

# Kansas Nocturnal Boundary Layer and Minimum Temperatures

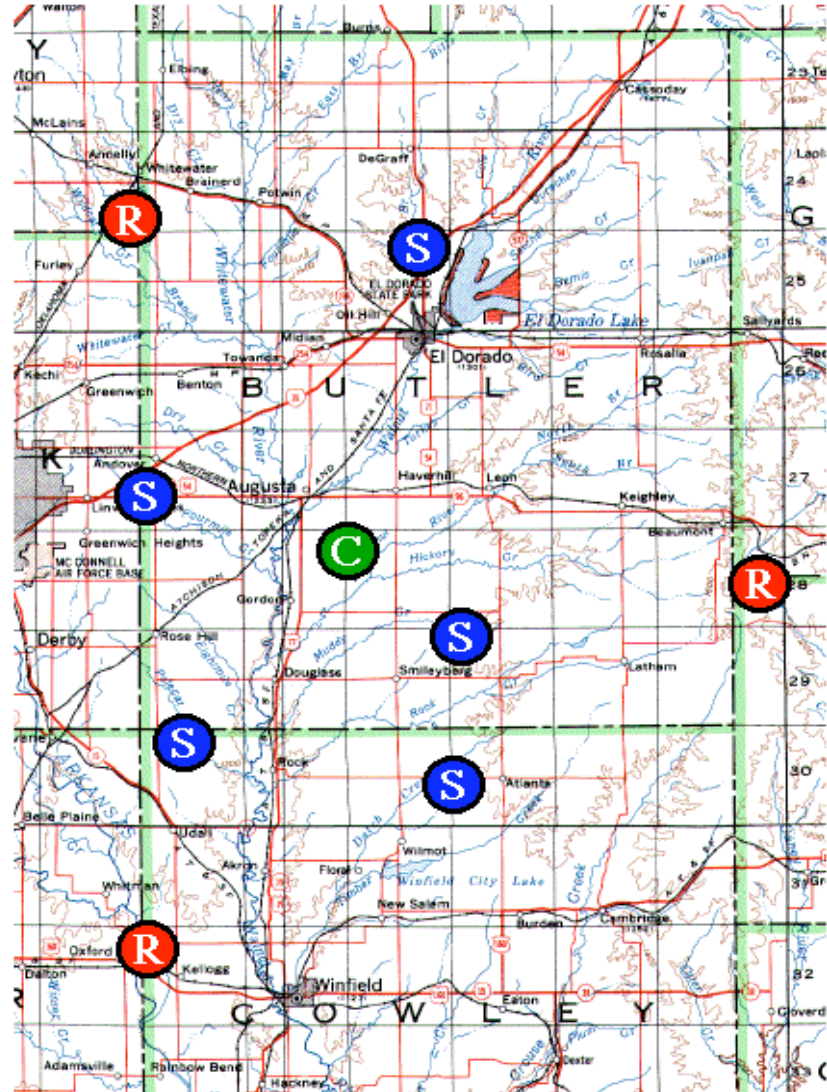
- What is the Boundary Layer
- Atmospheric Boundary Layer Experiment (ABLE)
- Goal of study
- Method

# Boundary Layer

- Definition: part of the troposphere that is directly influenced by the surface and responds to surface forcings within an hour or less
- Small scale not captured by data network
- Parameterized in models

# ABLE

- Mini Sodar
- Radar Accoustic Sounding System (RASS)
- Eddy Correlation
- Energy Balance Bowen Ratio (EBBR) station
- Radiosonde system
- Automatic Weather Station (AWS)
- Radiometry/Vegetation site



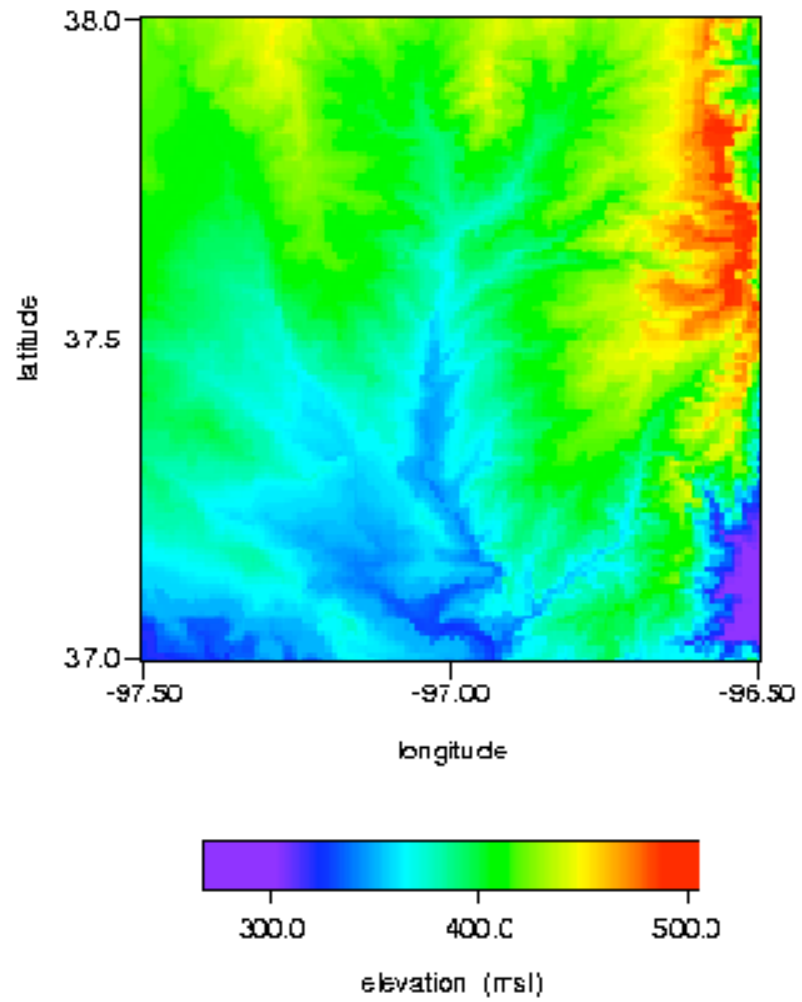
# Instrumentation

- Sodar: Uses sound waves emitted on 3 different axes to compute wind direction and speed.
- RASS: Uses a combination of radar and sound emissions to calculate temperature, and wind direction and speed.

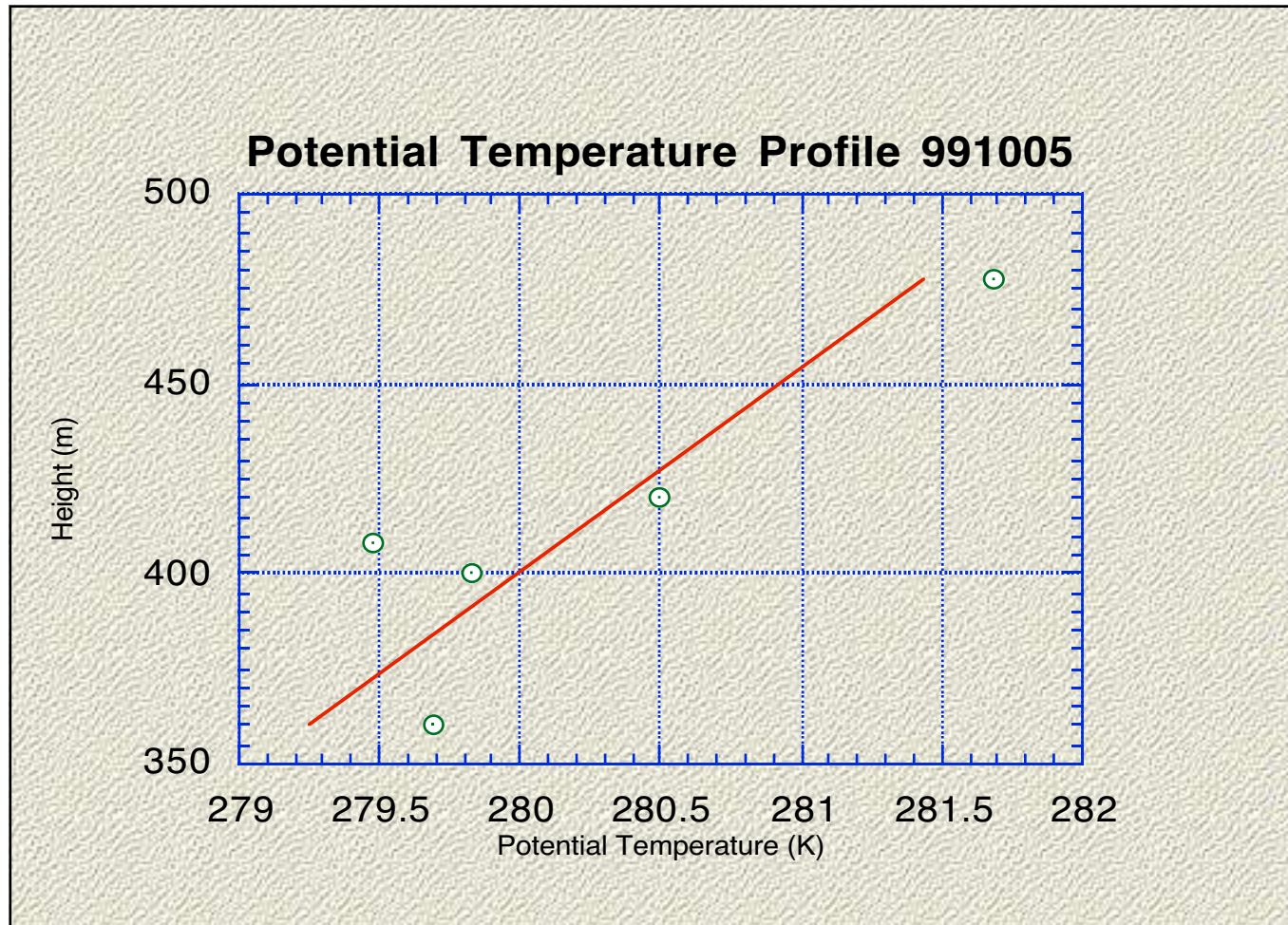
# Goal

- Create a dataset focussing on nocturnal boundary layers during minimum temperatures
- Identify any topographic influences

ABLF Topographic Map

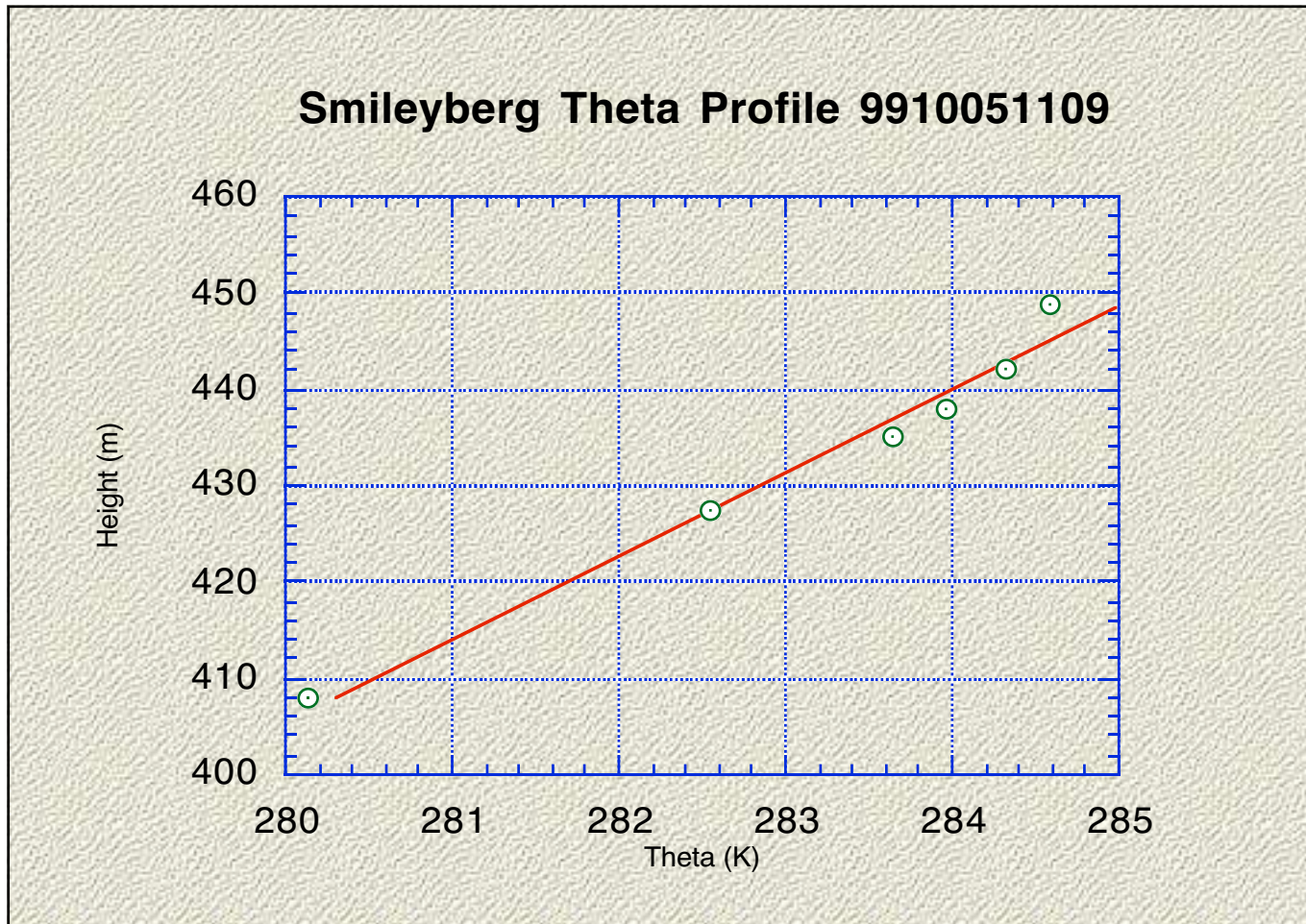


# Near-surface Profile





# Radiosonde Profile





# Joint Urban 2003

- Defense Threat Reduction Agency
- Department of Defense
- Department of Homeland Security
- Chemical & Biological National Security Program



# Objective

- Gather meteorological and tracer data for circulations ranging in scale from several km, encompassing suburban areas, to single city block.
- Look at outdoor to indoor penetration and dispersion.

# Global Change

- Social states
- Urban modifications of the boundary layer
- Pollution studies

# Why Oklahoma City?

- Climatological south winds
- Relatively calm
- Inactive weather
- Oklahoma Mesonet
- Proximity to Storm Prediction Center and local radars

# Instrumentation

- 215 tracer bag samplers
- 25 fast response tracer analyzers
- 1 5-level tracer profiling system
- 22 surface meteorology stations
- 164 sonic anemometers
- 6 surface energy budget stations
- CTIWind Tracer lidars
- 2 Radiosonde systems
- 2 tethered sonde systems
- 4 RASS profilers
- 1 FM-CW radar
- 3 ceilometer
- 9 sodar
- 1 remote sensing instrumented helicopter

# 3-D Sonic Anemometer

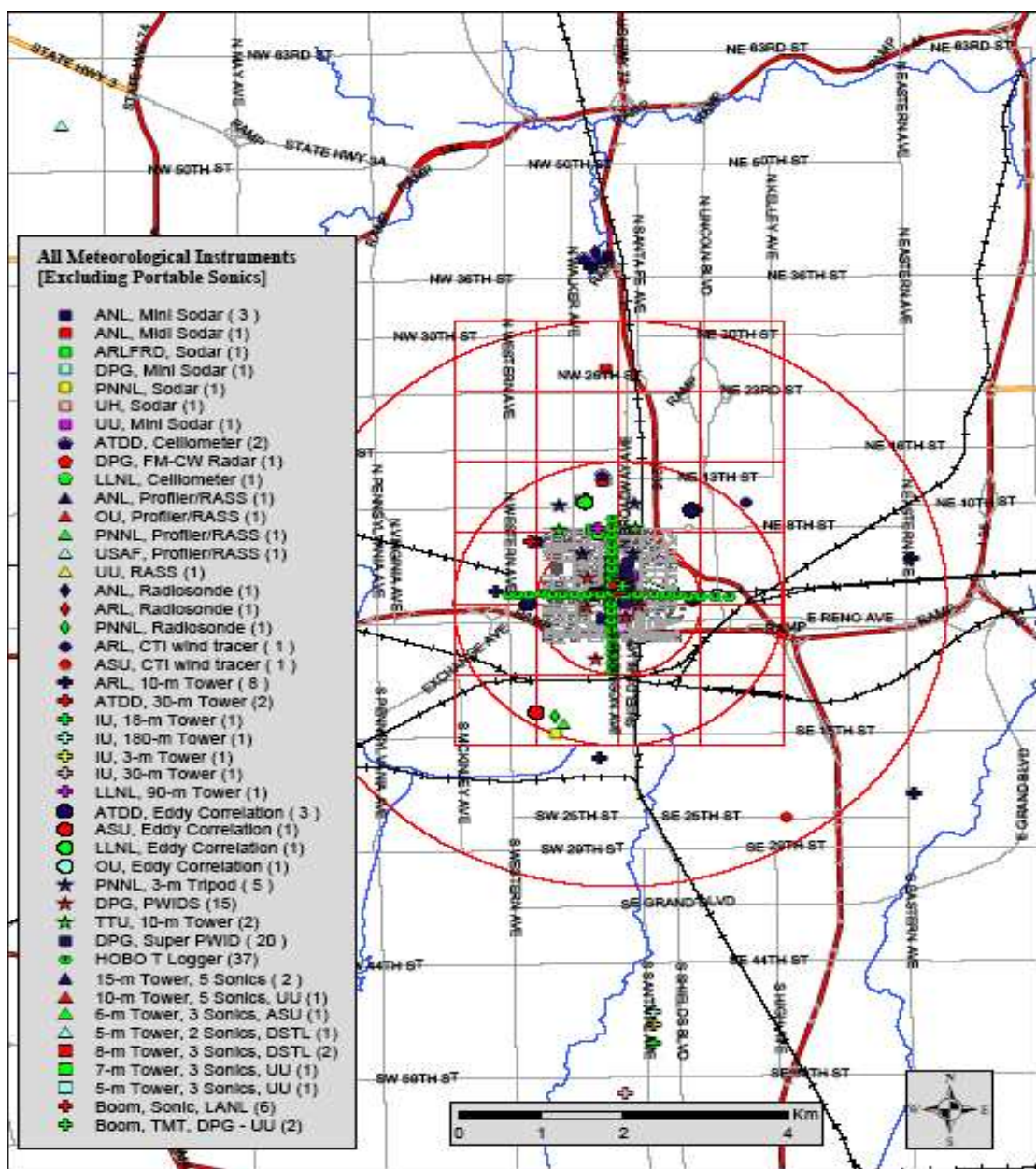


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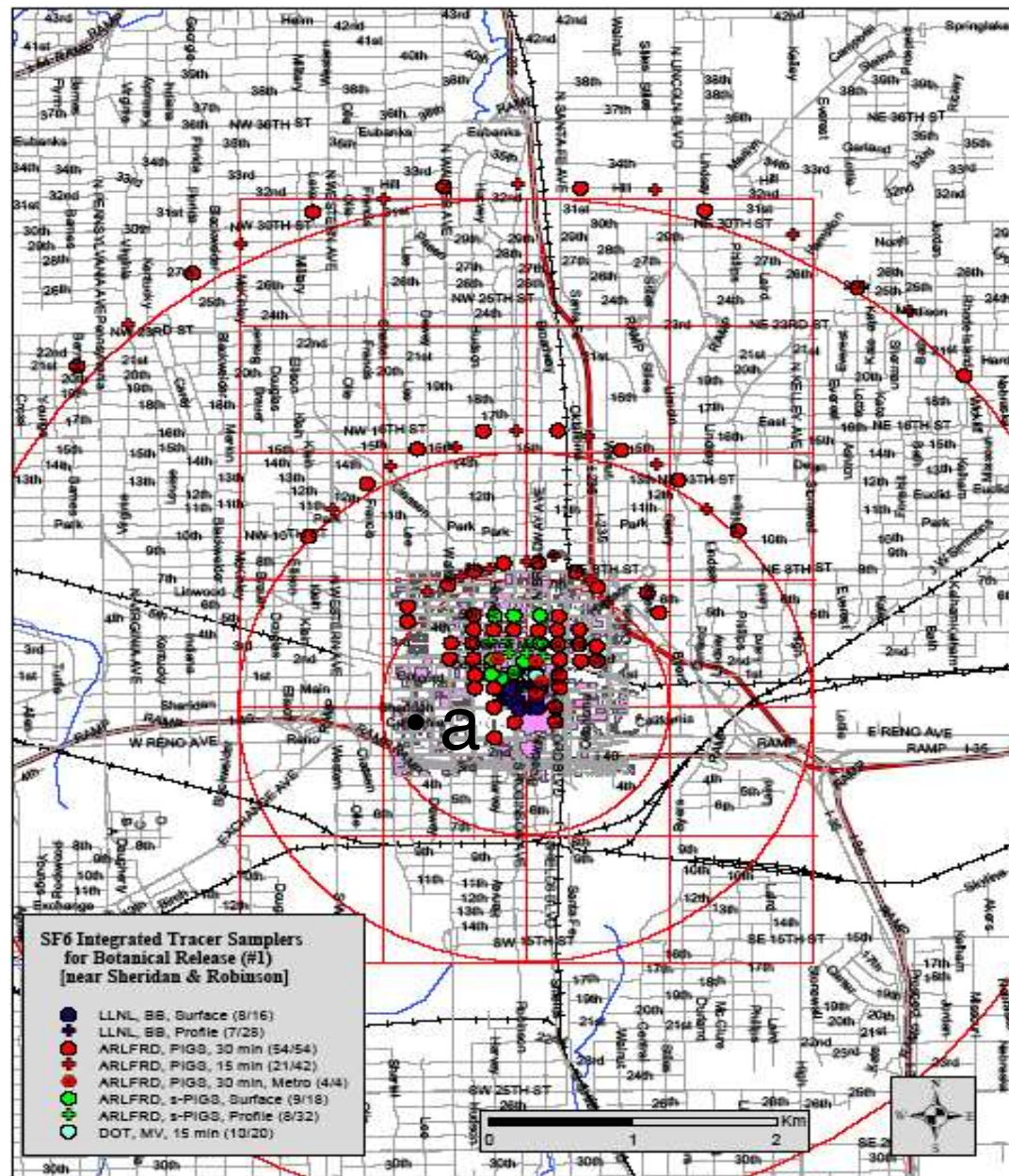




# **Intensive Operating Periods (IOP)**

- SF6 releases
- Radiosonde balloon launches
- Instrumented Helicopter
- Park Canyon Ralley





# Acknowledgments

- GCEP
- Rich Coulter
- ABLE
- Everyone from Joint Urban 2003
- Susan Kirt