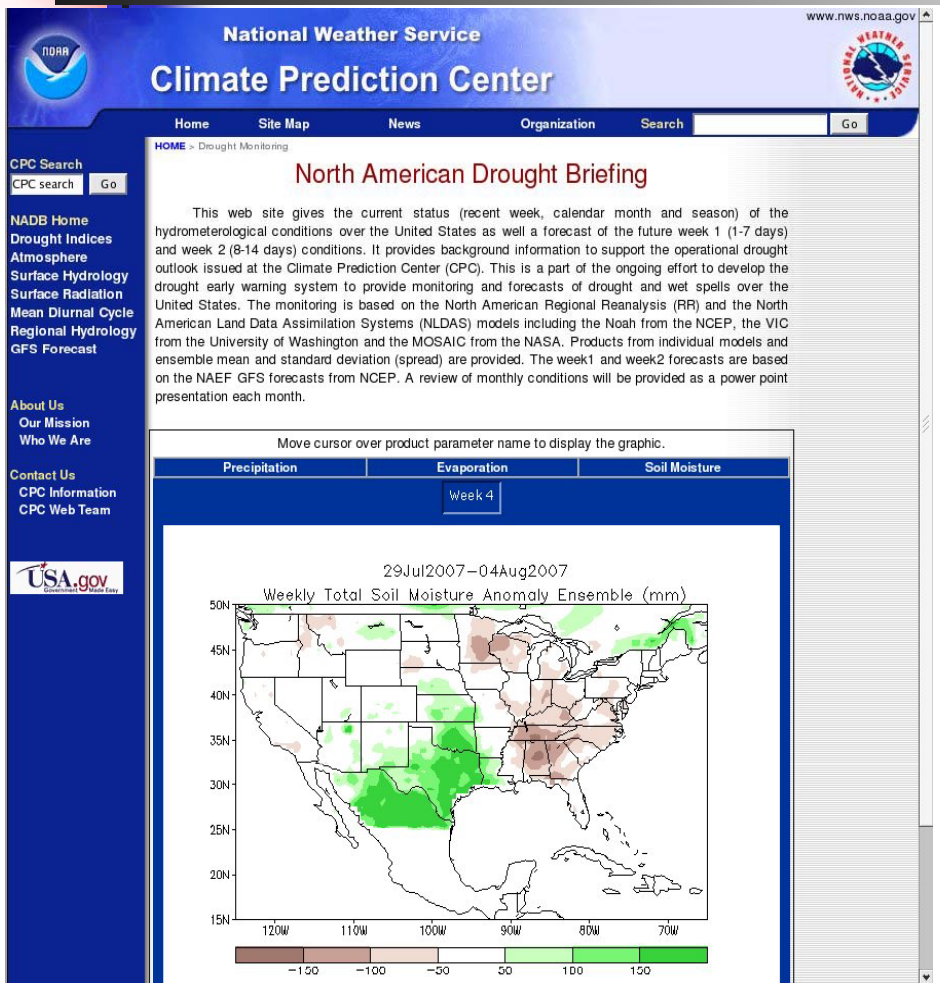
US Drought Monitor Forum
Austin, TX

7 Oct 09

Outline

- Monthly Drought Briefing
- Drought Blends, LDAS, and GRACE
- CPC – Pushing more into GIS formats

Monthly Drought Briefing



Usually second week of the month

Land-surface properties:

EMC/NCEP NLDAS

Atmospheric variables:

NARR

Consumers **Producers**

First order attributions

Forecasts

http://www.cpc.ncep.noaa.gov/products/Drought

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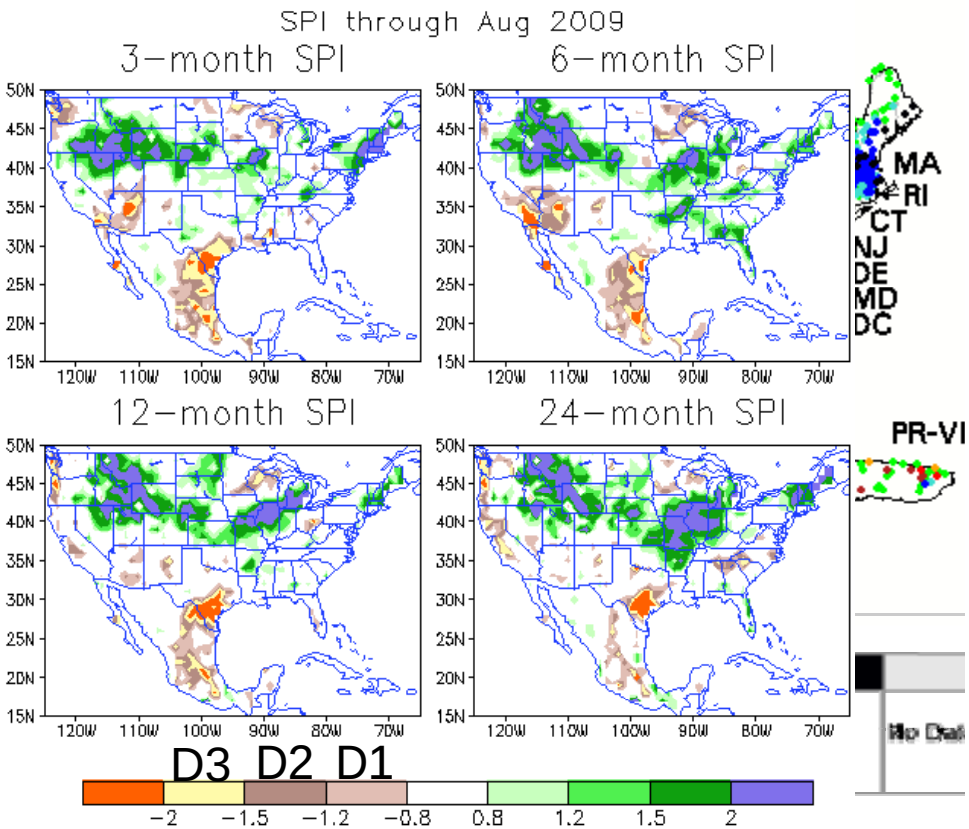
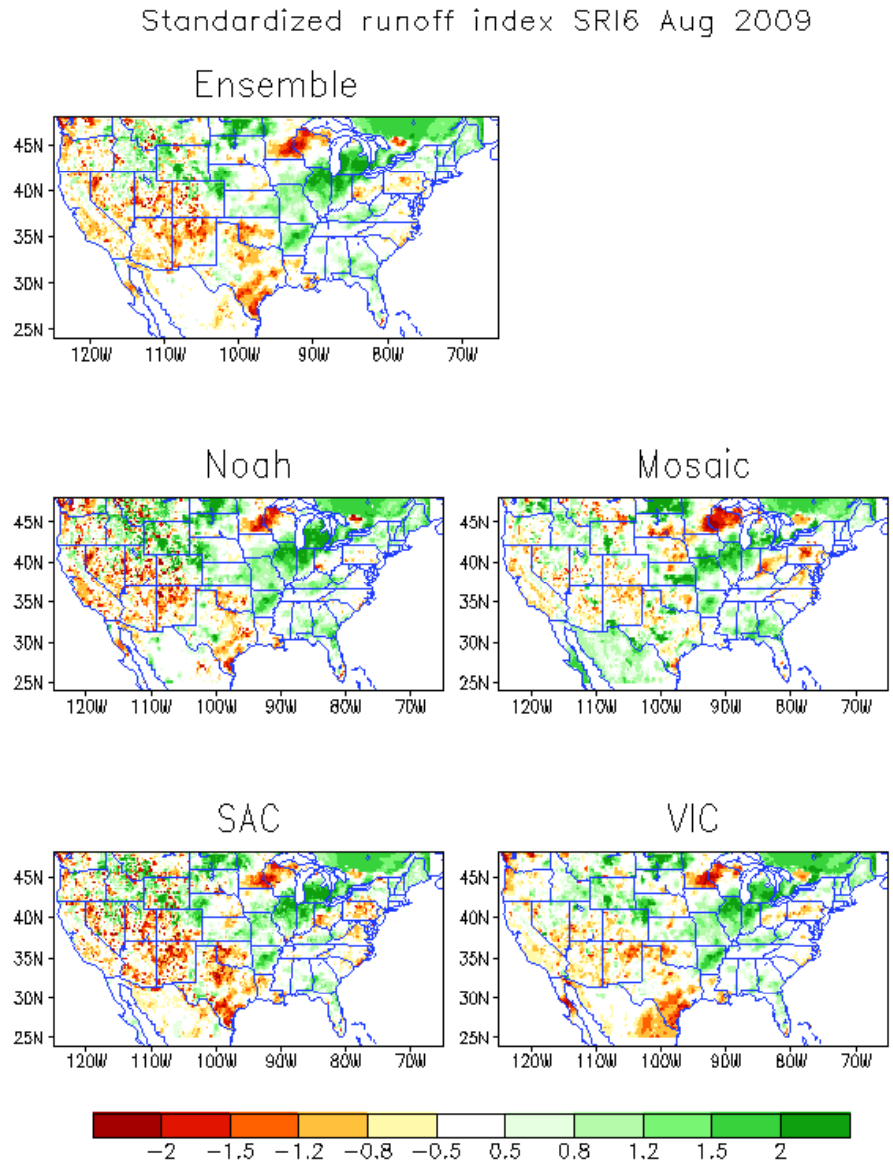
Objective drought monitoring Index Based

- Meteorological drought: Precipitation deficit.
  - Standardized Precipitation Index
- Hydrological drought: Streamflow or runoff deficit
  - Standardized Runoff Index
- Agricultural drought: Soil water storage deficit
  - SM Anomaly Percentile

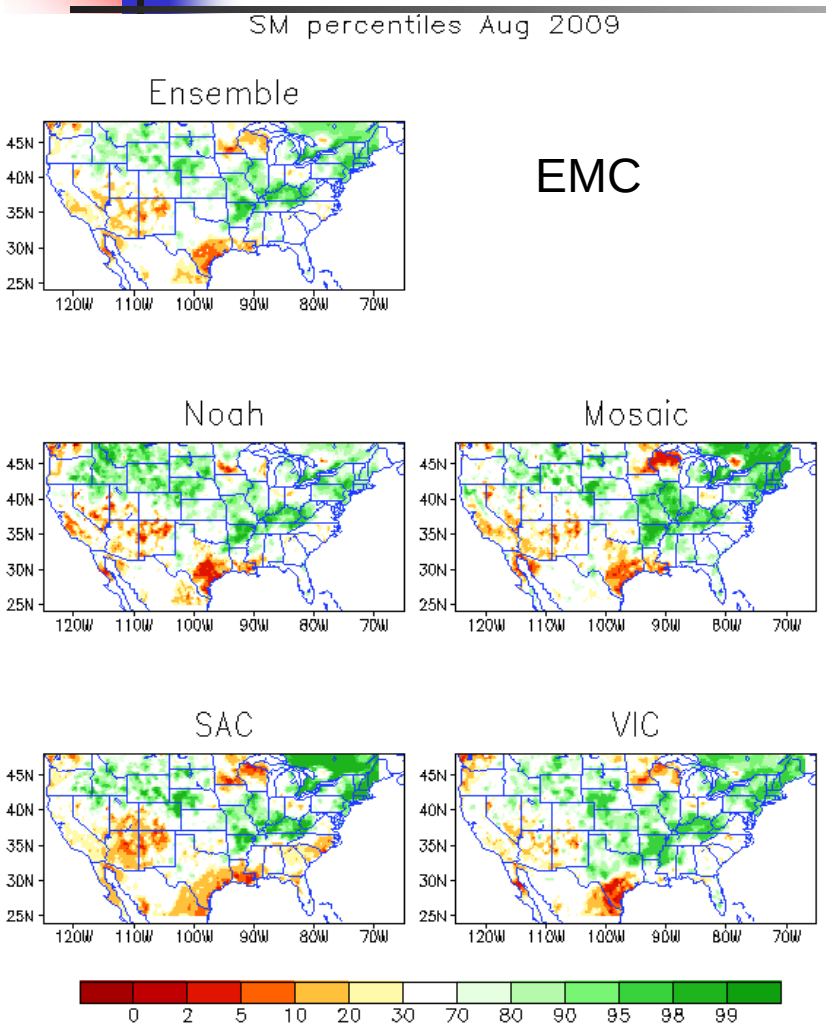
Examples





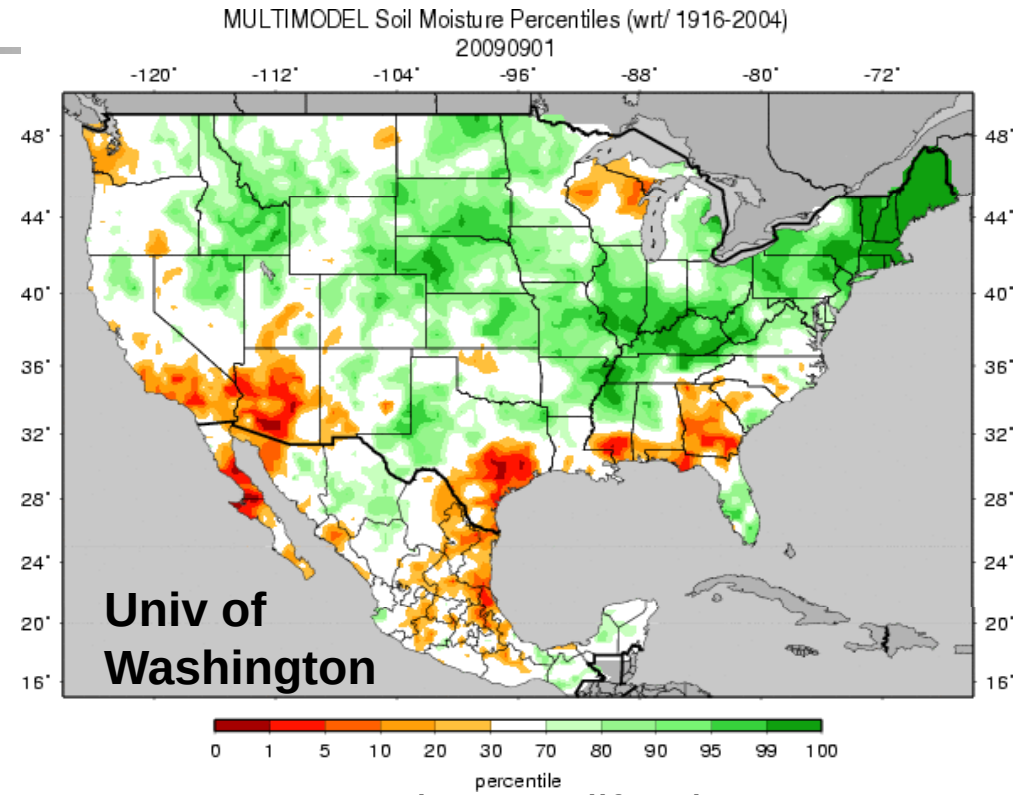
Meteorological
Hydrological

Multi model SM percentiles



EMC

Agricultural

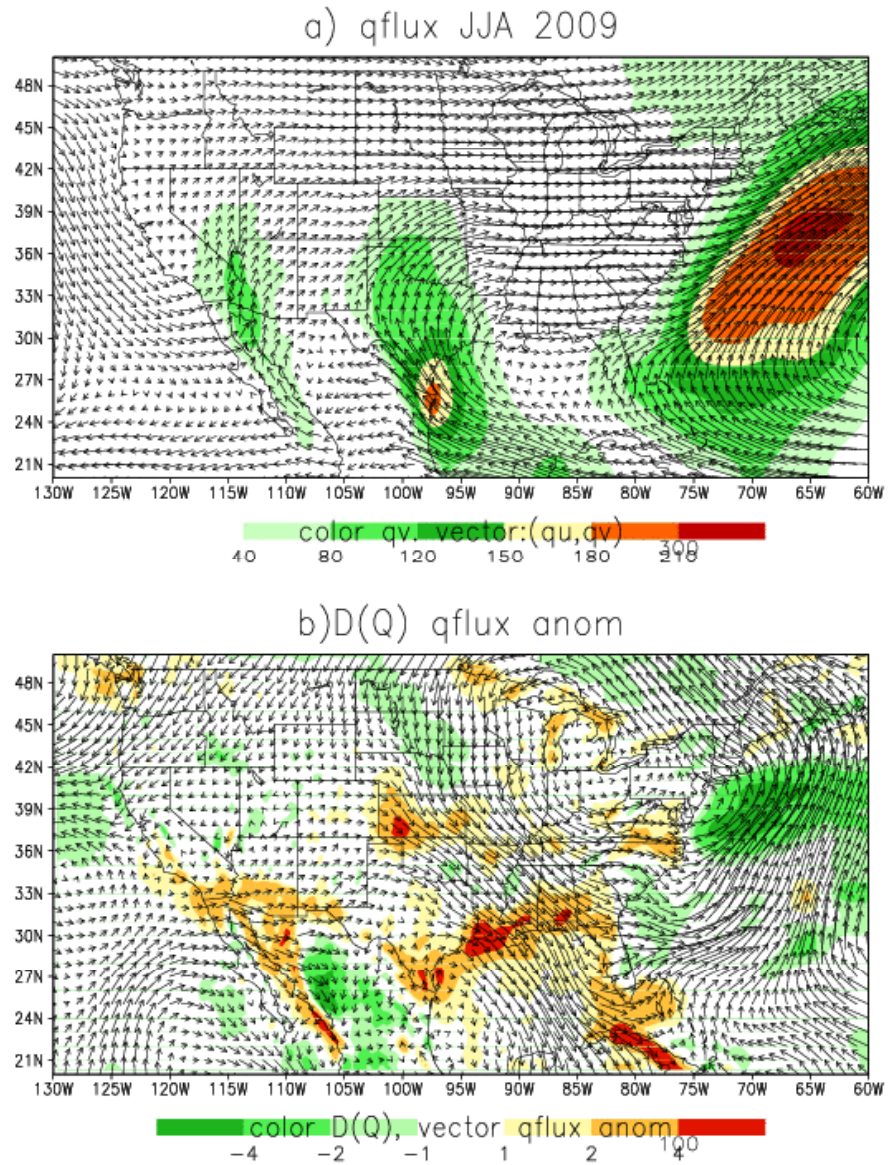


Texas, AZ, southern California: SM%, runoff and SPI all indicate drought

Pacific Northwest: streamflow and SM% indicate drought.

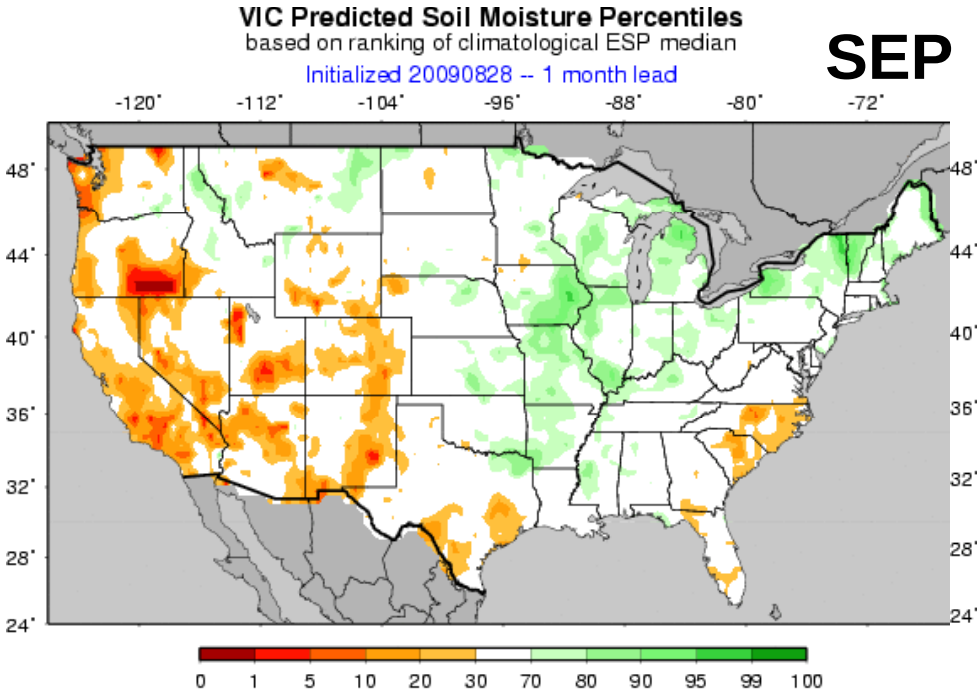
Rainy season starts in Oct or Late Sep.

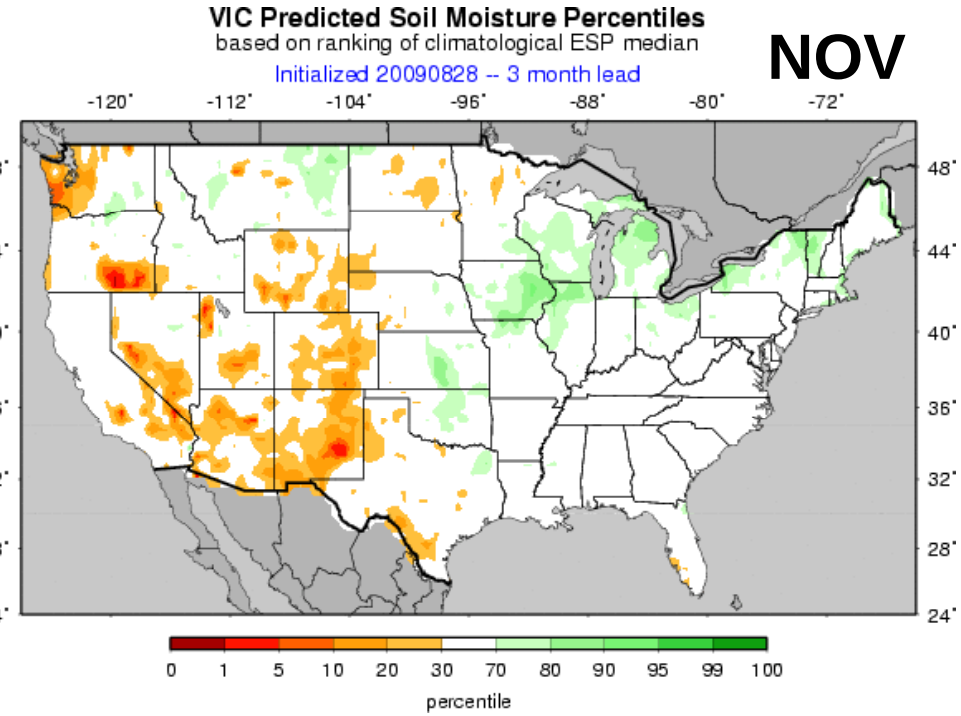
Attribution – Diving Deeper

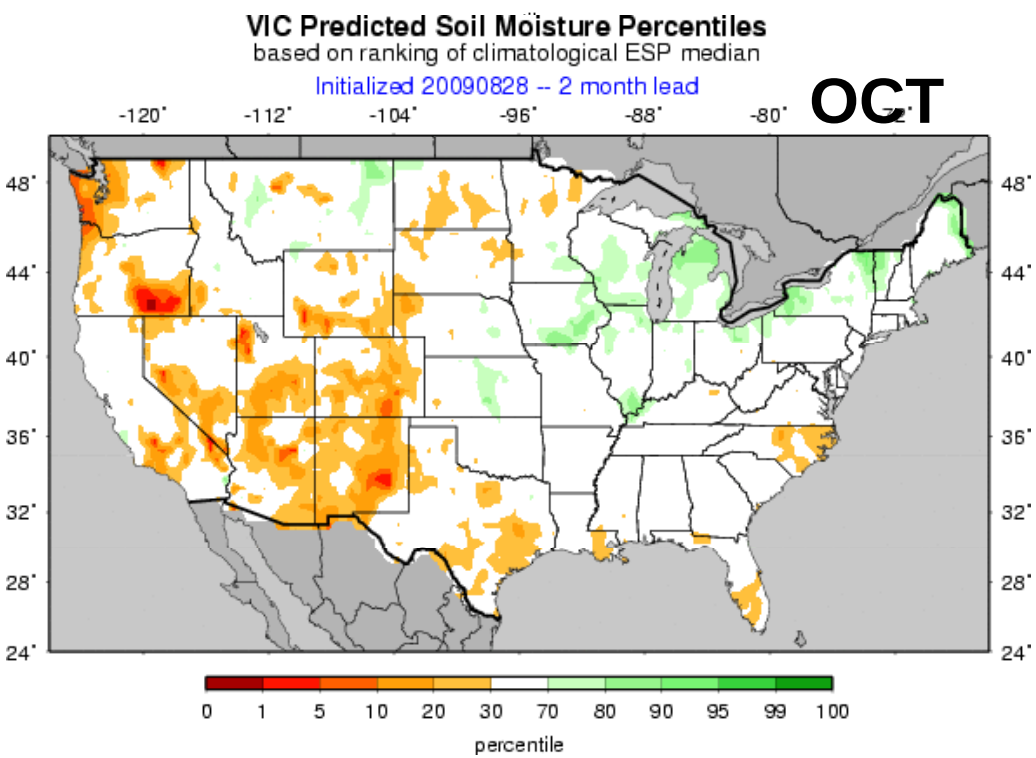


Qflux JJA

- The low level jet over the great plains was weak and positive D(Q) anomalies imply dryness over Texas
- The weaker LLJ from the Gulf of California is also consistent with a dry monsoon season







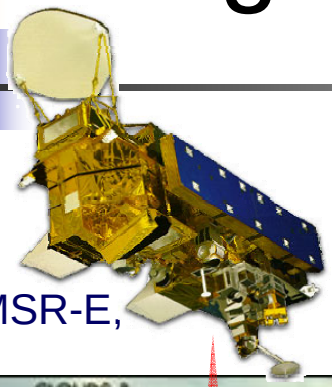
University of Washington

Forecasts provided each month

Consumers Producers

Vital link in Dvlpmnt Stage

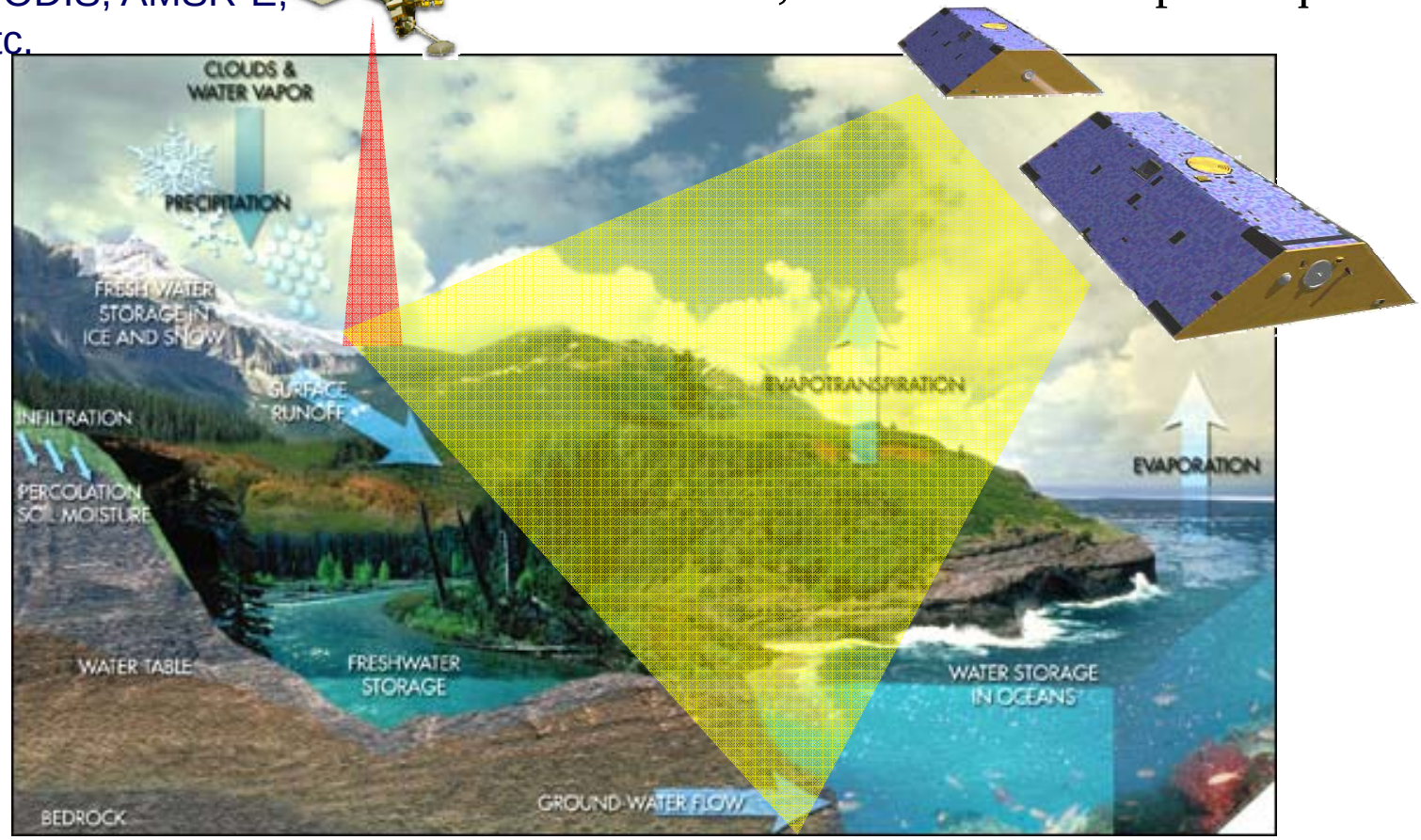
Drought Blends meets LDAS



Aqua:
MODIS, AMSR-E, etc.

GRACE

GRACE is unique in its ability to monitor water at all levels, down to the deepest aquifer



Partners:

NASA

NOAA

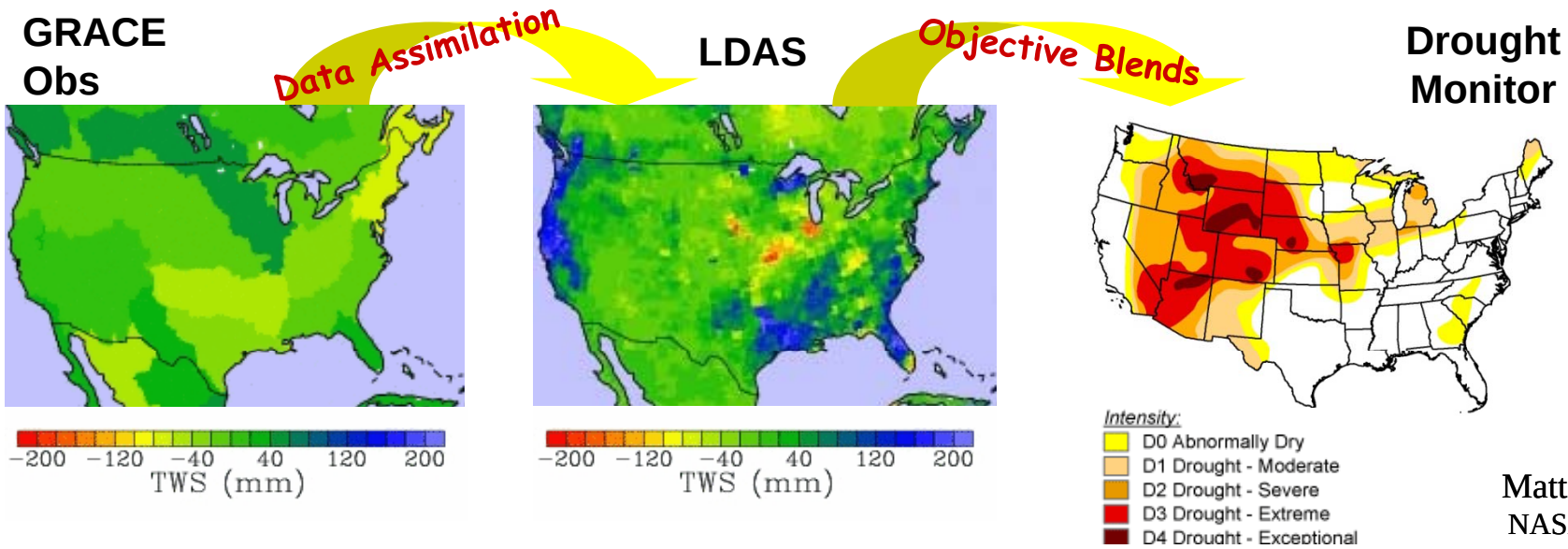
NDMC

UC Irvine

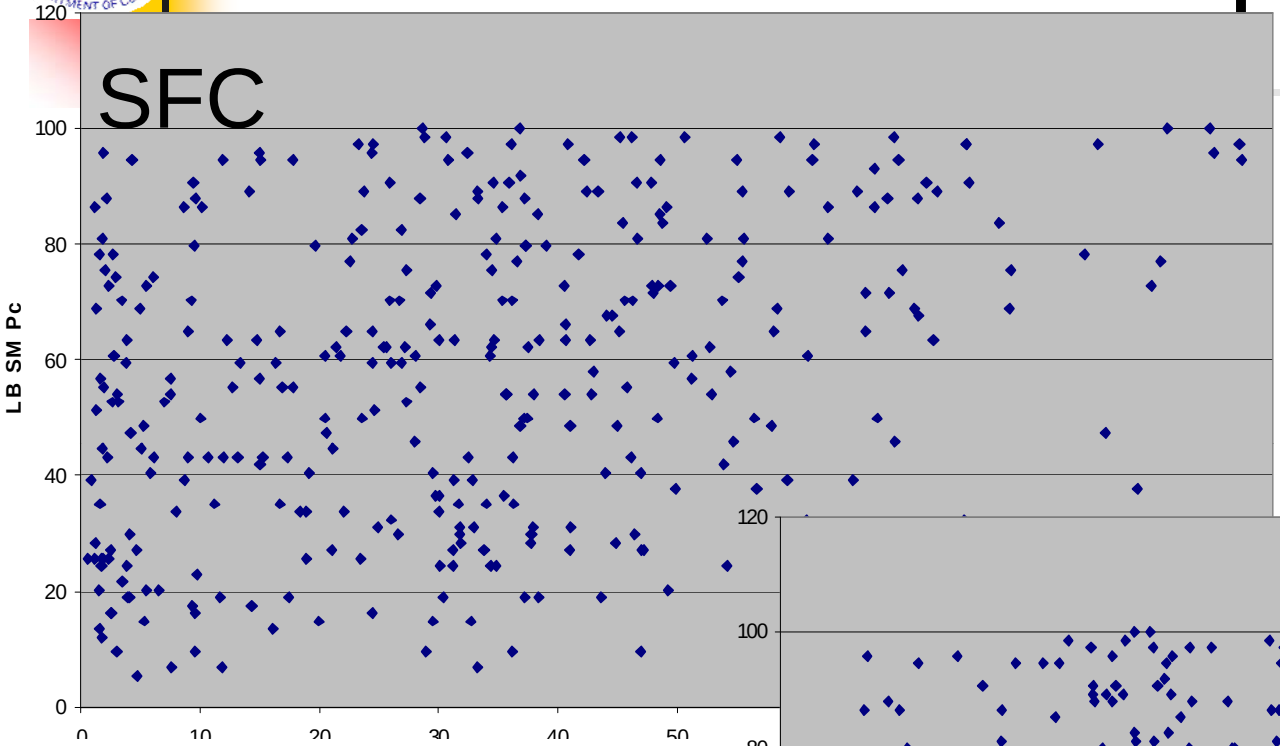
Matt Rodell
NASA GSFC

Project Specifications

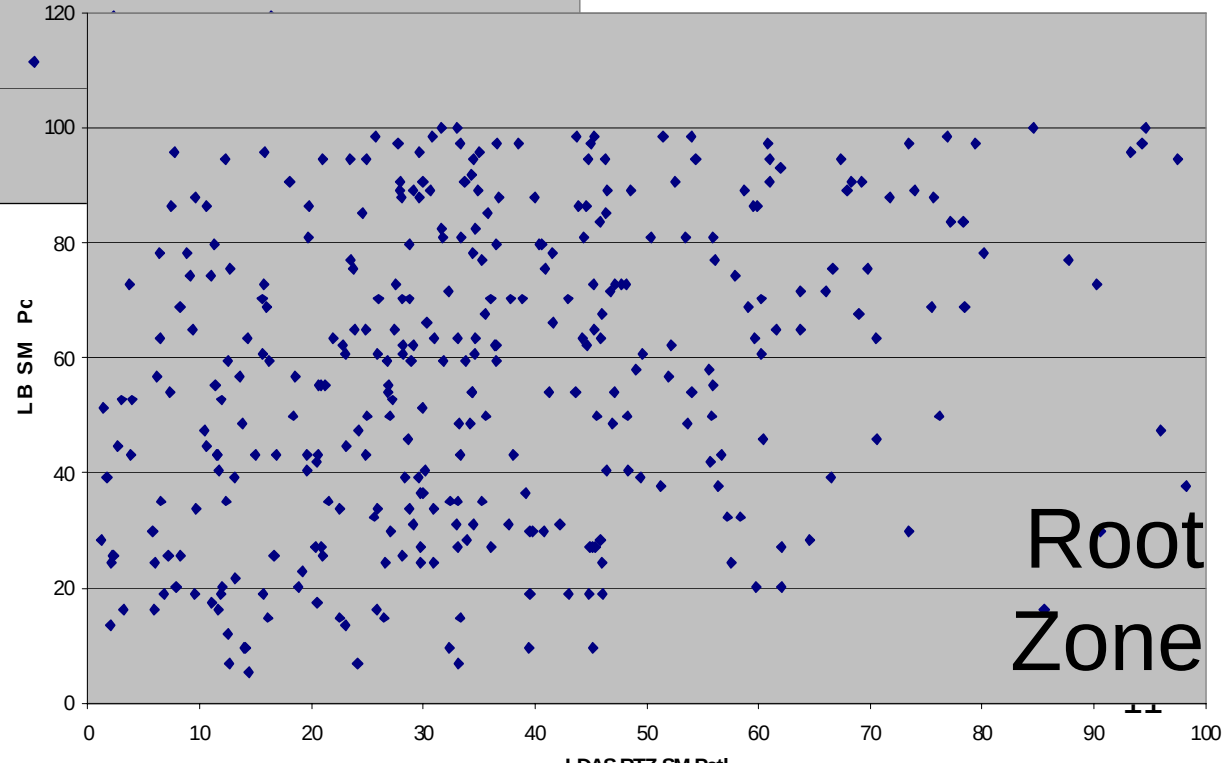
- 60-year retrospective Catchment model simulation for background climatology – compare to GRACE DA, CPC Blends
- 20-member ensemble simulations for open loop (OL) and data assimilation (DA) 2002-present
- GRACE "quick look" fields for timeliness vice GRACE final
- Output soil moisture and groundwater fields introduced as rank percentiles to Objective Blends, which are the baseline for Drought Monitor products



GRACE – Blends Comparisons

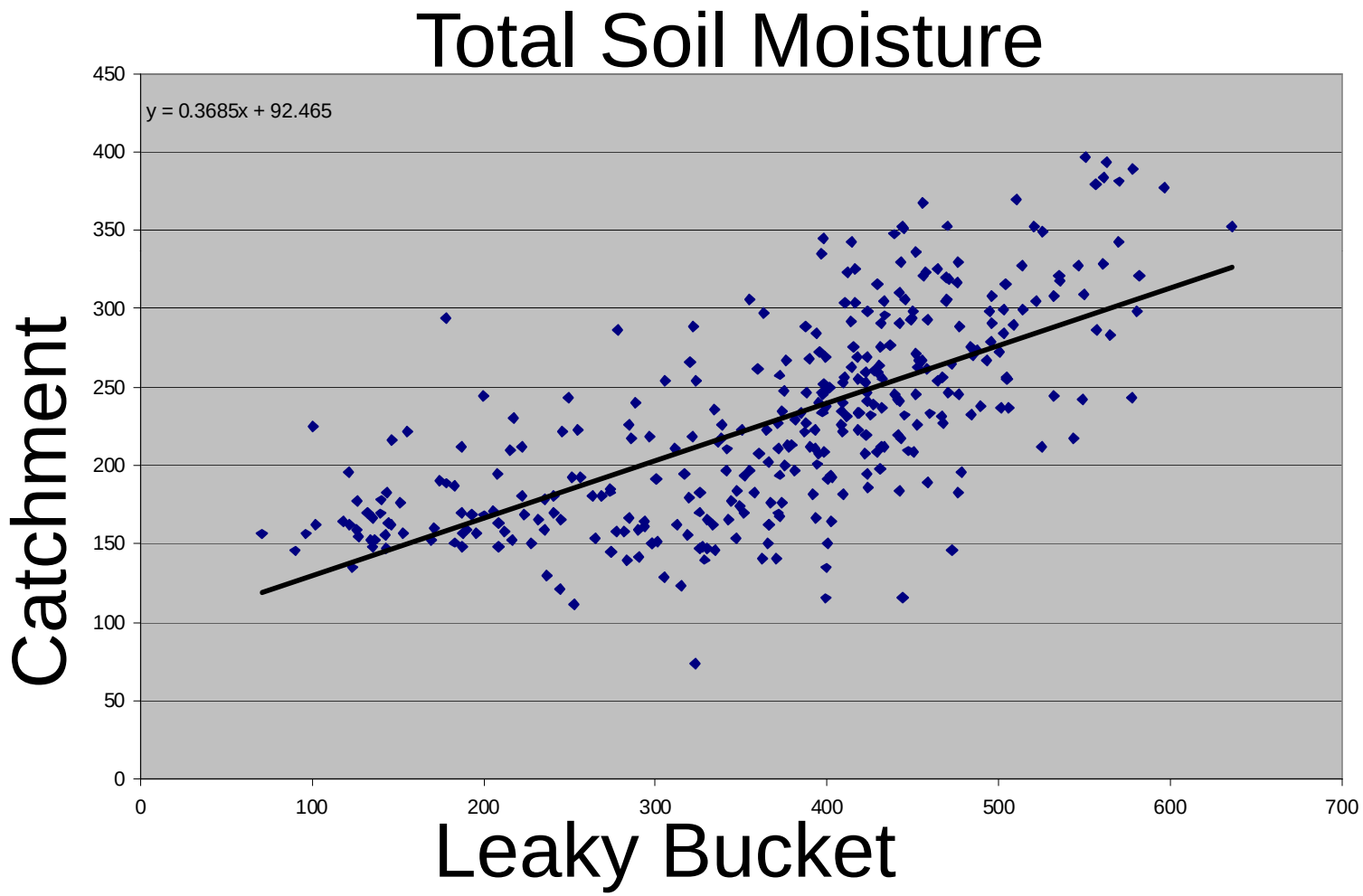


LDAS SM Pctls
vs
LB SM Pctls



Comparisons of percentiles shows little resemblence

GRACE – Blends Comparisons



MAE

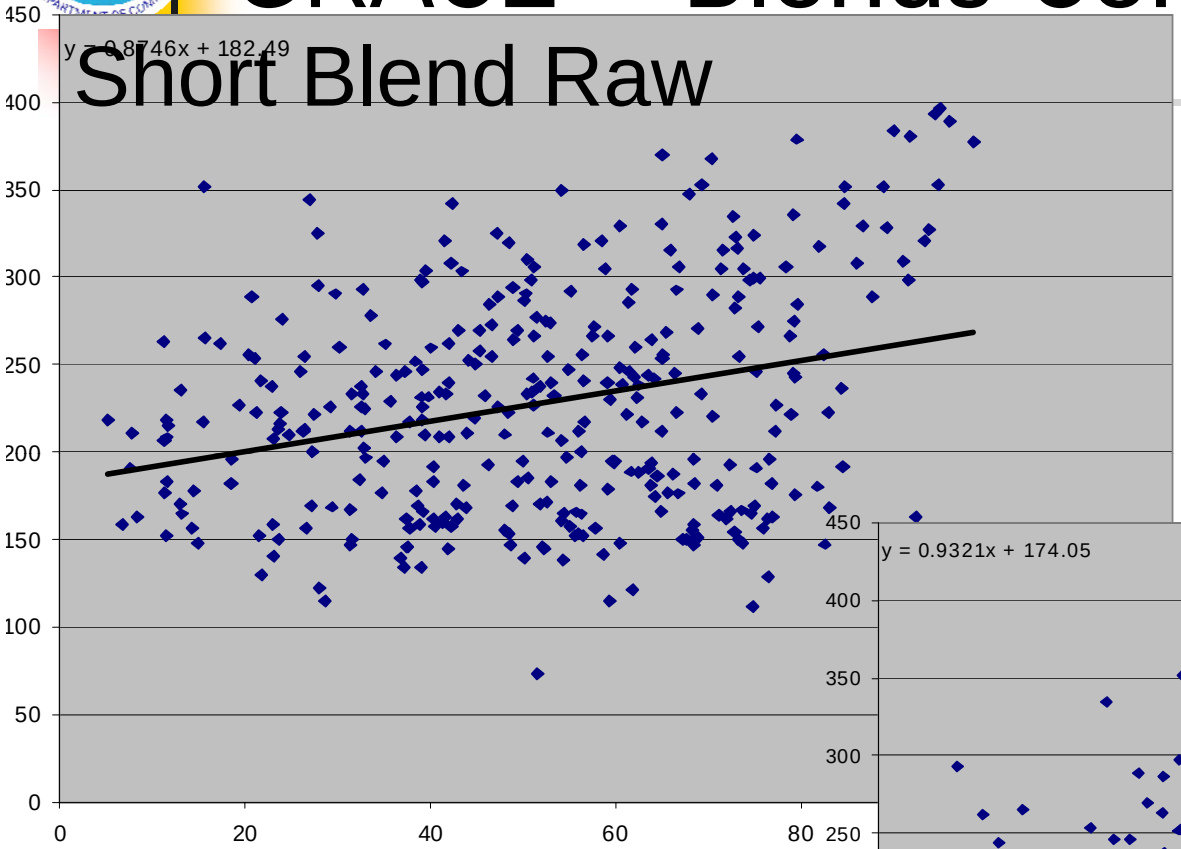
147.11

RMSE

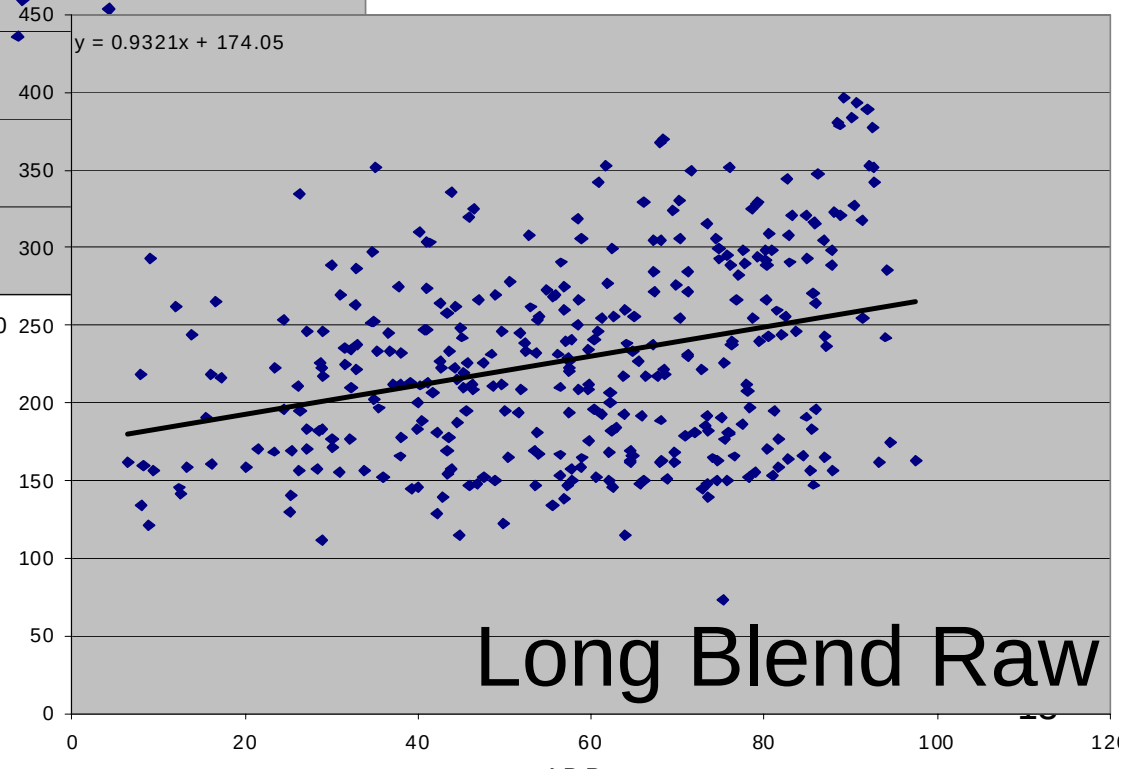
164.76

SFC + RTZ for Catchment (~1m), Full depth (1.6m) Leaky Bucket

GRACE – Blends Comparisons



LDAS SM Pctls
vs
Raw Blends



LDAS Tot Col SM

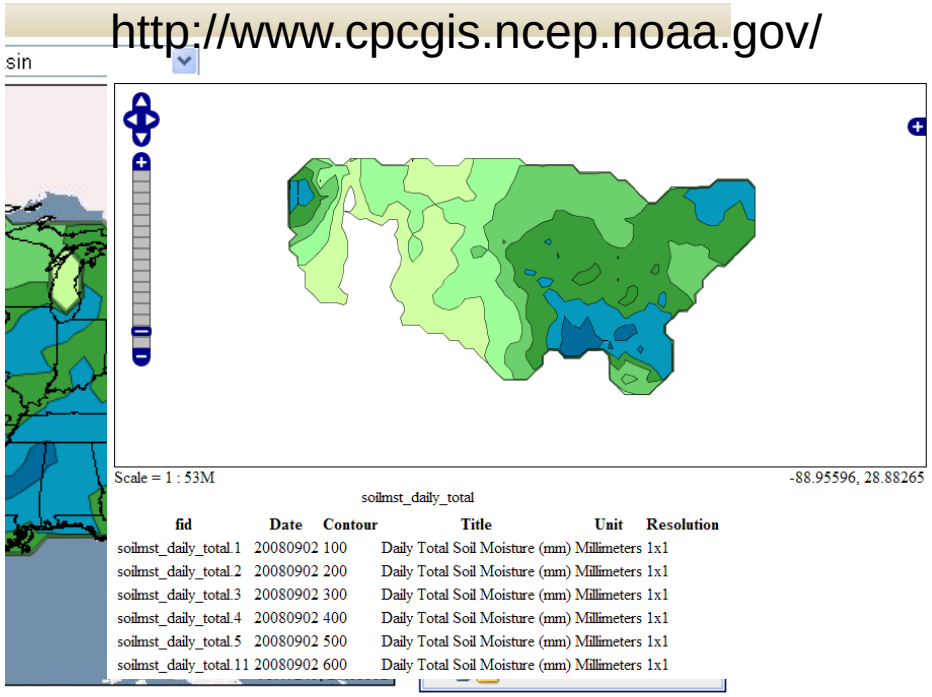
Follows Raw blends more than final blends

CPC GIS Layers

Open Source GeoServer:

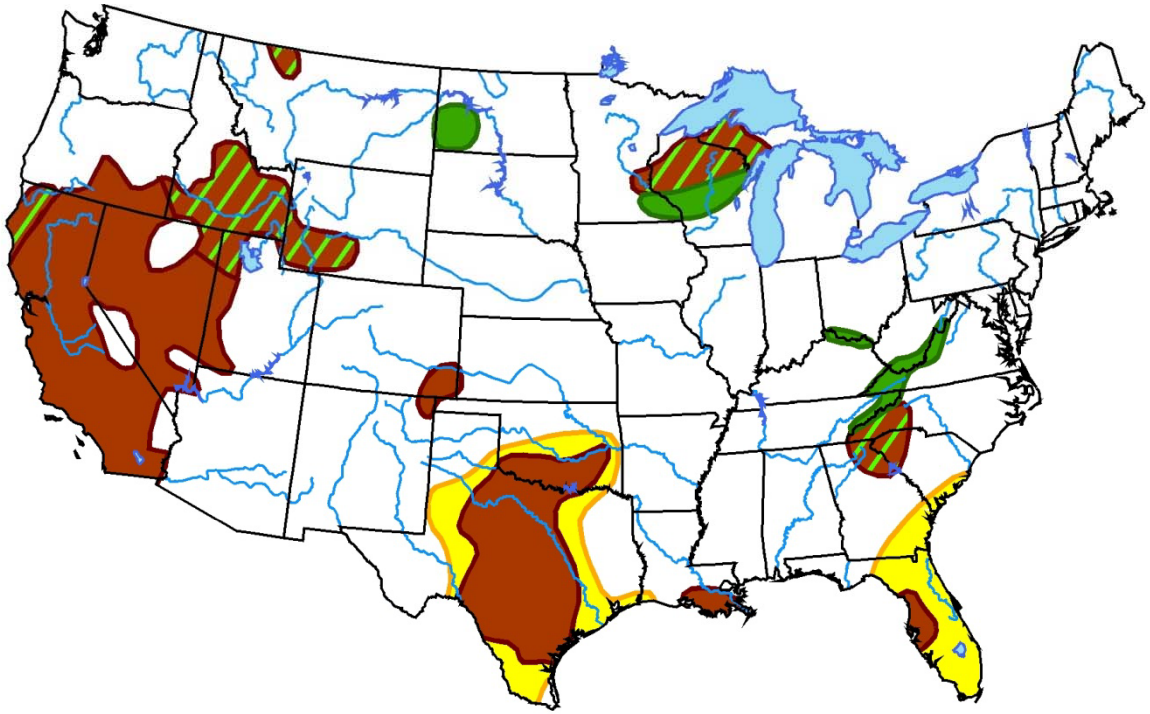
Layer (NameSpace:FeatureType)	Preview Map
USDM:evap_daily_anom	OpenLayers KML GeoRSS PDF SVG
USDM:evap_daily_mean	OpenLayers KML GeoRSS PDF SVG
USDM:evap_monthly_anom	OpenLayers KML GeoRSS PDF SVG
USDM:evap_monthly_mean	OpenLayers KML GeoRSS PDF SVG
USDM:evap_monthly_percentile	OpenLayers KML GeoRSS PDF SVG
USDM:precip_daily_anom	OpenLayers KML GeoRSS PDF SVG
USDM:precip_daily_total	OpenLayers KML GeoRSS PDF SVG
USDM:precip_monthly_anom	OpenLayers KML GeoRSS PDF SVG
USDM:precip_monthly_percentile	OpenLayers KML GeoRSS PDF SVG
USDM:precip_monthly_total	OpenLayers KML GeoRSS PDF SVG
USDM:runoff_daily_anom	OpenLayers KML GeoRSS PDF SVG
USDM:runoff_daily_mean	OpenLayers KML GeoRSS PDF SVG
USDM:runoff_monthly_anom	OpenLayers KML GeoRSS PDF SVG
USDM:runoff_monthly_mean	OpenLayers KML GeoRSS PDF SVG
USDM:runoff_monthly_percentile	OpenLayers KML GeoRSS PDF SVG
USDM:soilmst_daily_anom	OpenLayers KML GeoRSS PDF SVG
USDM:soilmst_daily_percentile	OpenLayers KML GeoRSS PDF SVG
USDM:soilmst_daily_total	OpenLayers KML GeoRSS PDF SVG
USDM:soilmst_monthly_anom	OpenLayers KML GeoRSS PDF SVG
USDM:soilmst_monthly_percentile	OpenLayers KML GeoRSS PDF SVG
USDM:soilmst_monthly_total	OpenLayers KML GeoRSS PDF SVG
USDM:temp_daily_anom	OpenLayers KML GeoRSS PDF SVG
USDM:temp_daily_mean	OpenLayers KML GeoRSS PDF SVG
USDM:temp_monthly_anom	OpenLayers KML GeoRSS PDF SVG
USDM:temp_monthly_mean	OpenLayers KML GeoRSS PDF SVG
USDM:temp_monthly_percentile	OpenLayers KML GeoRSS PDF SVG

http://www.cpcgis.ncep.noaa.gov/



- Web Mapping Services (WMS)
  - Meets Open Geospatial Consortium (OGC) standards
- Transition to ArcGIS Server coming

Seasonal Drought Outlook



- Allow users to see additional features on the map.
  - Layers – Overlay with other data.
  - Zoomable – National → Regional → State → Subdivison → Cul-de-sac?