

Mobile Observations in Fair Weather Environments of Micro/Mesoscale Atmospheric Variability

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Intro/Context

- Vehicle-mounted observations used previously for dryline and severe thunderstorm studies (*Straka et al. 1996; Pietrycha and Rasmussen 2004; Markowski 2002*)
- Very few published cases of use in other environments (*Mayr et al. 2002*)
- Similarity to high time-resolution obs (*Sanders 1955*), airplane obs, Clarus road weather proposal (*Mahoney et al. 2010*), USDOT IntelliDrive, NWS MoPED.

Observing System Design

- Primary sensor has been HMP45C (w/radn. shield)
- Position and time from Garmin GPS
- Easily mounted/removed using “Sticky Pods”
- Campbell Scientific CR23X datalogger powered through inverter and 12V power supply from vehicle
- Data logged every 10 seconds -> 200 m typical spatial resolution

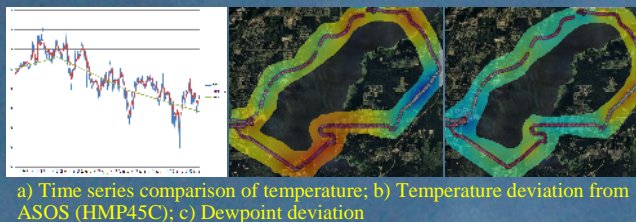


Data Exploration/Analysis

- Raw time series
- Geospatial portrayal by Perl script to write .gpx files, and then convert to shapefile in “Quantum GIS”
- Comparison to synoptic, mesonet, radar, and satellite data

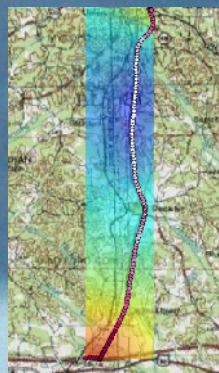
Ross Barnett Reservoir

- 1 August 2012 mid-afternoon
- Mostly sunny skies and light wind from west
- Relatively hot and humid conditions on bridges/causeways
- Pocket of significantly cooler and humid conditions on downwind side of lake
- Comparison of HMP45C and T107 sensors



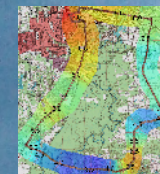
Post-rain Cool Swaths

- 16 June 2012 daytime
- Long circuit around Central Mississippi, that crossed swaths of wet ground from rain during previous few hours



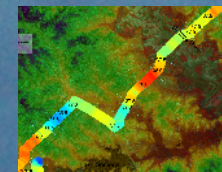
Early Morning Urban/Rural

- 1 December 2012 before sunrise
- Calm conditions with patchy ground fog
- Higher temperatures both in Jackson, MS urban area and rural areas of varying terrain and surface



Fair Weather in Central Texas

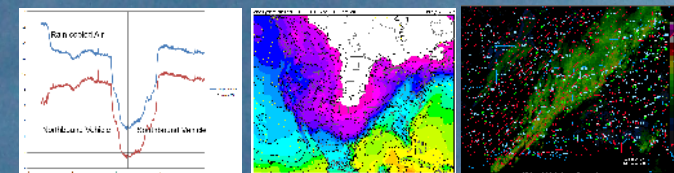
- 7 August mid-day
- Mesoscale temperature and humidity variations under clear light-wind conditions
- Possibly related to soil moisture/evaporation variations



Temperature with overlay of DEM and aerial imagery

Rain-Obscured Cold Front

- 10 December 2012 late night
- Primary cold front embedded in broad rainband behind initial squall line



NOAA Center for Atmospheric Studies