

U.S. Climate Reference Network (USCRN): SMAP Preparation

Jesse E. Bell, Ph.D.

USCRN Drought and Soil Climate Specialist

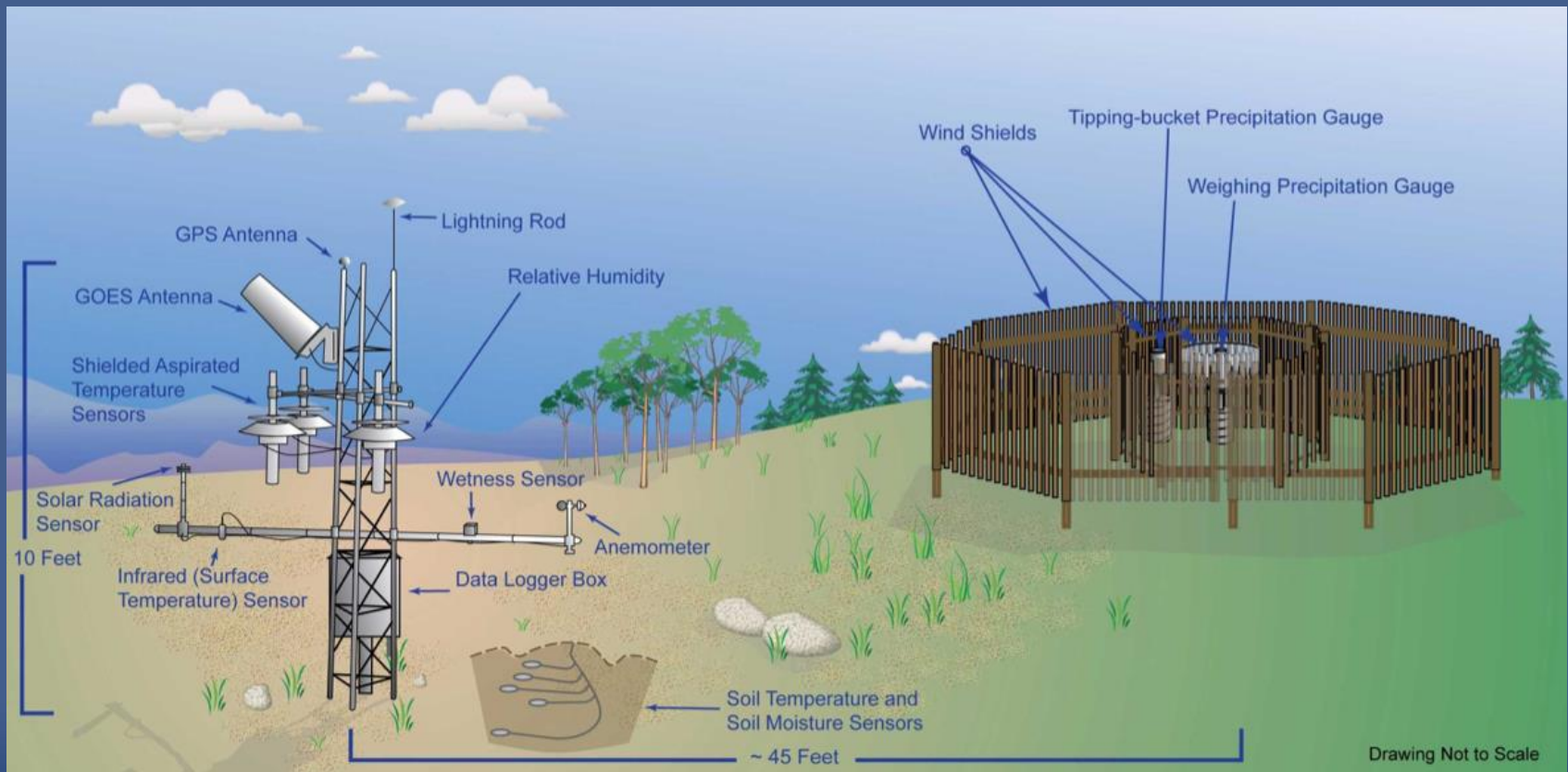
Cooperative Institute for Climate and Satellites

NOAA's National Climatic Data Center



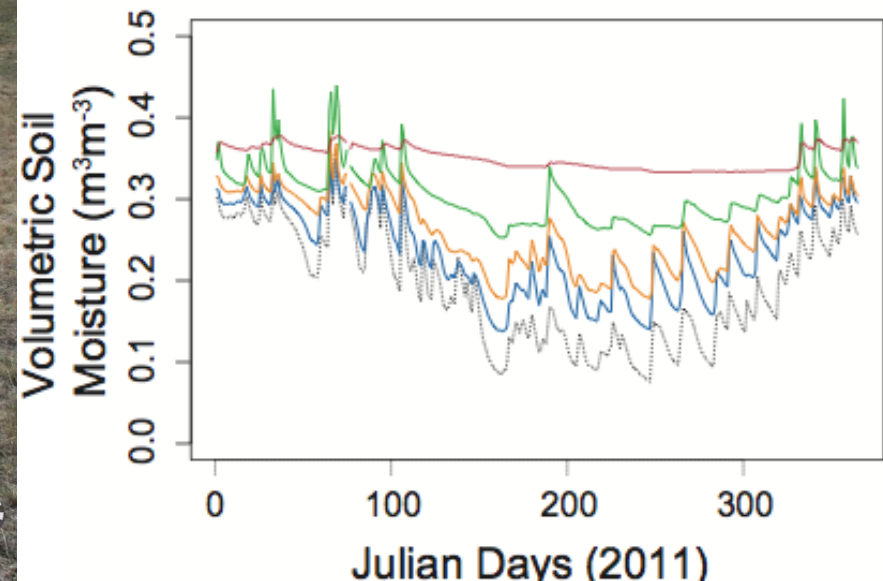
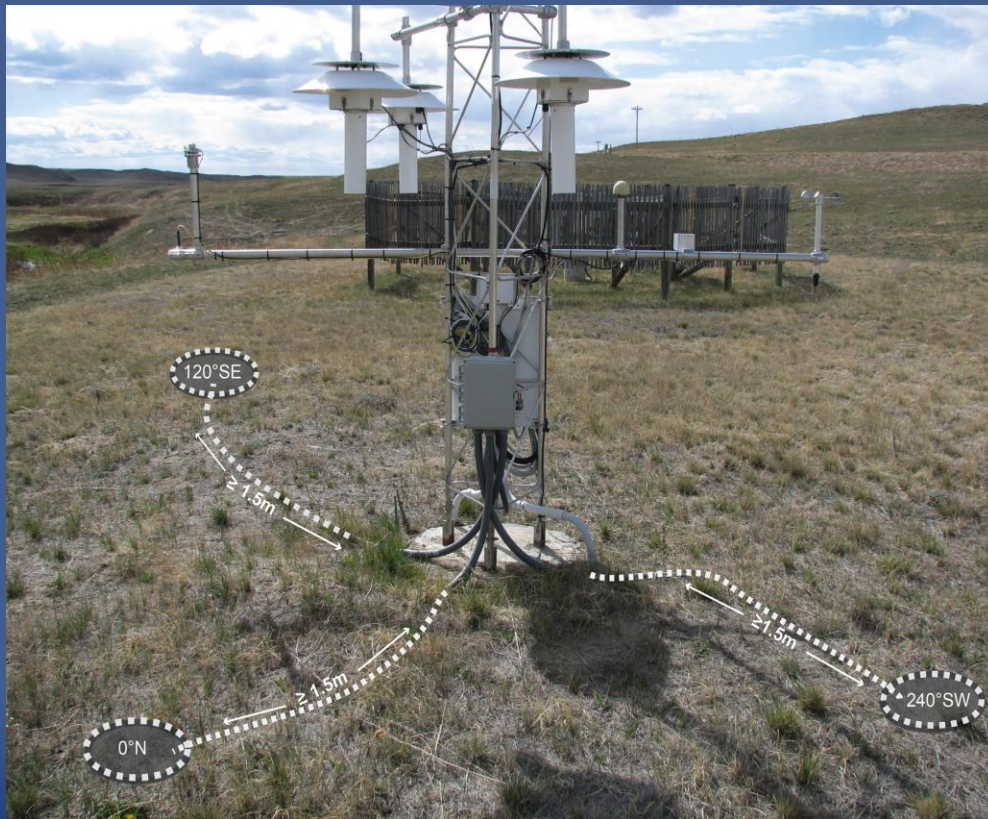
USCRN: Background

- Climate Measurements

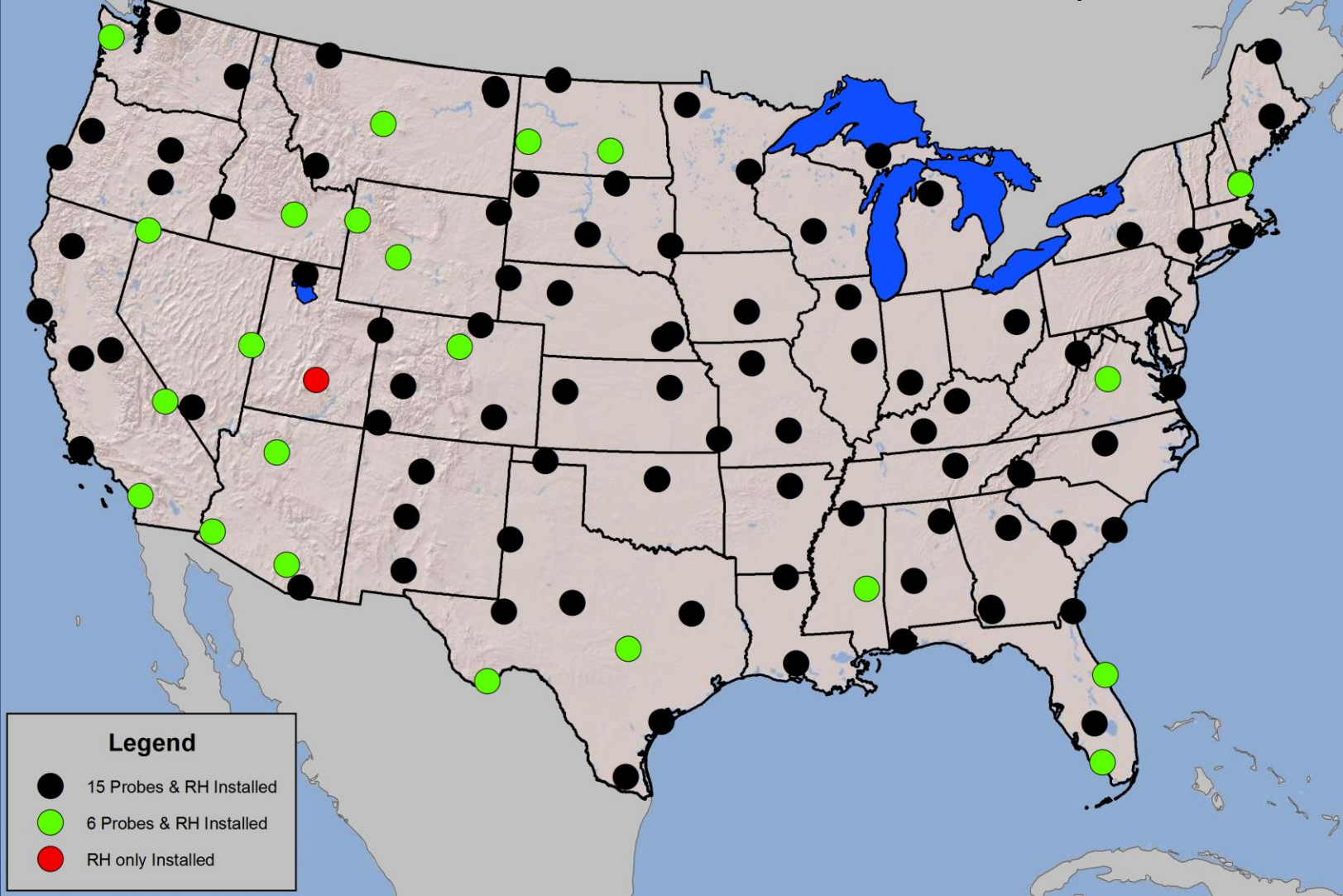


USCRN: Background

- Triplicate Configuration
- Soil Temperature and Moisture
- Redundancy
- Consistency
- 5 depths
 - 5, 10, 20, 50, 100cm

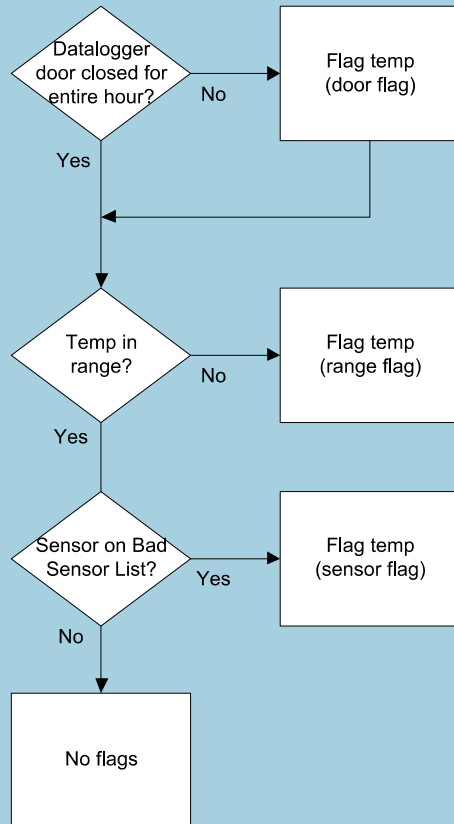


USCRN Station Placement and Soil Probe Depths

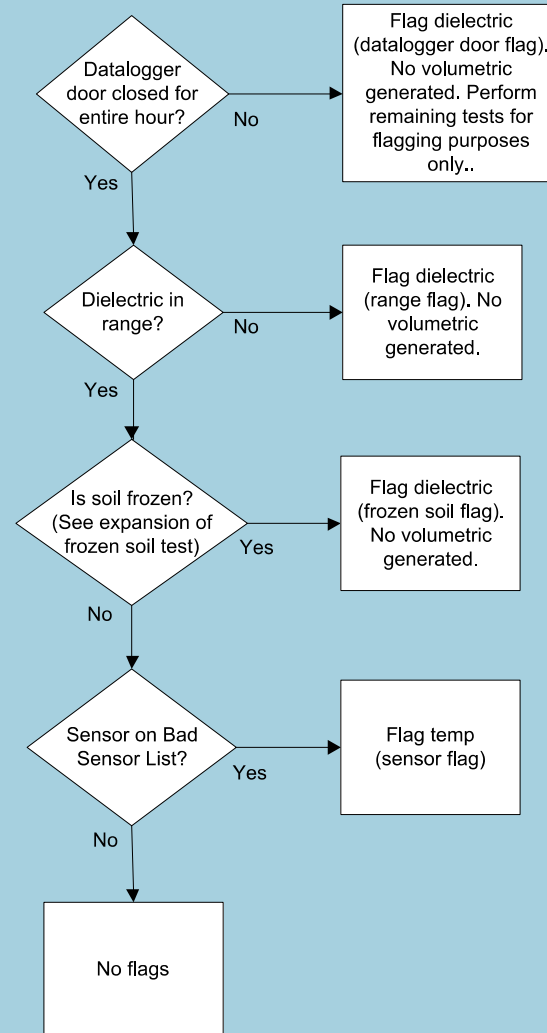


USCRN Quality Control

Temperature Flagging

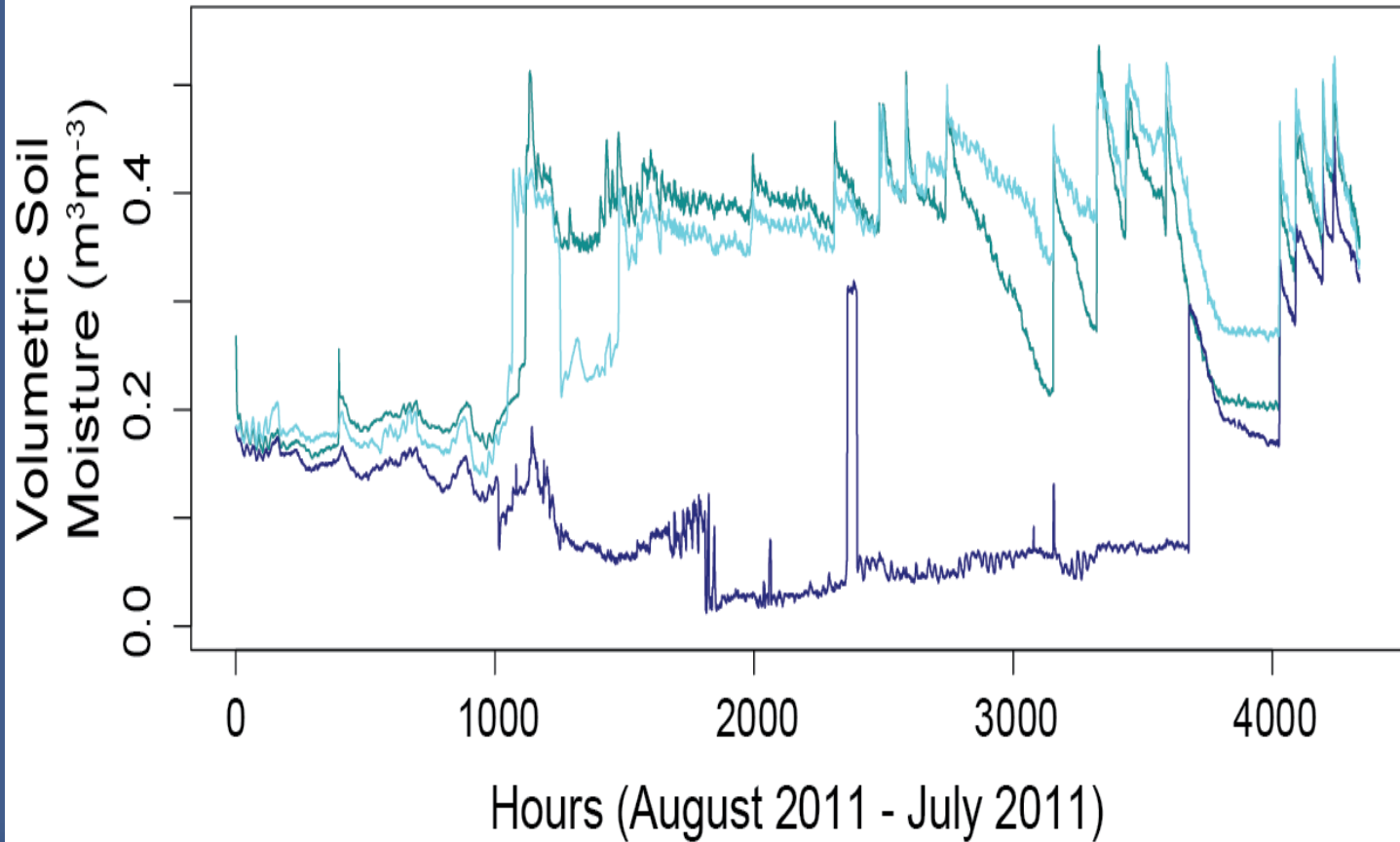


Dielectric Flagging



Monthly post-processing

Faulty Measurements

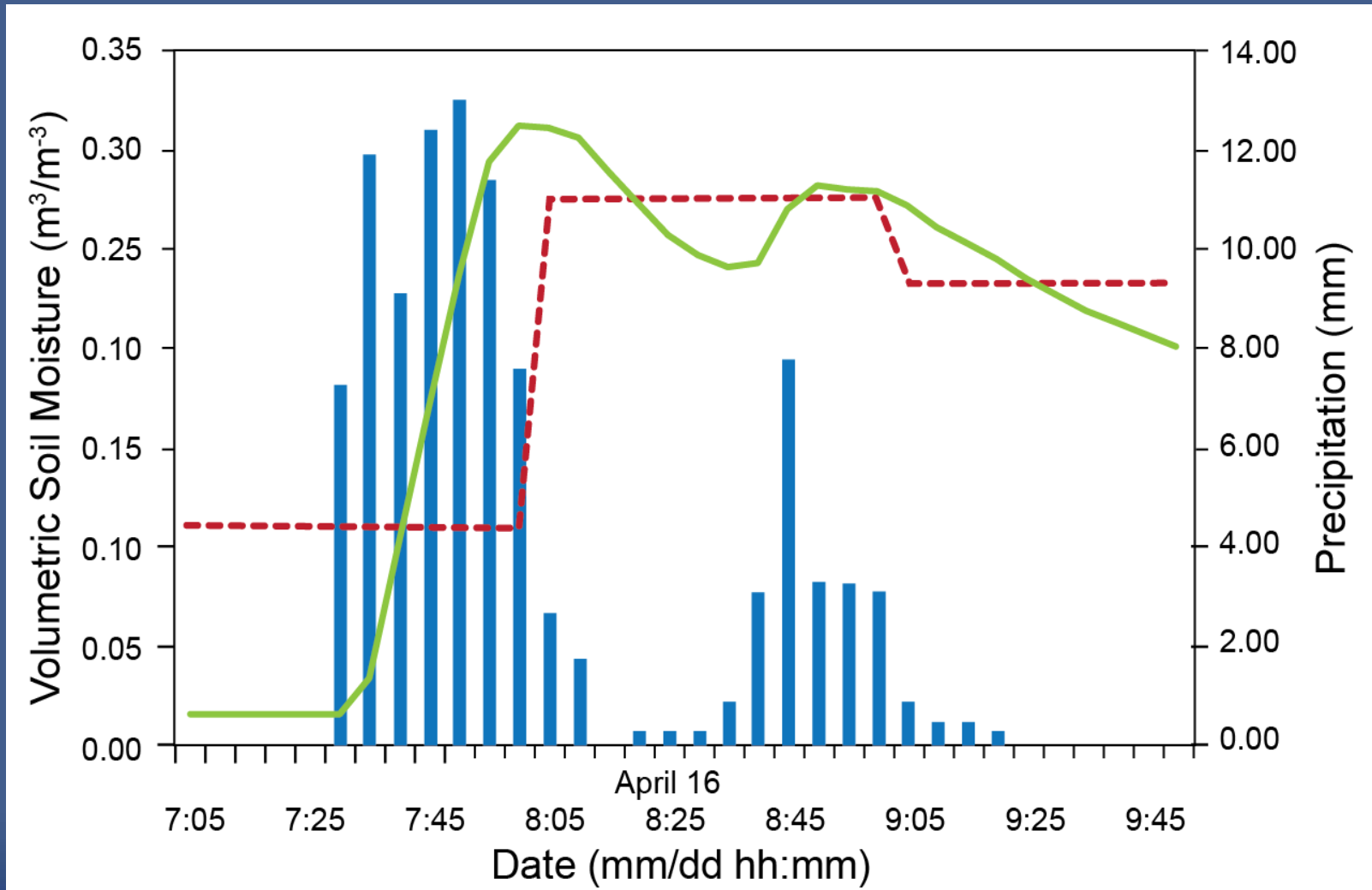


Station Maintenance



- Atmospheric Turbulence and Diffusion Division
- Soil probes initially calibrated
- Annual visits
 - Maintenance
 - Installation
- Site managers
- Emergency visits

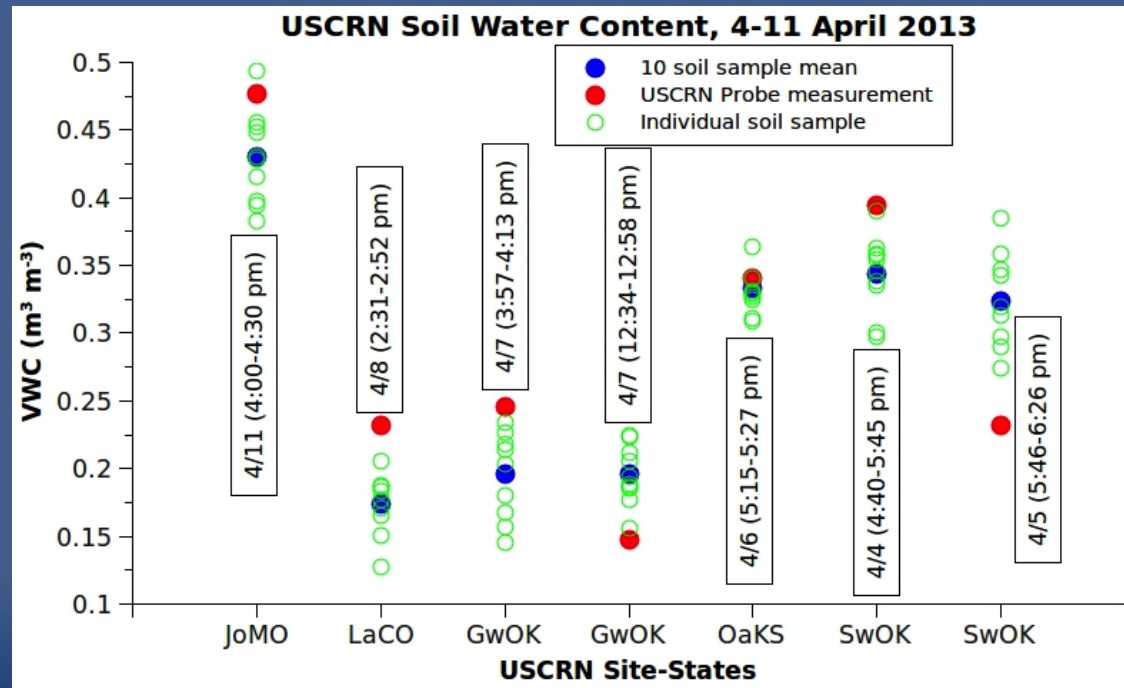
5-Minute Values



Green line = 5 minute Red line = 1 hour

Intensive Gravimetric Calibration

- Gravimetric Sampling
 - 5cm
- Multiple samples over a two year period
 - 10 samples
 - 18 locations
- Interstate routes
- High priority sites
 - Stillwater, Sioux Falls, Champaign, Millbrook
- Great Plains
 - Fewer trees



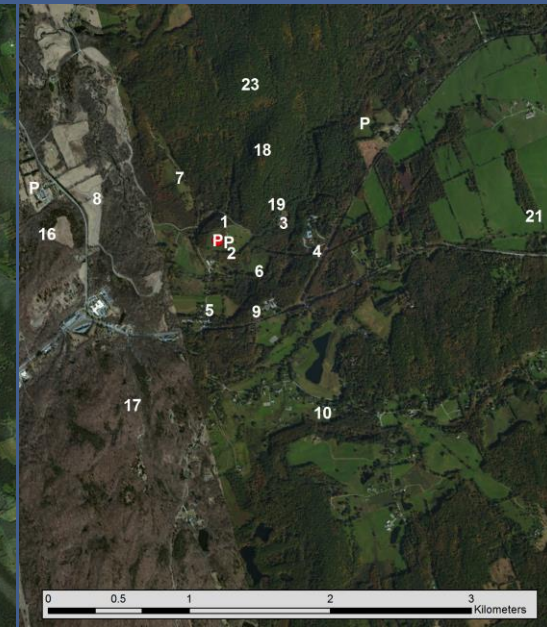
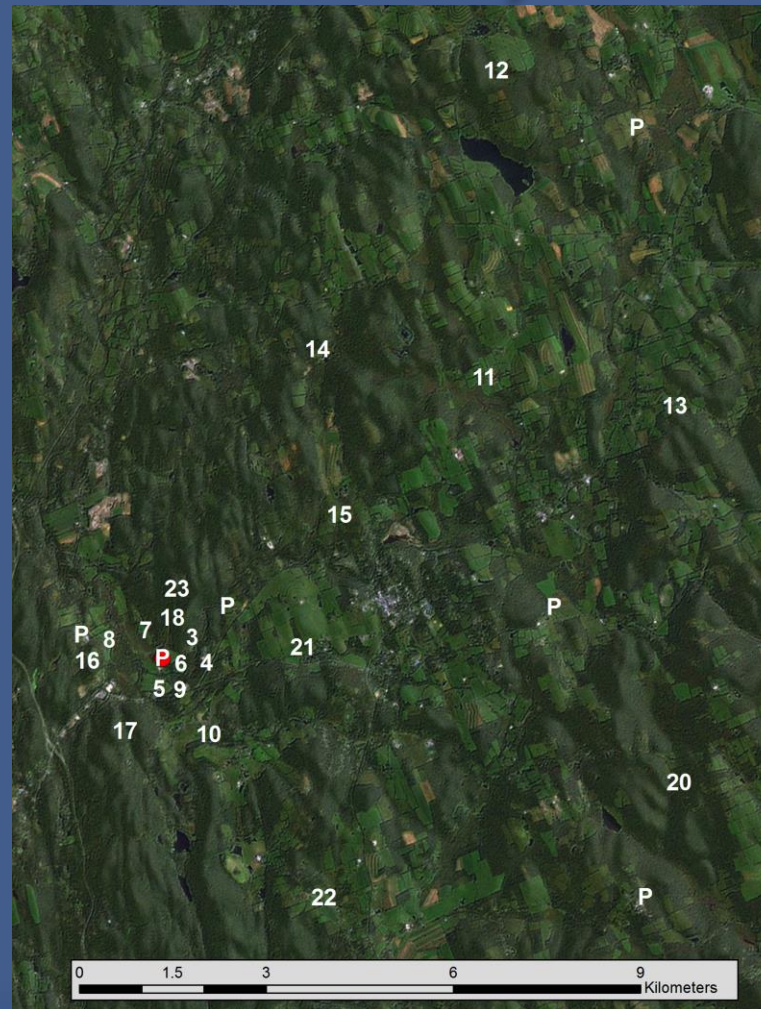
Spatial Representativeness Study

- Two USCRN Sites (Millbrook, NY and Crossville, TN)
- USDA-ARS, NOAA CICS-NC, NOAA CREST, NOAA ATDD, NOAA NCDC, Cary Institute
- Temporary Network Installed Around USCRN



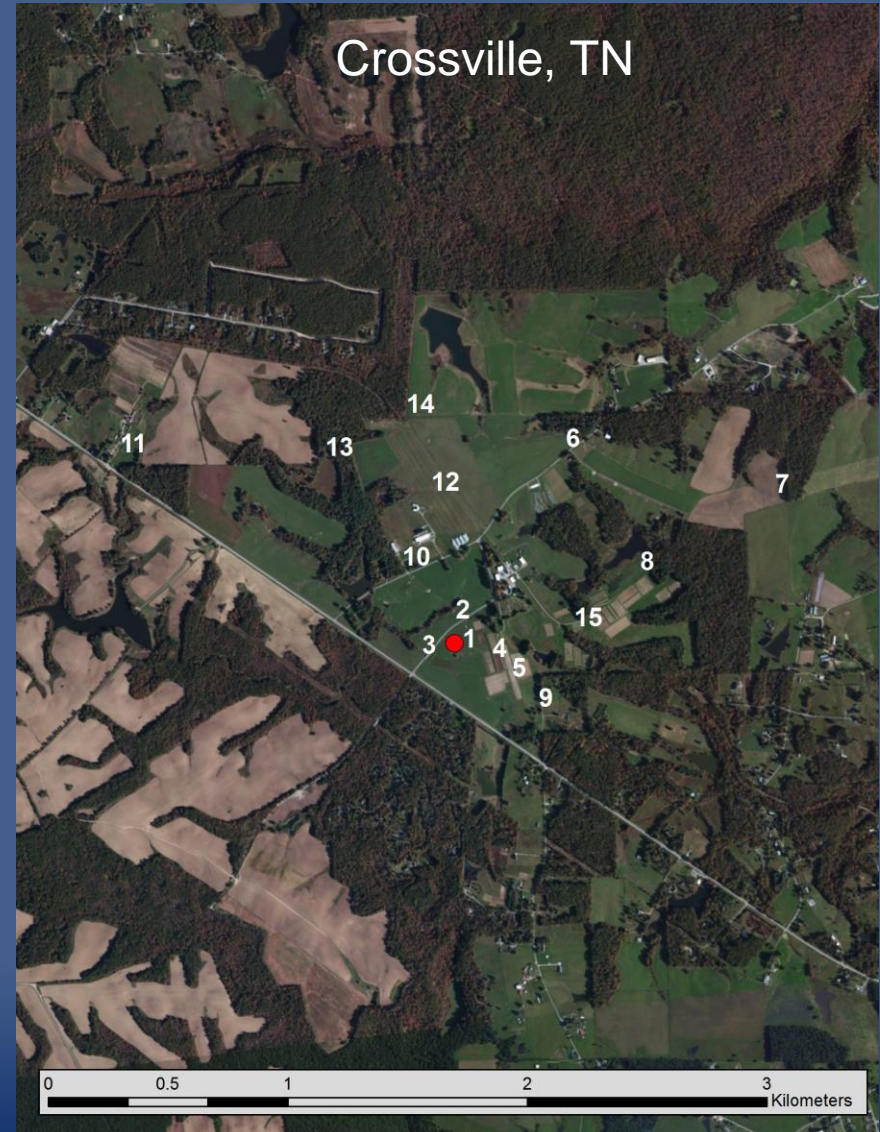
Millbrook, NY

- 25 temporary stations
- 1 probe installed at 5cm depth
- Same probe technology as USCRN
- ~9km resolution around the USCRN
- Variety of vegetation types and topography
- Multiple soil samples collected at each site

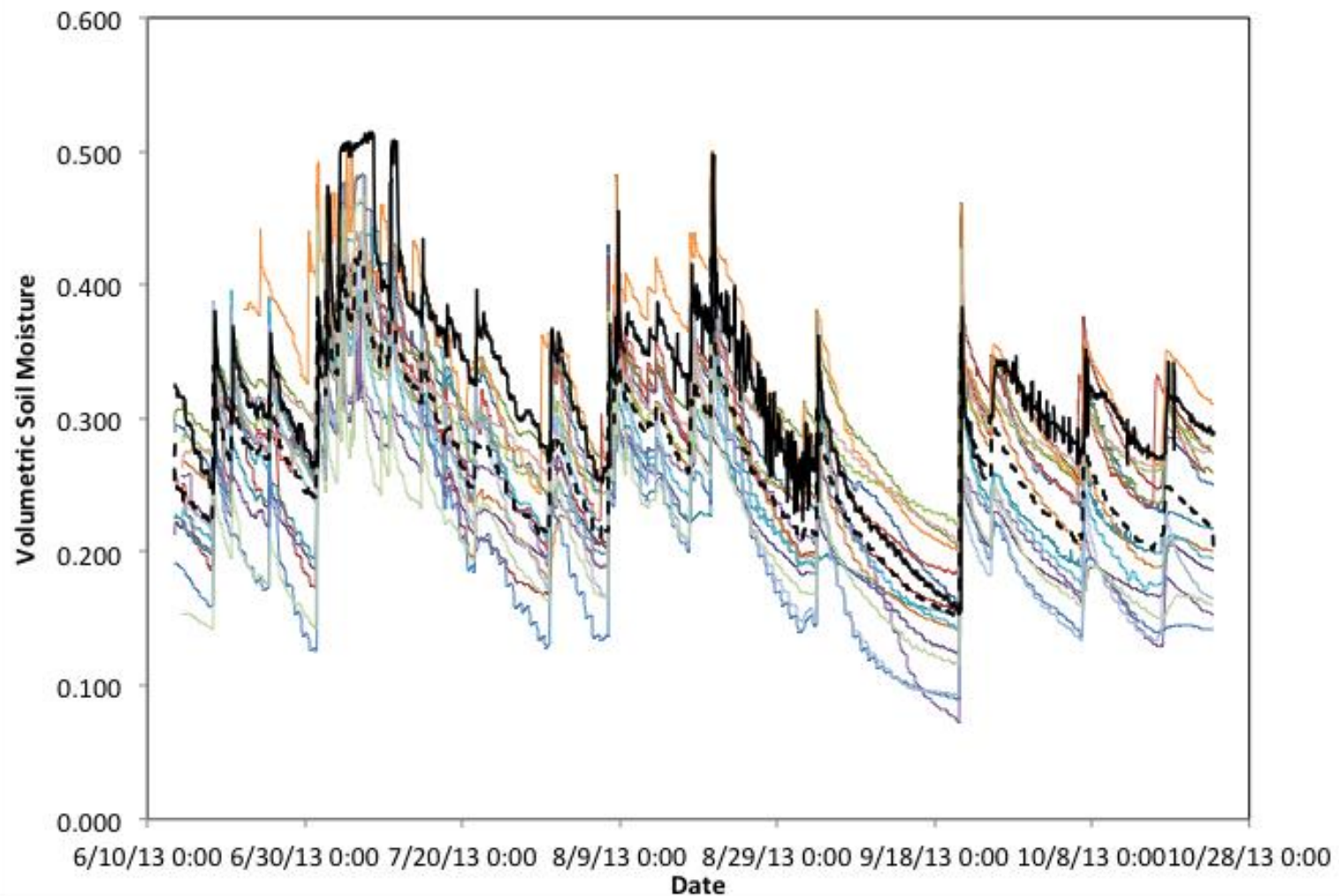


Crossville, TN

- 15 temporary stations
- 1 probe installed at 5cm depth
- Same probe technology as USCRN
- ~3km resolution around the USCRN
- Variety of vegetation types and topography
- Multiple soil samples collected at each site



Results from Study (Crossville, TN)



Conclusion

- Three independent measurements of soil moisture and soil temperature
 - 114 stations
- Multiple quality control procedures
- Yearly maintenance
- Intensive field gravimetric calibration
- Spatial representativeness study
 - Desire to expand this study!!!
- Pushing to continue these projects

Thank you!

Jesse.bell@noaa.gov

<http://www.ncdc.noaa.gov/crn/>
<http://www.ncdc.noaa.gov/crn/products.html>
<http://www.ncdc.noaa.gov/crn/visualizations.html>

US Climate Reference Network



Acknowledgements

- Dr. Mike Palecki (NCDC/NOAA)
- Howard Diamond (NCDC/NOAA)
- Dr. Michael Cosh (USDA-ARS)
- Mark Hall (ATDD/NOAA)
- Dr. Tim Wilson (ATDD/NOAA)
- Rocky Bilotta (ERT/NOAA)
- Ronald Leeper (CICS-NC)
- USCRN Team (Andrea, Scott, and Diana)
- NCDC/NESDIS/NOAA
- NOAA's ATDD

