The Oklahoma Mesonet

- Weather and climate network of **120 sites** covering 181,186 km²
- Commissioned in 1994
- Joint project between the **Oklahoma State University** and the **University of Oklahoma**.
- Extensive quality assurance is applied to the collected observations (real-time and archived ↔ automated and manual)
- Over 4 billion observations archived
- Operational funding supplied by the State of Oklahoma – Research funded mainly by grant awards
- Over 330 peer-reviewed publications, over 80 M.S. theses, and over 30 Ph.D. dissertations have used Oklahoma Mesonet data.

**Jeff Basara**, Director of Research, Oklahoma Climatological Survey, University of Oklahoma
- Contact Point and Lead Scientist for SMAP Cal/Val related activities involving the Oklahoma Mesonet
The Oklahoma Mesonet

- Every 5 minutes:
  - Air temperature, 1.5 m, 9 m
  - Relative humidity, 1.5 m
  - Rainfall (tipping bucket)
  - Barometric pressure
  - Solar, net radiation, 1.8 m
  - Wind speed/direction, 10 m
  - Wind speed, 2 m, 9 m
  - Skin temperature, 1.5 m

- Every 15 minutes:
  - 5 cm soil temp, bare soil, native sod
  - 10 cm soil temp, bare soil, native sod
  - 30 cm soil temp, native sod

- Every 30 minutes:
  - 5 cm soil moisture (108 Sites)
  - 25 cm soil moisture (106 Sites)
  - 60 cm soil moisture (81 Sites)
  - 75 cm soil moisture (32 Sites)

Soil Moisture Instrumentation

- Campbell Scientific 229-L Sensor
- Heat Dissipation Sensor
- Raw measurement is a change in temperature ($\Delta T$) following the introduction of a heat pulse
- Provides relative measures of soil “wetness”
- With soil texture information, soil water content is empirically estimated
- Does not work well in sand

Oklahoma Mesonet Soil Moisture

- **Core Measurement** of the Oklahoma Mesonet at 5, 25, and 60 cm – i.e. fully supported both now and into the future.
- Current technology does not measure **Water Content** directly – empirical relationships exist and are being revisited/improved by colleagues at Oklahoma State University.
- Over **13 years** of data collected thus far – data available in near real time or via archived datasets.
- Coincident metadata available (soil texture, vegetation, etc.) – additional metadata collection is currently underway.
- Developing a project, which if funded, will conduct long-term evaluations of current instrumentation at multiple locations with other soil moisture technology to determine *(a)* standardized conversions between various sensors in various soil types and *(b)* evaluate whether the Oklahoma Mesonet should transition to a different technology.