

# River Forecast Center Soil Moisture Products

MOISST Workshop

Eric Jones  
May 2017

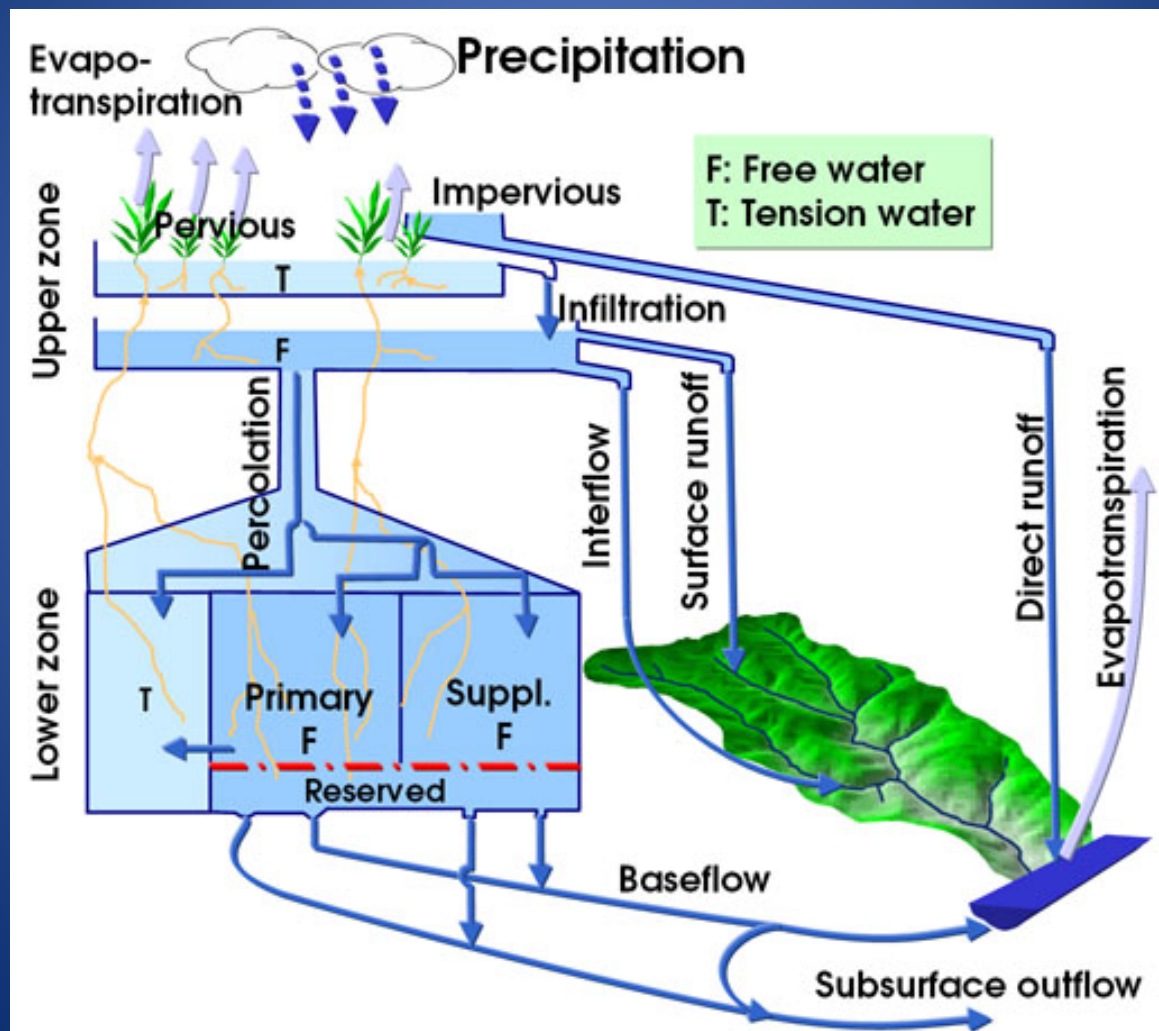


# Rainfall/Runoff Models

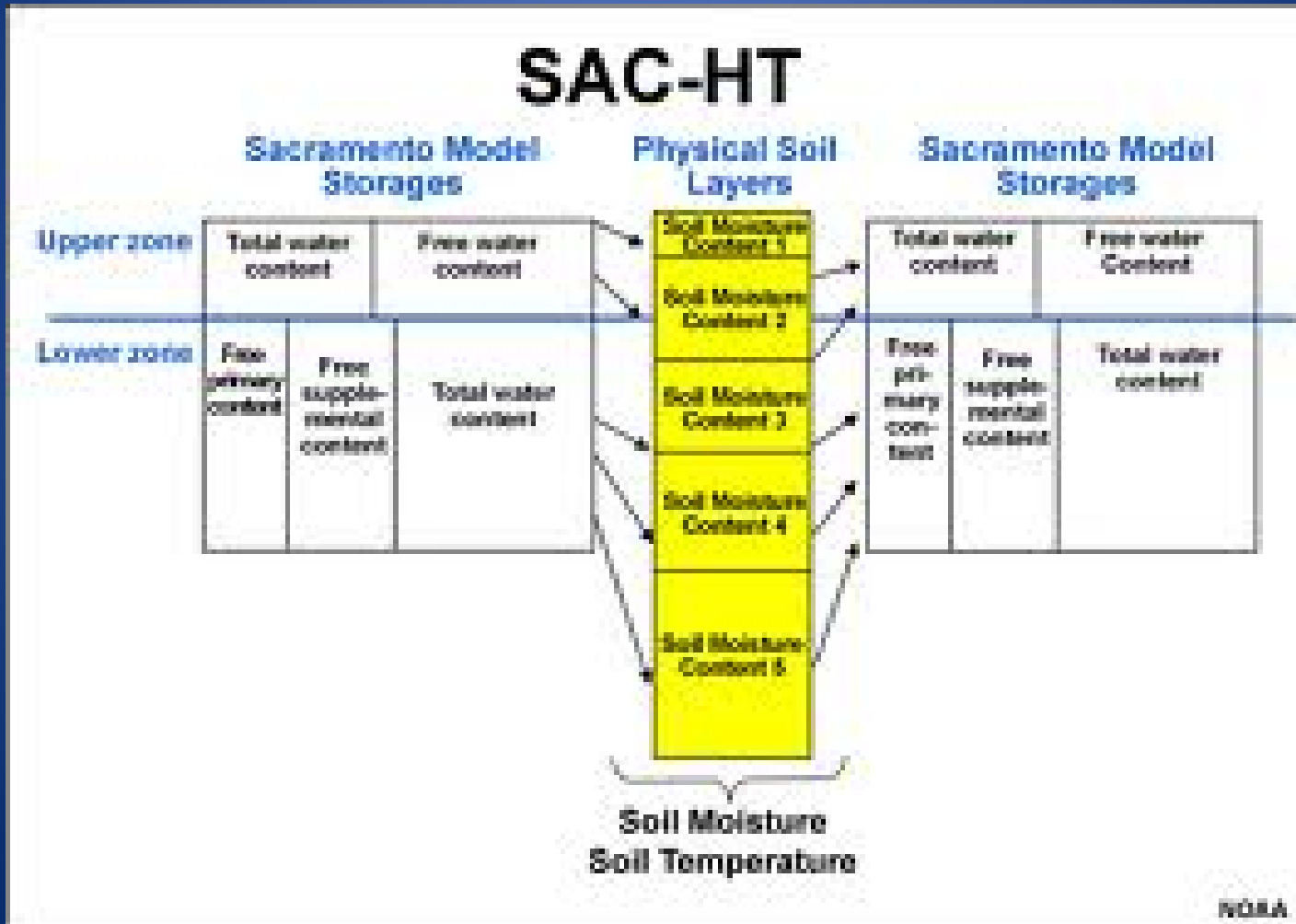


- Legacy SAC-SMA for majority of operations
  - Upper and lower soil moisture buckets
  - Catchment basin scale (50-1000 sq mi)
- Gridded Distributed Hydrologic Model for Flash Flood Guidance and flashier stream flow modeling
  - Uses both legacy SAC-SMA and SAC-HT
  - 4x4 km resolution

# Legacy Hydrologic Models - Lumped (SAC-SMA)



# Legacy Hydrologic Models - Distributed (SAC-HT)

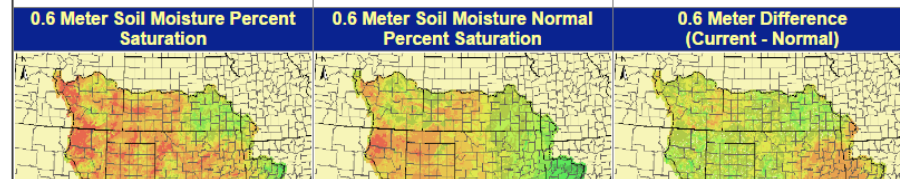
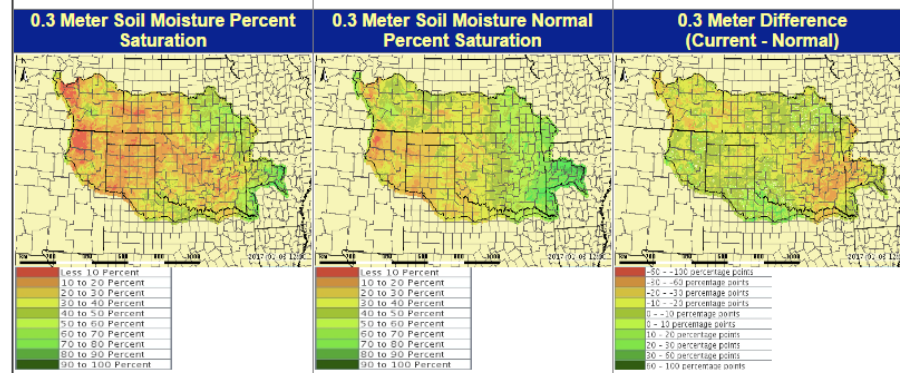
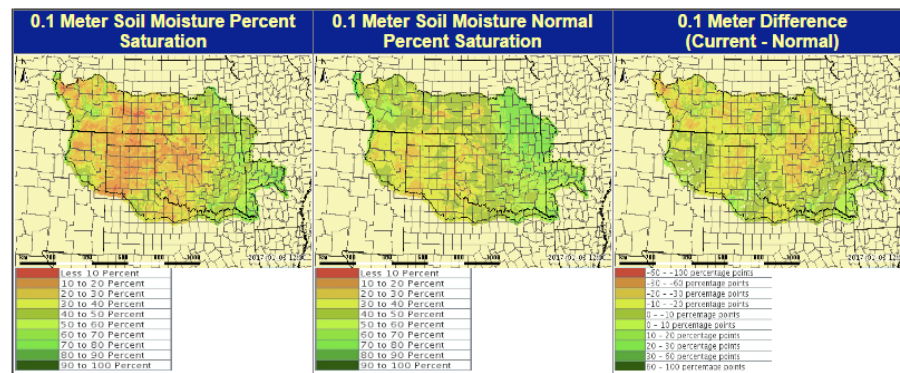
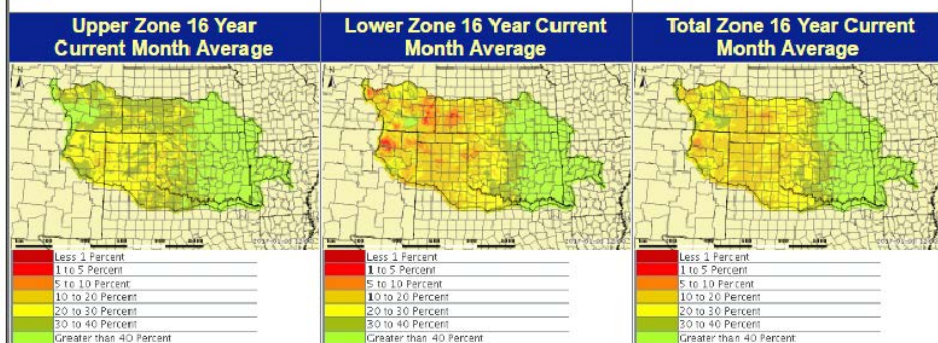
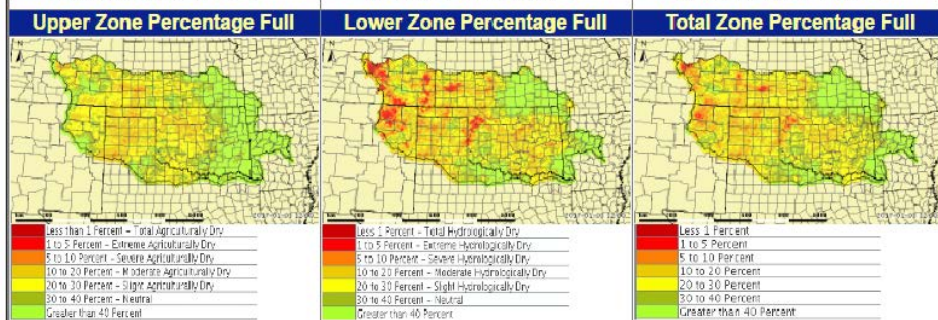
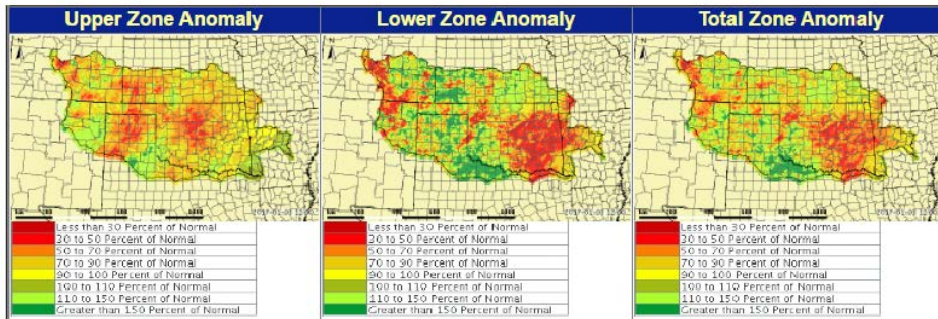




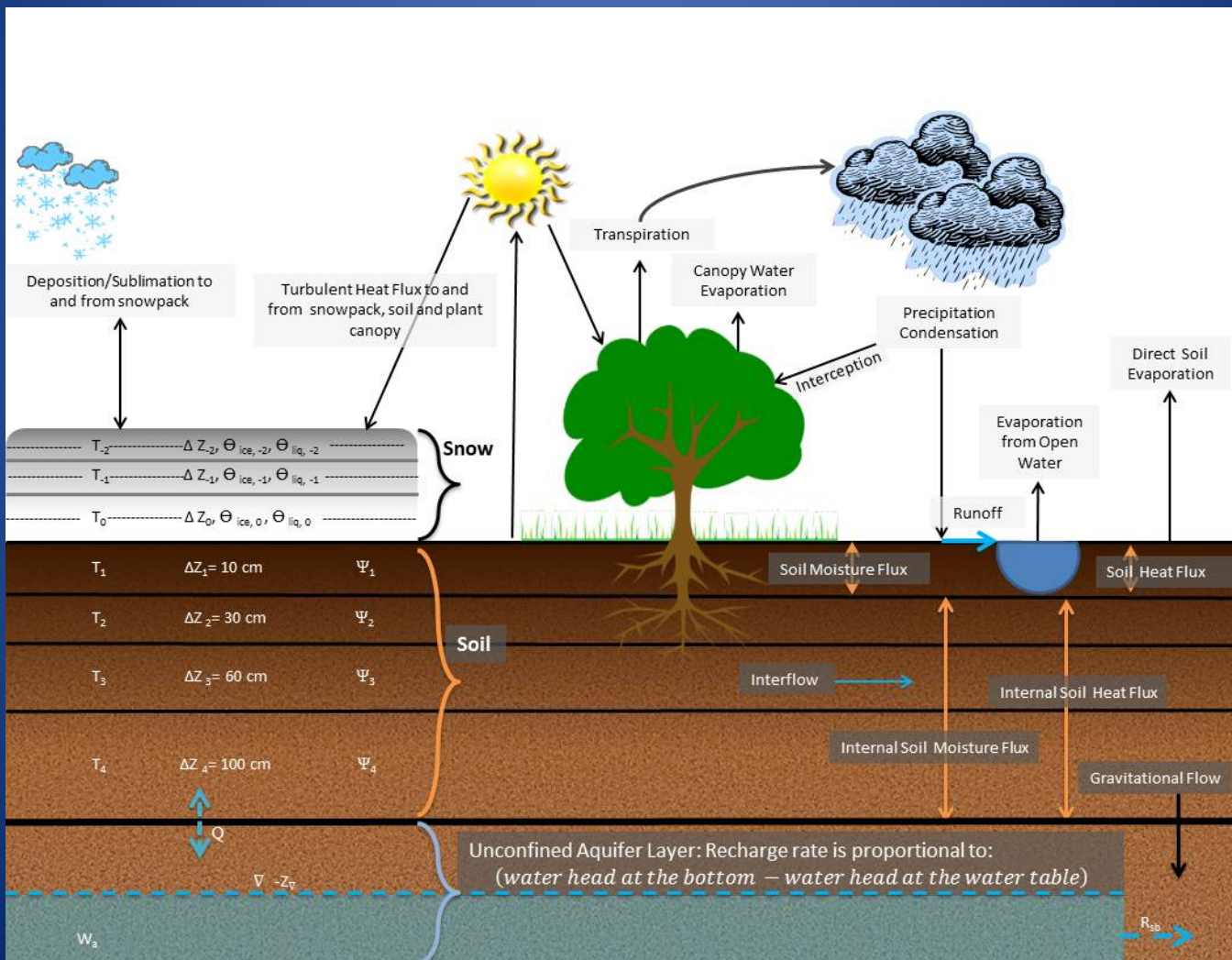
# ABRFC Soil Moisture Webpage



File created: 2017-01-03 16:15Z

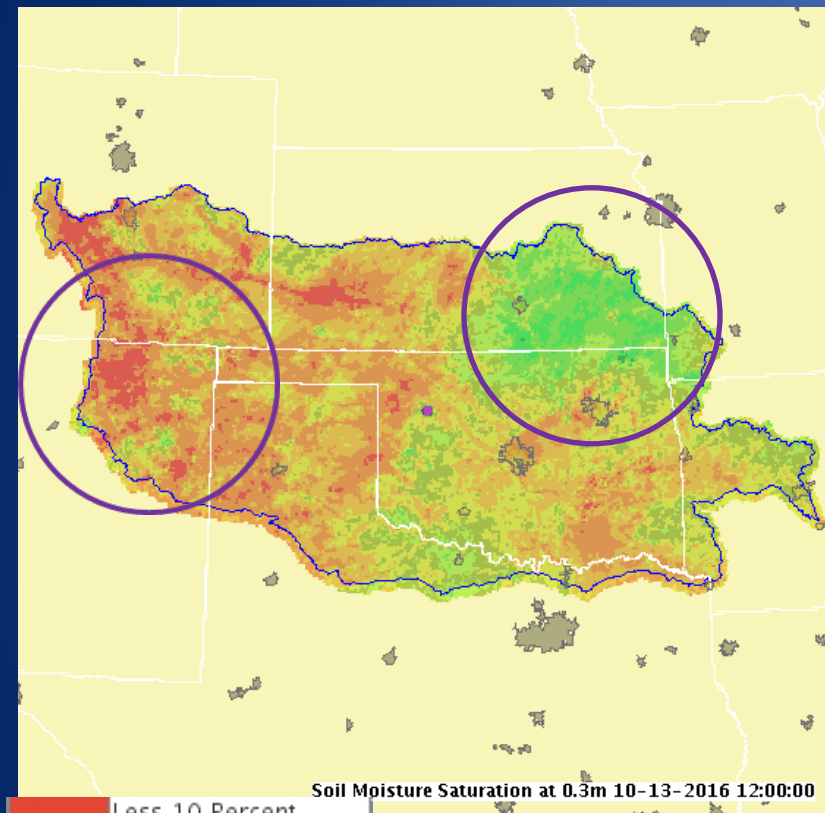


# National Water Model – WRF-Hydro (Noah LSM MP)



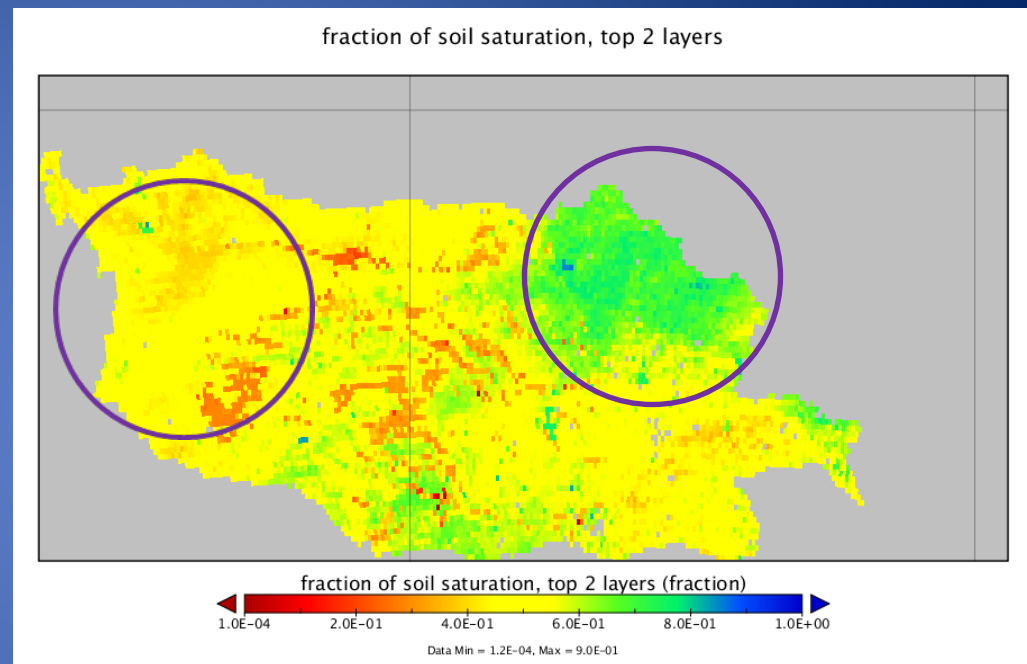


# HL-RDHM vs National Water Model



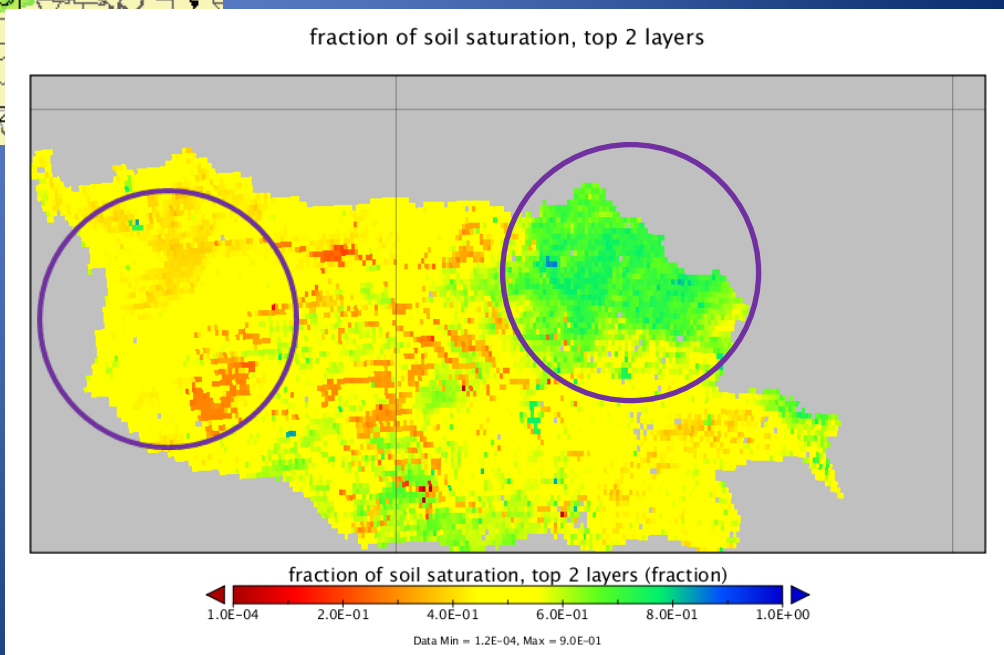
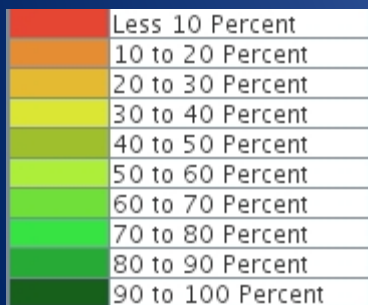
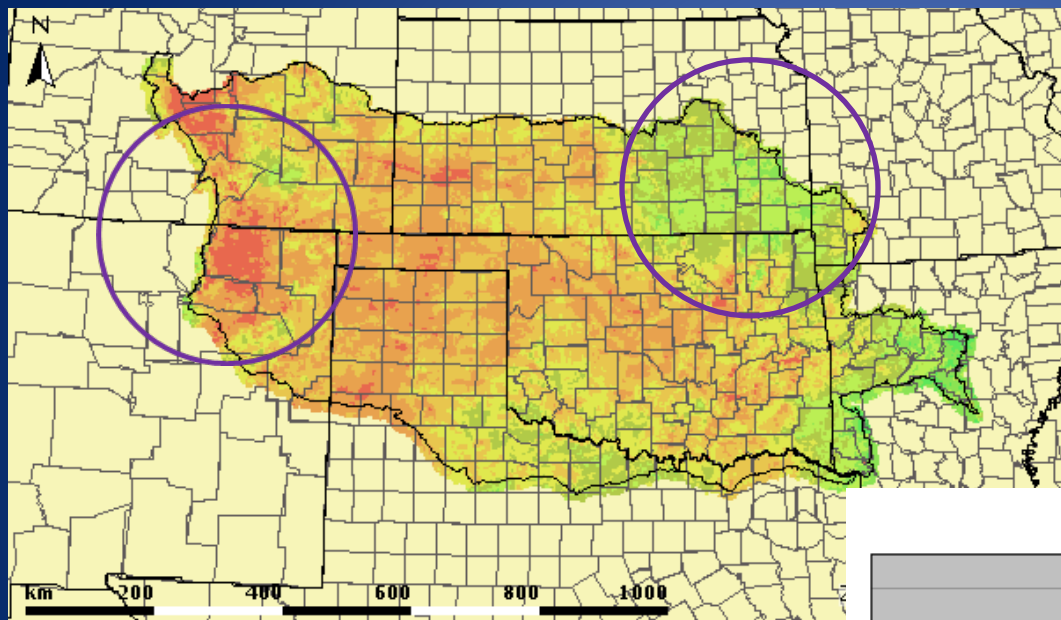
Soil Moisture Saturation at 0.3m 10-13-2016 12:00:00

Less 10 Percent
10 to 20 Percent
20 to 30 Percent
30 to 40 Percent
40 to 50 Percent
50 to 60 Percent
60 to 70 Percent
70 to 80 Percent
80 to 90 Percent
90 to 100 Percent

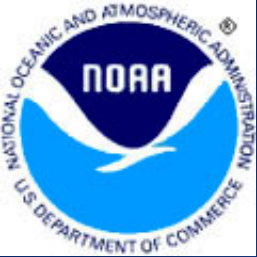




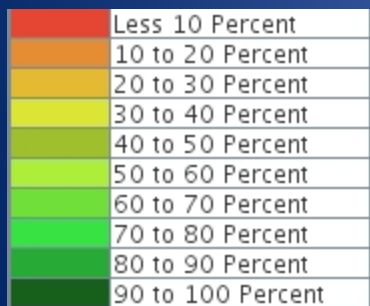
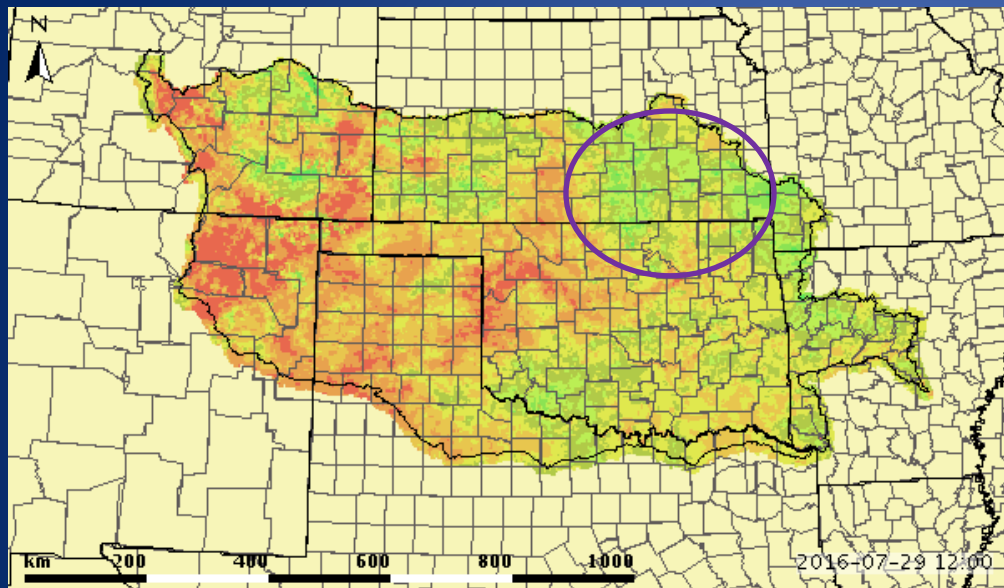
# HL-RDHM vs National Water Model



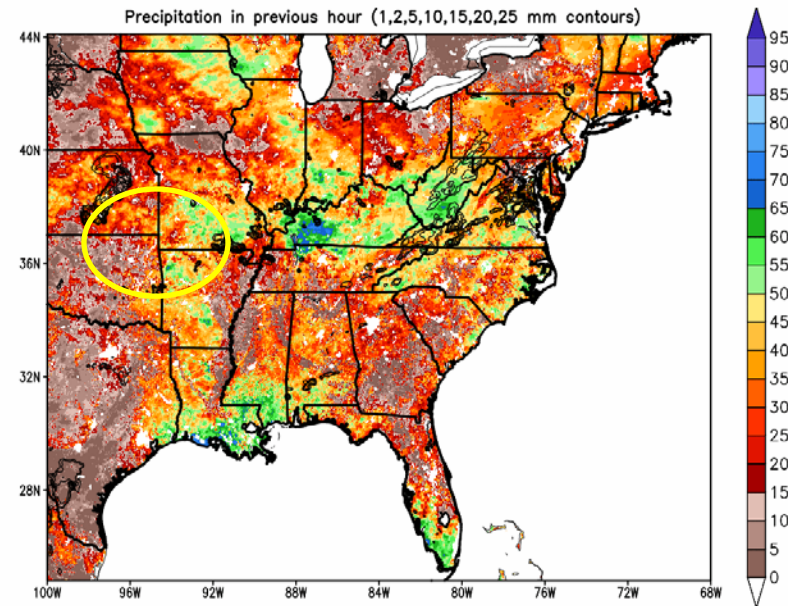




# HL-RDHM vs NASA Sport

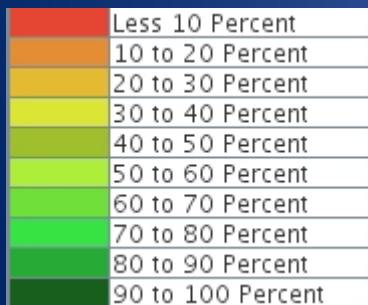
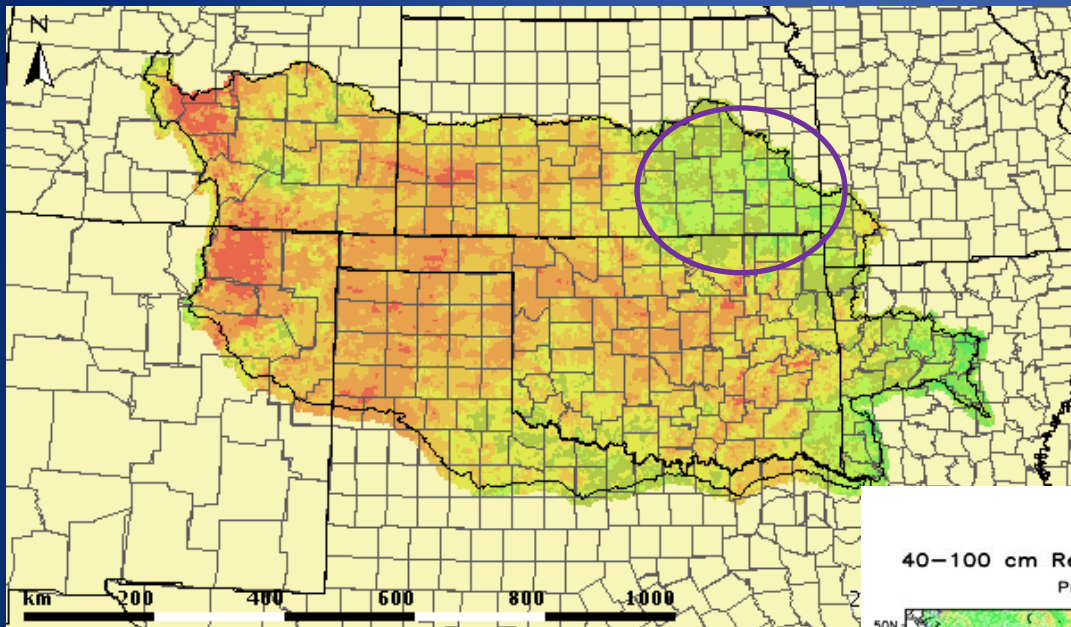


40-100 cm Relative Soil Moisture (available water; %) valid 02z 29 Jul 2016  
Precipitation in previous hour (1,2,5,10,15,20,25 mm contours)

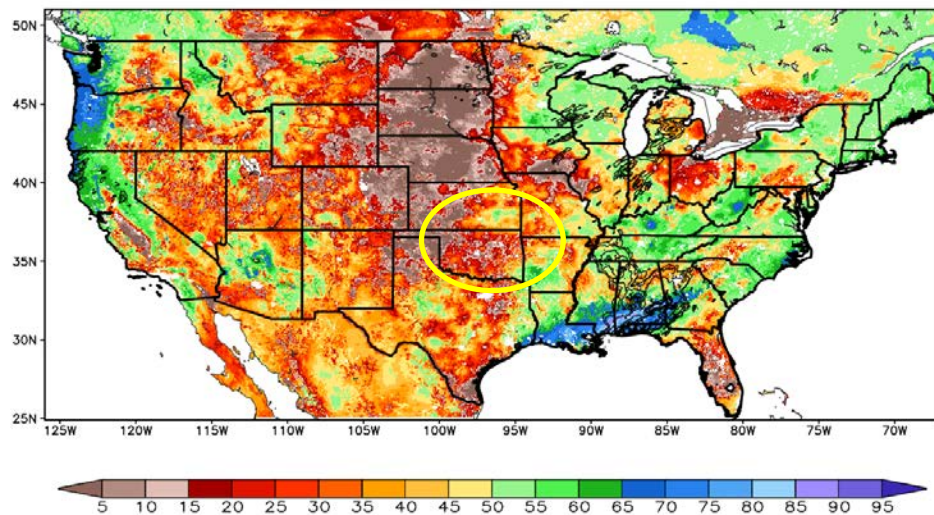




# HL-RDHM vs NASA Sport

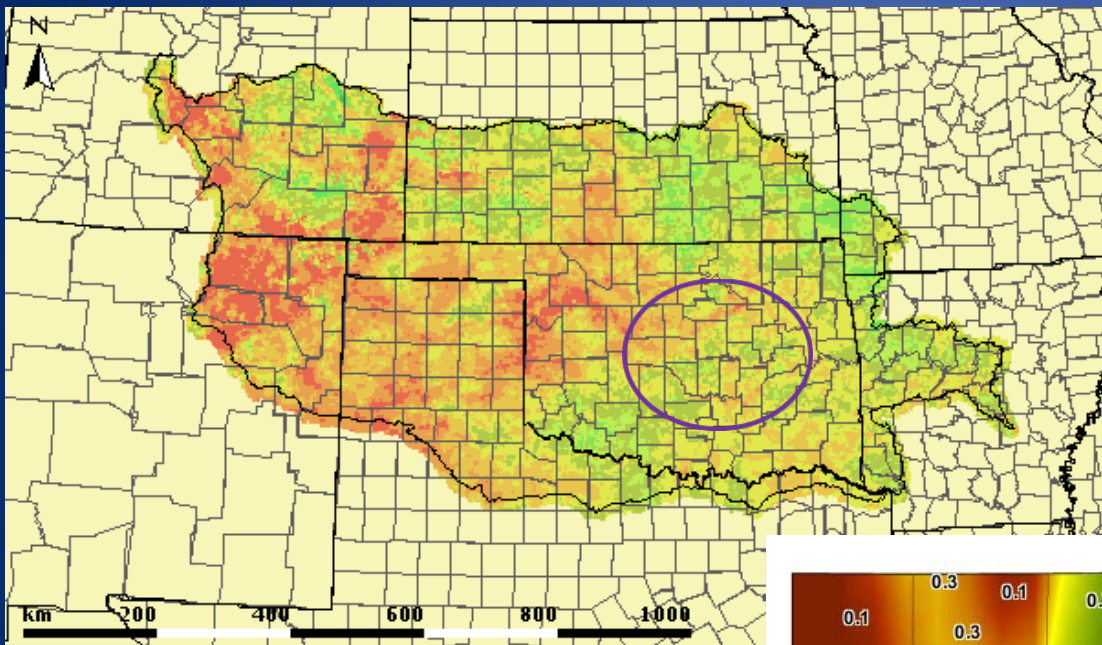


40-100 cm Relative Soil Moisture (available water; %) valid 00z 03 Jan 2017  
Precipitation in previous hour (1,2,5,10,15,20,25 mm contours)

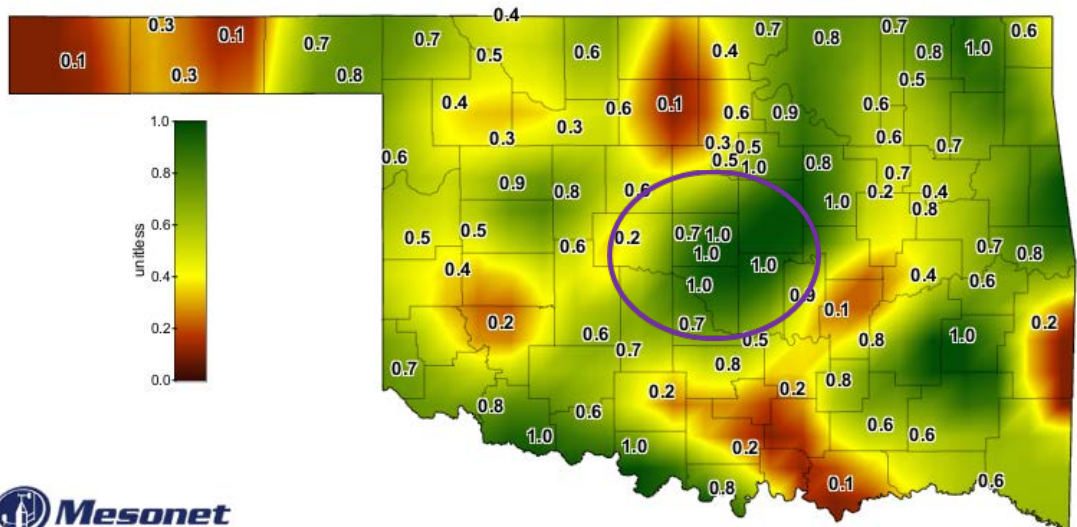




# HL-RDHM vs OK Mesonet



Less than 10 Percent
10 to 20 Percent
20 to 30 Percent
30 to 40 Percent
40 to 50 Percent
50 to 60 Percent
60 to 70 Percent
70 to 80 Percent
80 to 90 Percent
90 to 100 Percent



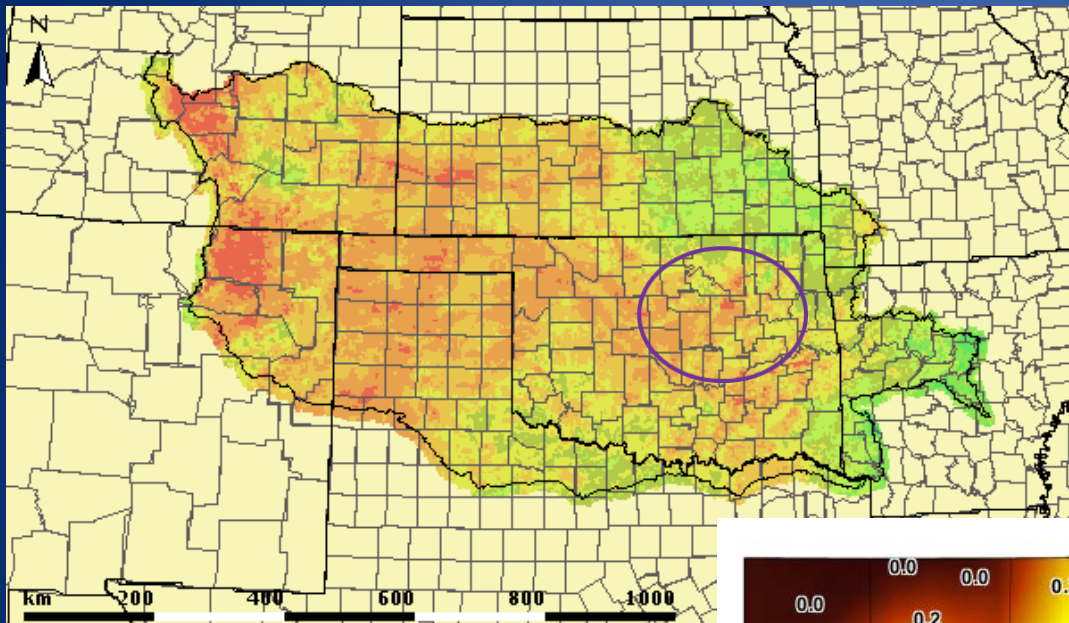
1-day Average 24-inch Fractional Water Index

July 28, 2016

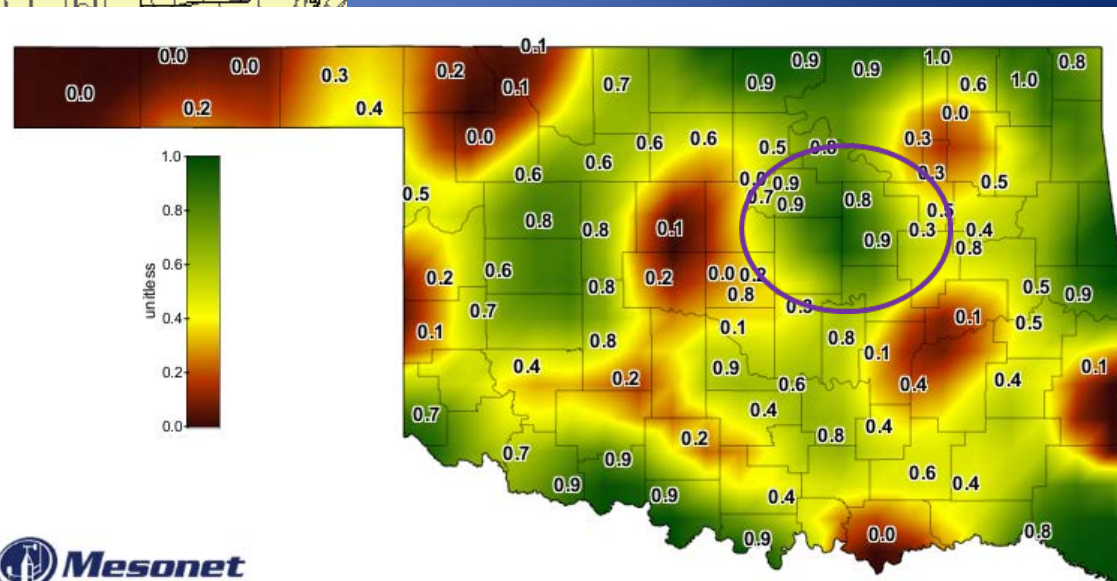
Created 7:30:14 AM July 29, 2016 CDT. © Copyright 2016



# HL-RDHM vs OK Mesonet



Less than 10 Percent
10 to 20 Percent
20 to 30 Percent
30 to 40 Percent
40 to 50 Percent
50 to 60 Percent
60 to 70 Percent
70 to 80 Percent
80 to 90 Percent
90 to 100 Percent



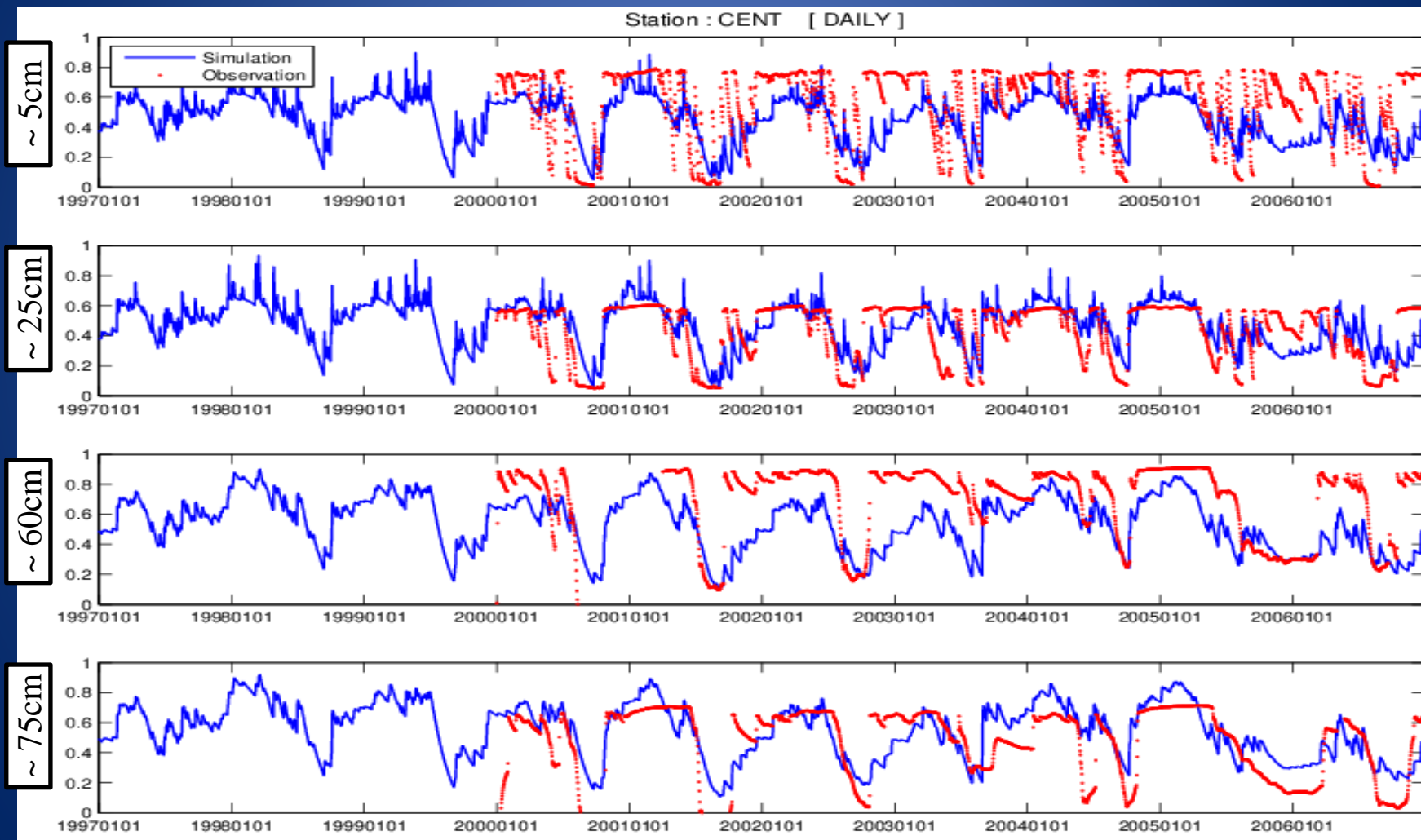
1-day Average 24-inch Fractional Water Index

January 2, 2017

Created 6:30:17 AM January 3, 2017 CST © Copyright 2017



# Legacy Hydrologic Models - Distributed (SAC-HT) Modeled vs OK Mesonet obs



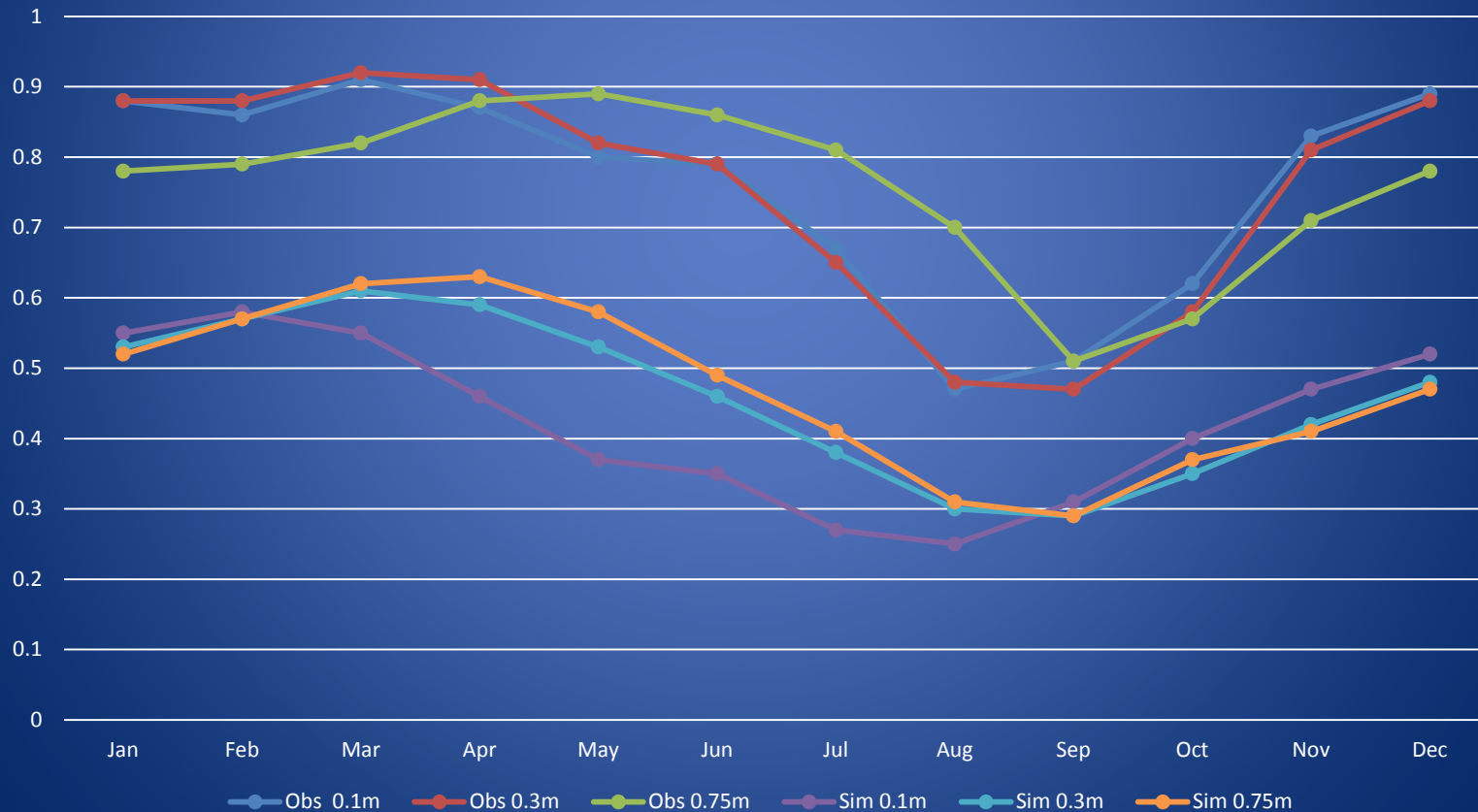
Source: Jongkwan Kim (UCAR/NOAA)



# OK Mesonet vs Simulation

(average monthly saturation)

Centrahoma

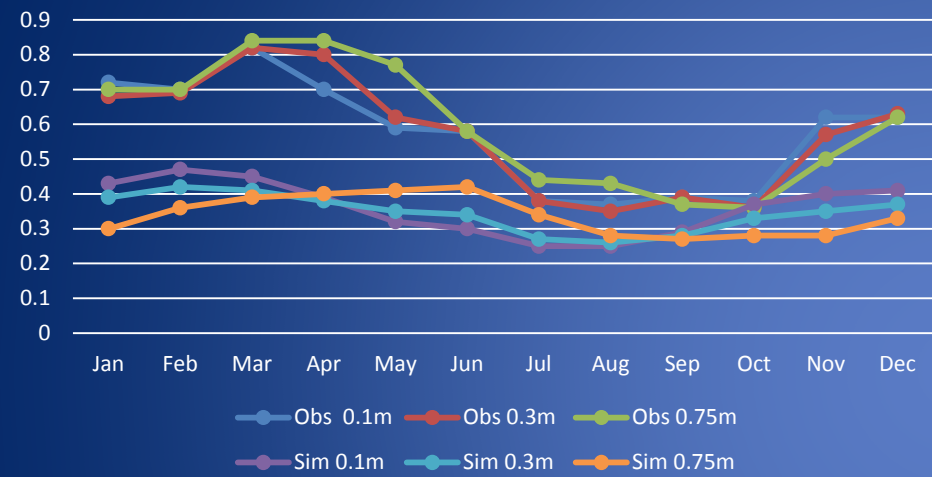




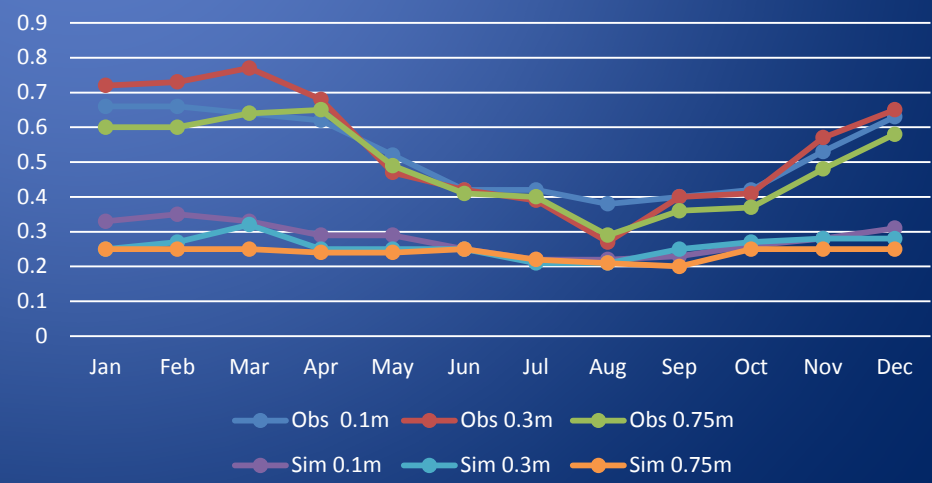
# OK Mesonet vs Simulation

(average monthly saturation)

### Norman



### Cheyenne



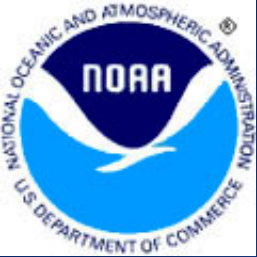


# Soon to be Soil Moisture Forecast Maps

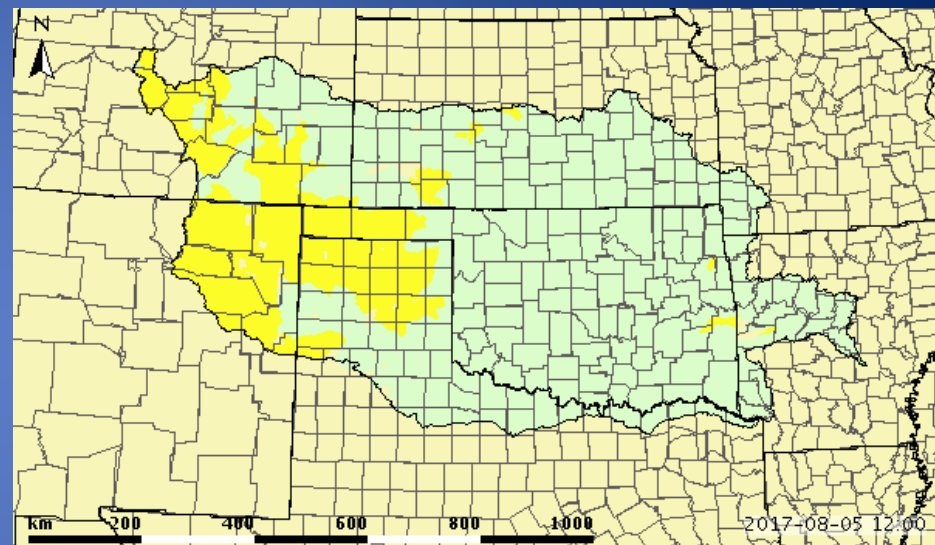
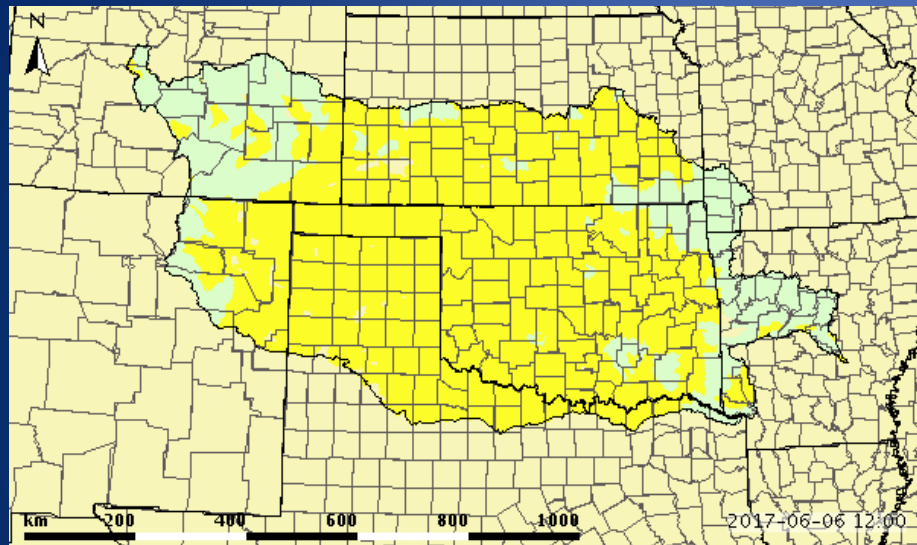


- Based on Hydrologic Ensemble Forecast System driven forecasts
  - Downscaled CFSv2 forecast
- Lumped model only
- 30,60,90,180 day forecast for upper/lower zones





# Soon to be Soil Moisture Forecast Maps



More than 50 Percent Chance Below Normal
30 to 50 Percent Chance Below Normal
10 to 30 Percent Chance Below Normal
5 to 10 Percent Chance Below Normal
0 to 5 Percent Chance Below Normal
0 to 5 Percent Chance Above Normal
5 to 10 Percent Chance Above Normal
10 to 25 Percent Chance Above Normal
Greater than 25 Percent Chance Above Normal



# Application Data



- Need network of soil moisture observations to verify modeled soil moisture (OK Mesonet like)
- Gridded scale
- Data assimilation method
  - Currently no direct method (legacy models)



Questions???