



*non-radar profiling*

Using Ground-based Observations at NSSL

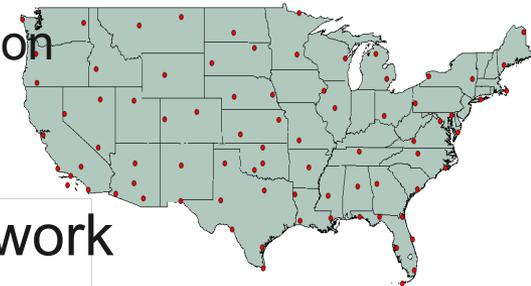
Dr. David Turner (NSSL)  
February 25–27, 2015  
National Weather Center  
Norman, Oklahoma





# Ground-based Temperature, Humidity, & Wind (THW) Profile Obs in the Boundary Layer (BL)

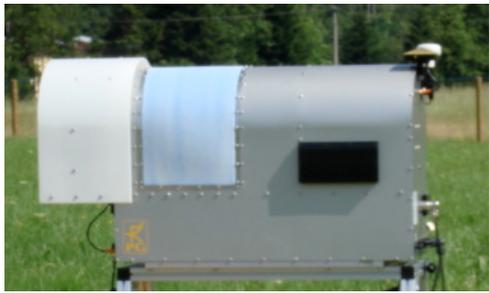
- Storm initiation and evolution depends strongly on THW profiles in the BL, but storms also modify these profiles
  - Higher temporal and spatial THW profiles in BL needed for:
    - Better understanding storm initiation and evolution
    - Improved analyses, forecasts, and warnings
- Spatial and temporal gaps in radiosonde network
- Satellites don't see BL well, especially in cloudy cases
- Aircraft obs provide uneven sampling
- Weather radars do not see true THW structure of atmosphere





# These Ground-based Remote Sensors Exist (and are commercially available)

## Thermodynamic Profiling Systems



Microwave Radiometer (MWR)



Atmospheric Emitted Radiance Interferometer (AERI)

## Wind Profiling Systems



Doppler Wind Lidar (DWL)



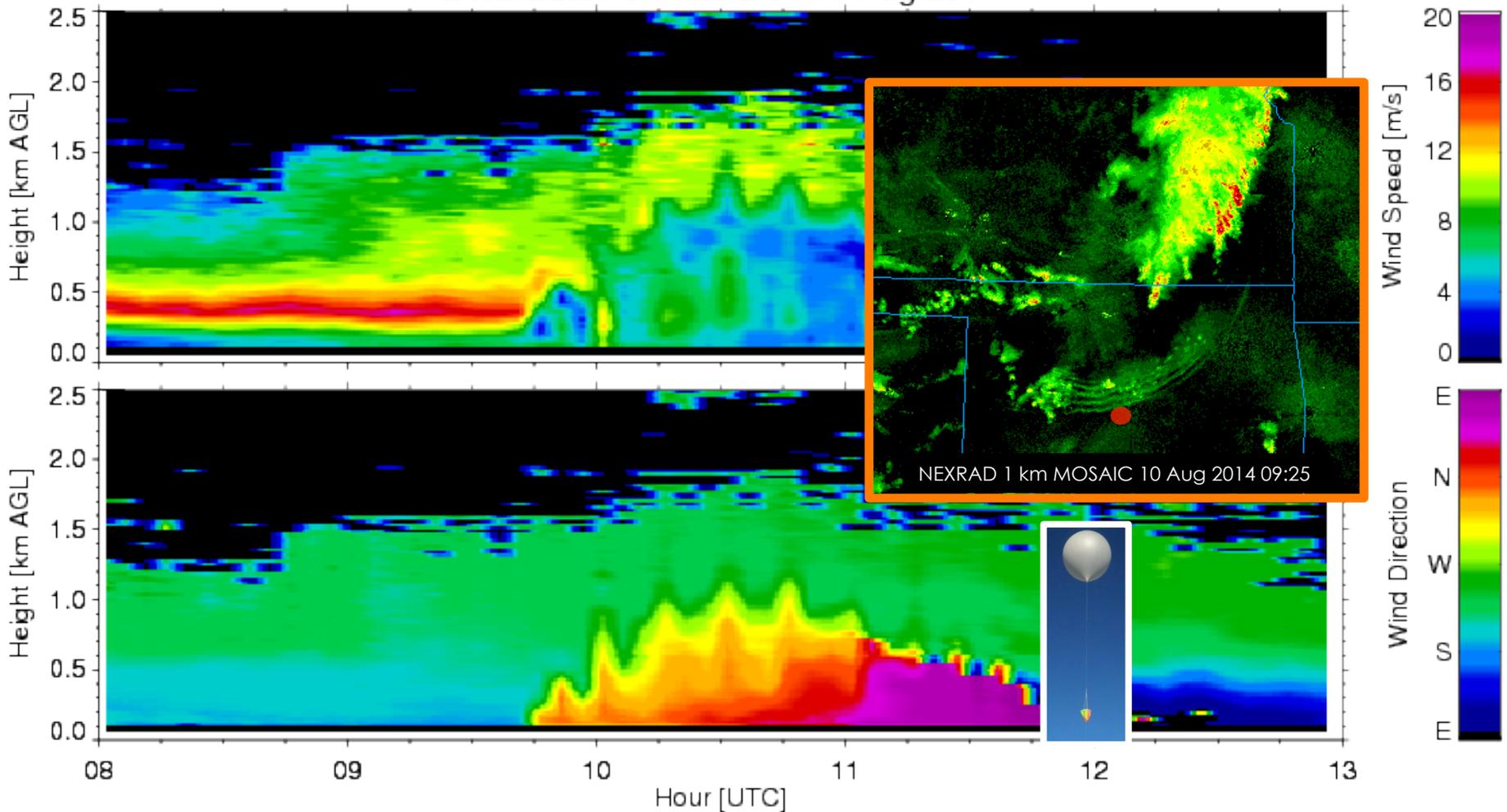
Radar Wind Profiler (RWP)





# Using These New Remote Sensors: Example 1

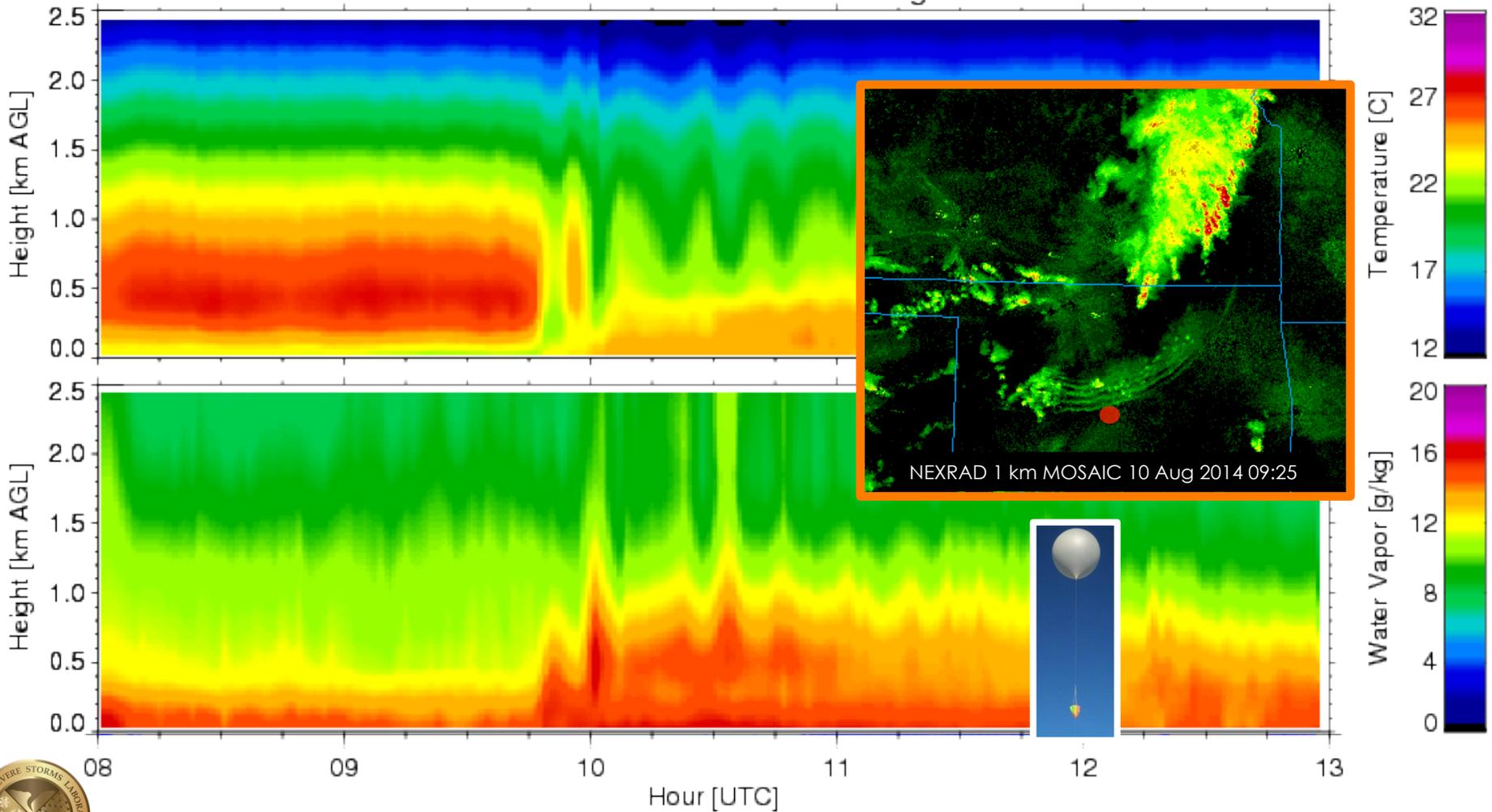
DWL Data from NWC on 10 Aug 2014





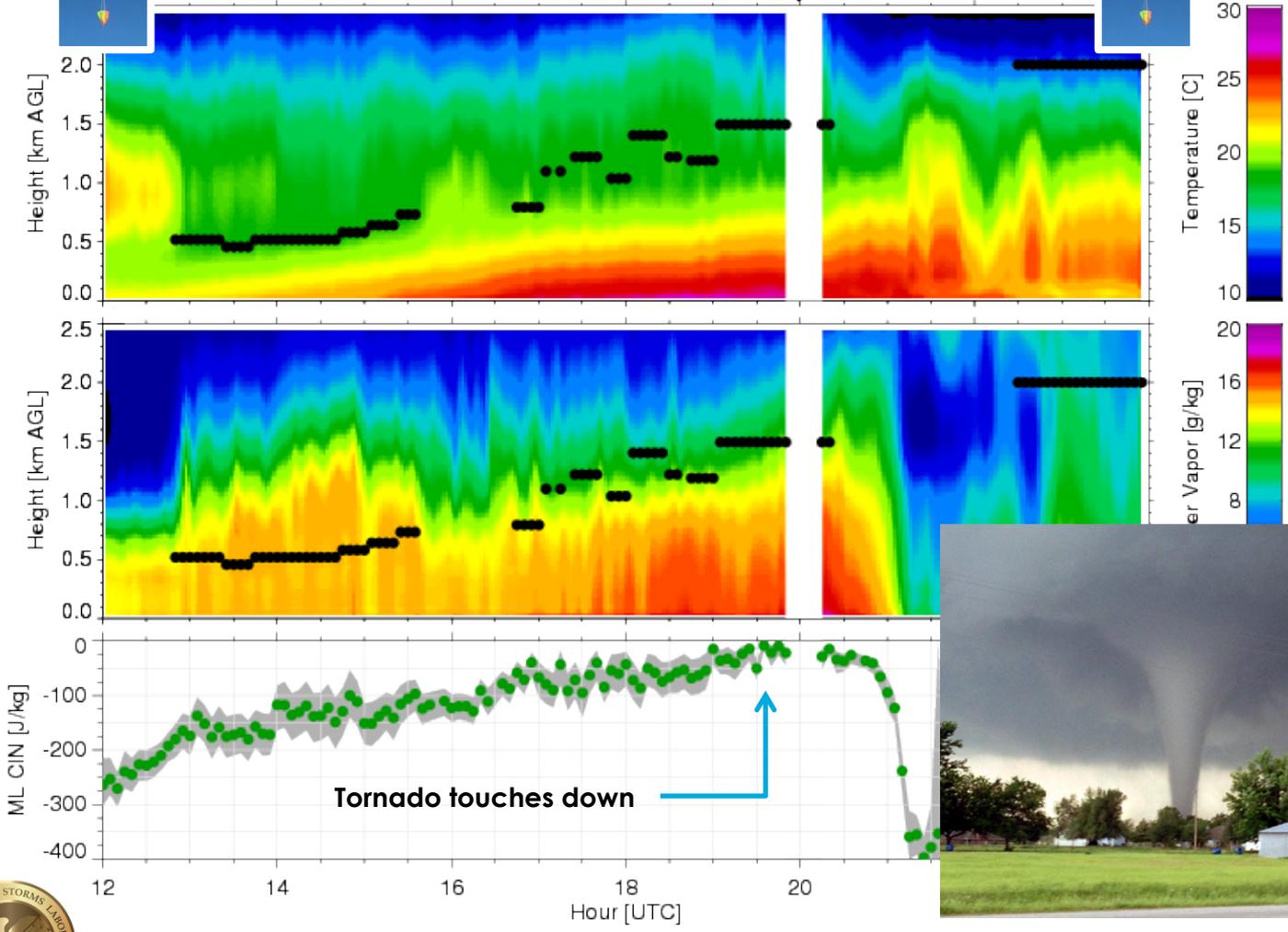
# Using These New Remote Sensors: Example 1

AERloe Data from NWC on 10 Aug 2014



# Using These New Remote Sensors Example 2

AERloE Data from NWC on 20 May 2013

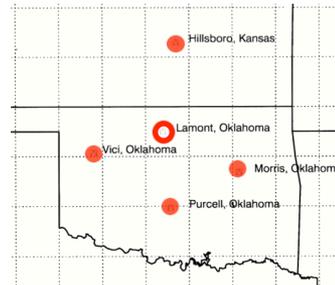


## 20 May 2013 Moore / OKC Tornado



# Summary: A Future Ground-based Network?

Using Historical Datasets  
(NWC rooftop and DOE)



Network for 4 years (1998-2003)  
Central Facility for 20+ years

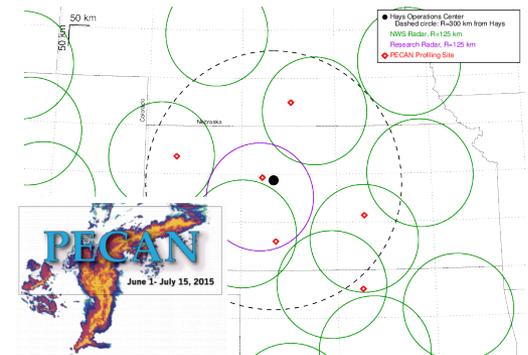
DOE also has sites in the Arctic,  
tropics, and other locations



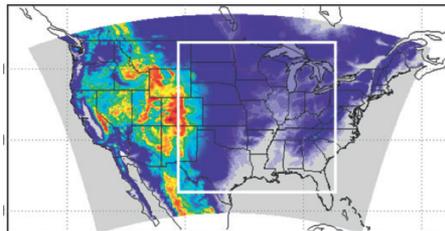
Collaborative Lower Atmospheric  
Mobile Profiling System (CLAMPS)  
(under construction)

## Plains Elevated Convection at Night (PECAN)

1 June through 15 July 2015 (NSF, NOAA, NASA, DOE)  
6 fixed profiling sites and 4 mobile profiling facilities



Wintertime OSSE  
showed improved  
precip location and  
intensity in midwest



Observation System Simulation  
Experiments (OSSEs)

