

Remote Sensing for Water Resource Management:

A Few Available Products

Chris Martinez

North American Land Data Assimilation System (NLDAS)

- 2 main datasets:
 - Forcings for land surface models (LSMs)
 - Output from four LSMs
- 1/8 degree resolution
- 1979 - present

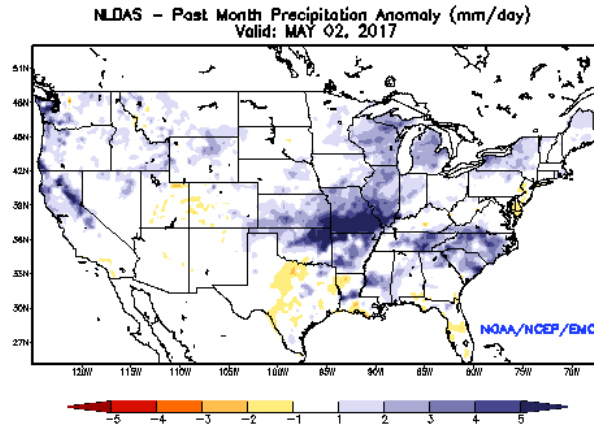
<https://ldas.gsfc.nasa.gov/index.php>

NLDAS

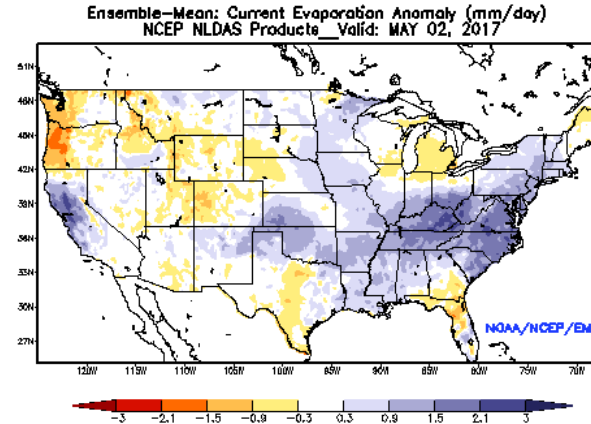
- Forcing data is a combination of:
- Gauge observations
- North American Regional reanalysis (NARR)
- Geostationary Operational Environmental Satellite (GOES)-derived solar radiation

NLDAS-based Drought Indicators

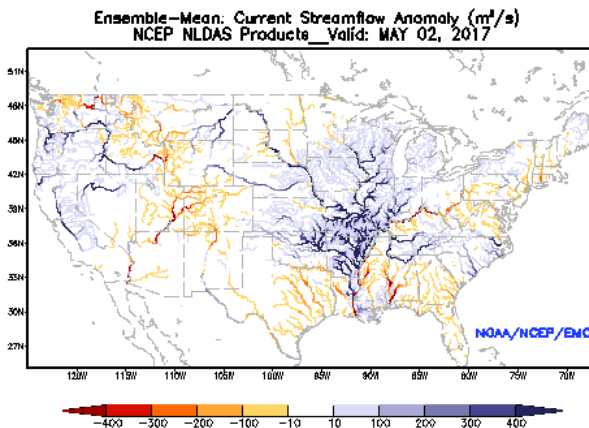
Precipitation Anomaly



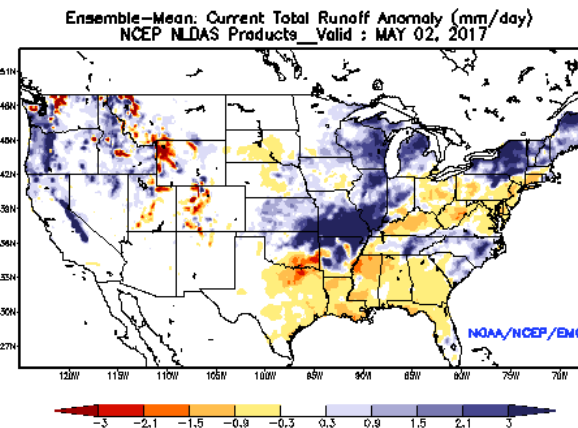
Evapotranspiration Anomaly



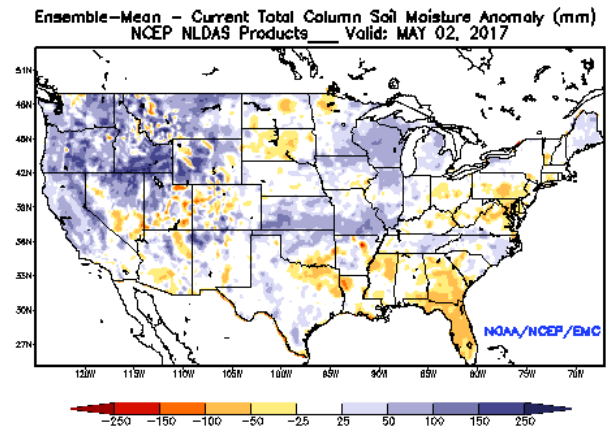
Streamflow Anomaly



Runoff Anomaly



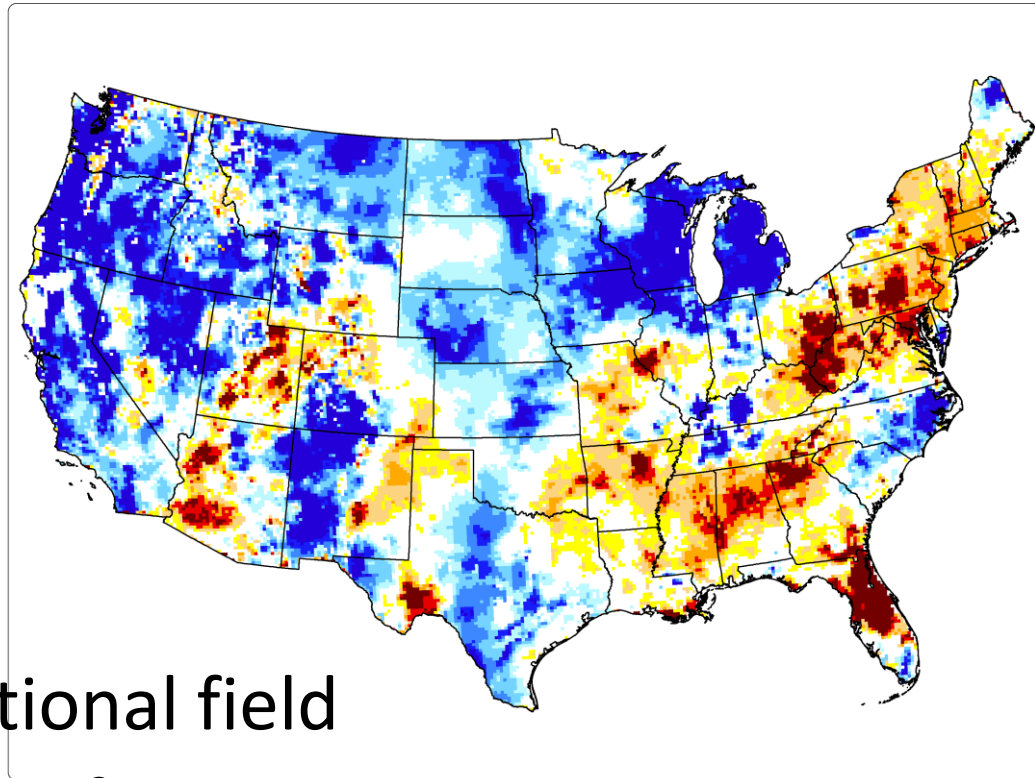
Soil Moisture Anomaly



<http://www.emc.ncep.noaa.gov/mmb/nldas/drought/>
<http://www.cpc.ncep.noaa.gov/products/Drought/>

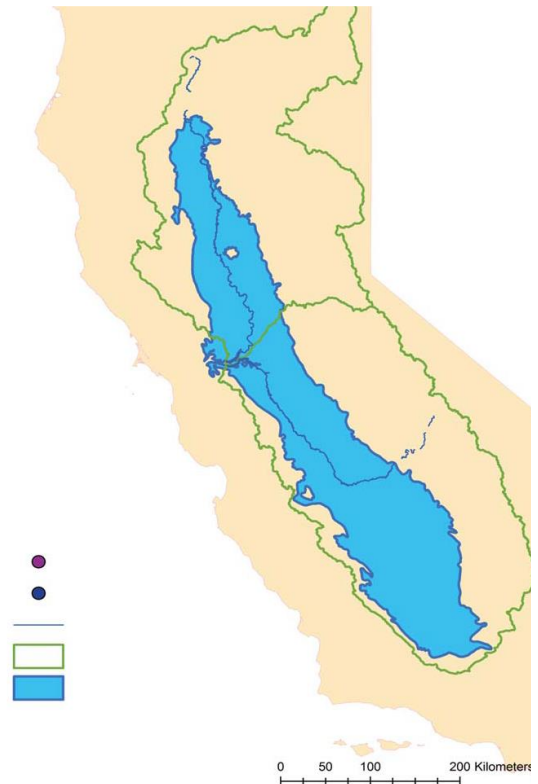
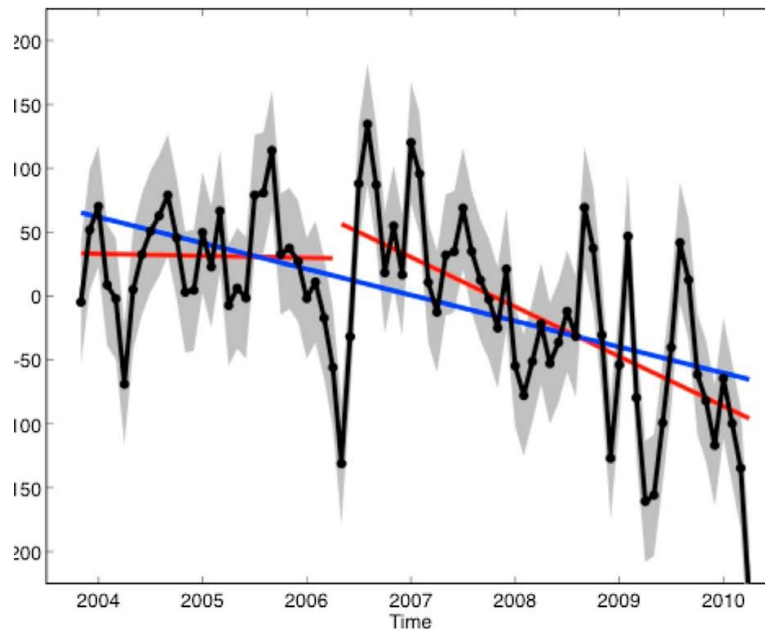
Groundwater and Soil Moisture Conditions from GRACE

- Groundwater
- Recovery
- And
- Climate
- Experiment
- Detects changes in Earth's gravitational field
- Scale: $\sim 100,000 \text{ km}^2$



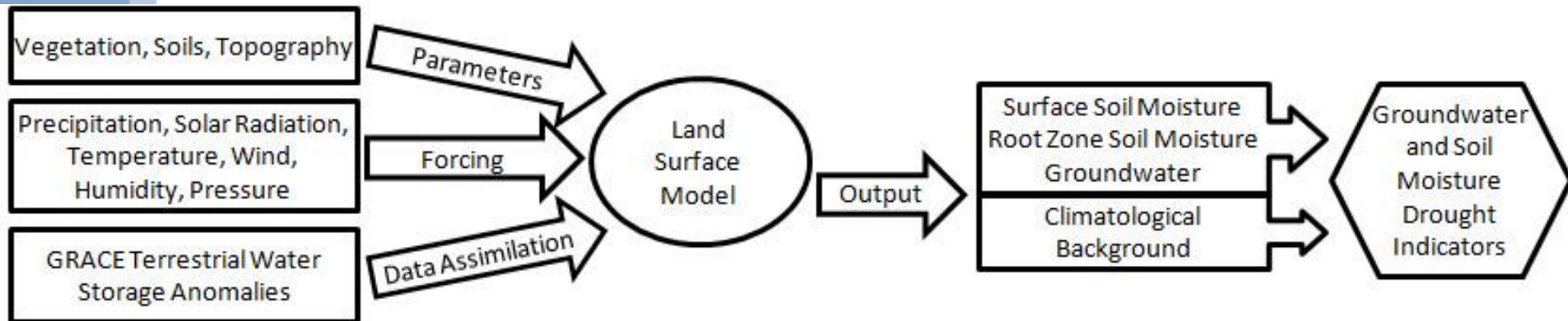
GRACE: Depletion in Central Valley

- Losing ~ 31 mm/yr (~ 20 mm/yr from groundwater)



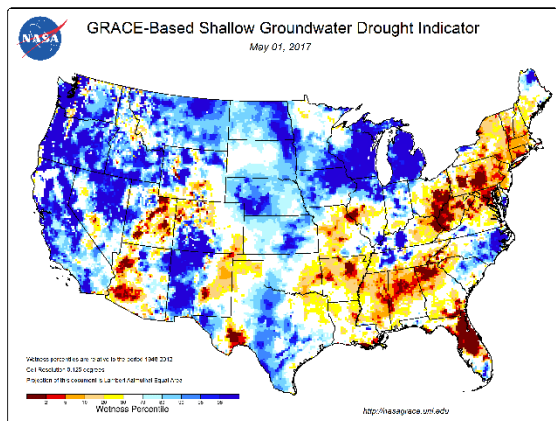
Famiglietti et al. 2011. Geophysical Research Letters, 38(3), L03403
doi: <http://dx.doi.org/10.1029/2010GL046442>.

GRACE-based Drought Indicators

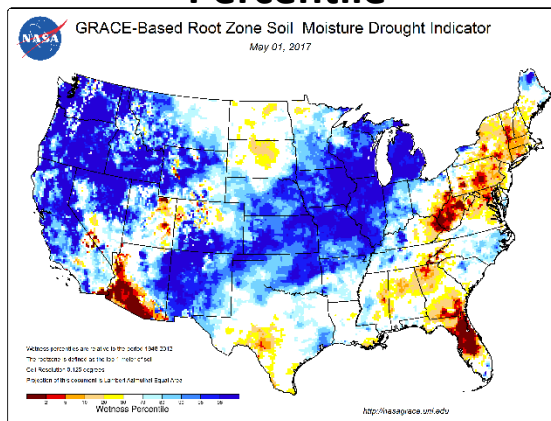


<http://nasagrace.unl.edu>

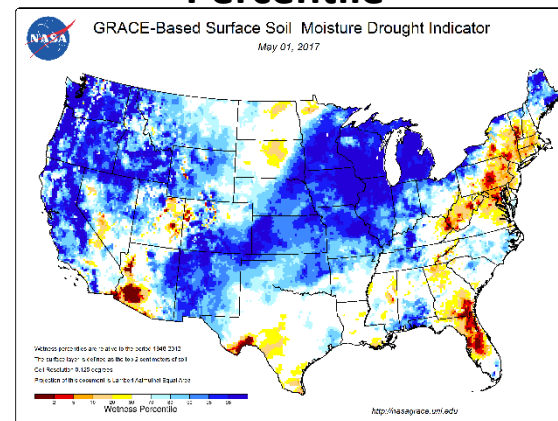
Groundwater Percentile



Root Zone Soil Moisture Percentile



Surface Soil Moisture Percentile



A Few other Products and Resources

- Tropical Rainfall Measuring Mission
- Global Precipitation Measurement System
- Soil Moisture Active Passive
- National Environmental Satellite, Data, and Information Service <https://www.nesdis.noaa.gov/>
- Training Opportunities:
 - Appplied Remote Sensing Training <https://arset.gsfc.nasa.gov/>