

TexAQS II Radar Wind Profiler Analysis: Beeville and New Braunfels Mixing Heights

Preliminary Results

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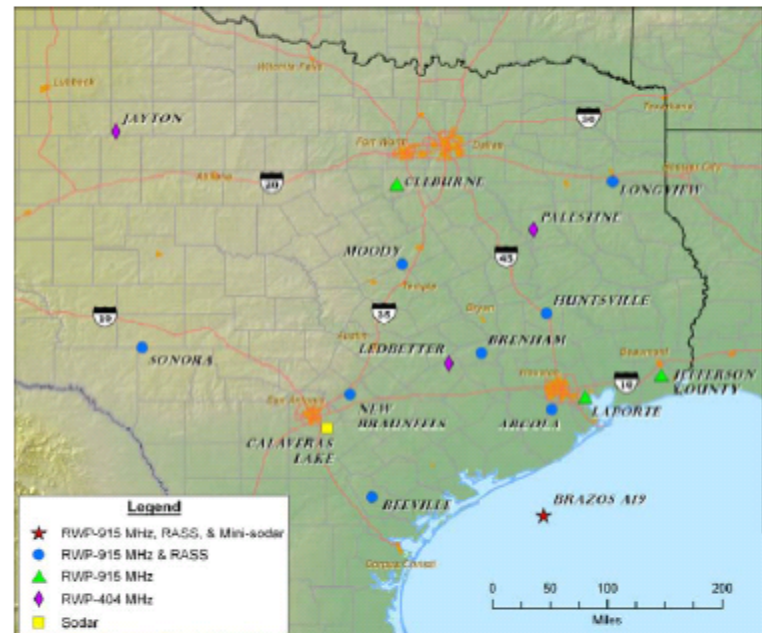
The University of Texas at Austin

Radar Wind Profiler Data

- **Measurements available from ~June 2005 – October 2006**
- **Funding for Beeville site provided by Victoria and Corpus Christi**
- **Funding for New Braunfels site provided by Austin and San Antonio**
- **Collected by Sonoma Technology, Inc.**
- **Provided by Doug Boyer (TCEQ)**

RWP Measurements

- Upper-air meteorological measurements:
 - Eleven 915-MHz RWPs
 - Seven 404-MHz RWPs
 - Eight Radio Acoustic Sounding Systems (RASS)
 - Two sodars
 - One ship-based lidar
- Data collected by TCEQ, NOAA-PSL, and STI
- Data are being used to support modeling and data analysis



Planned Analyses

- UT to analyze mixing heights measured at the Beeville and New Braunfels stations.
 - Is there a relationship between ozone concentrations and
 - Morning mixing heights?
 - Afternoon mixing heights?
 - How do mixing heights vary diurnally and spatially
 - By season?
 - On low vs. high ozone days?

Planned Analyses (cont.)

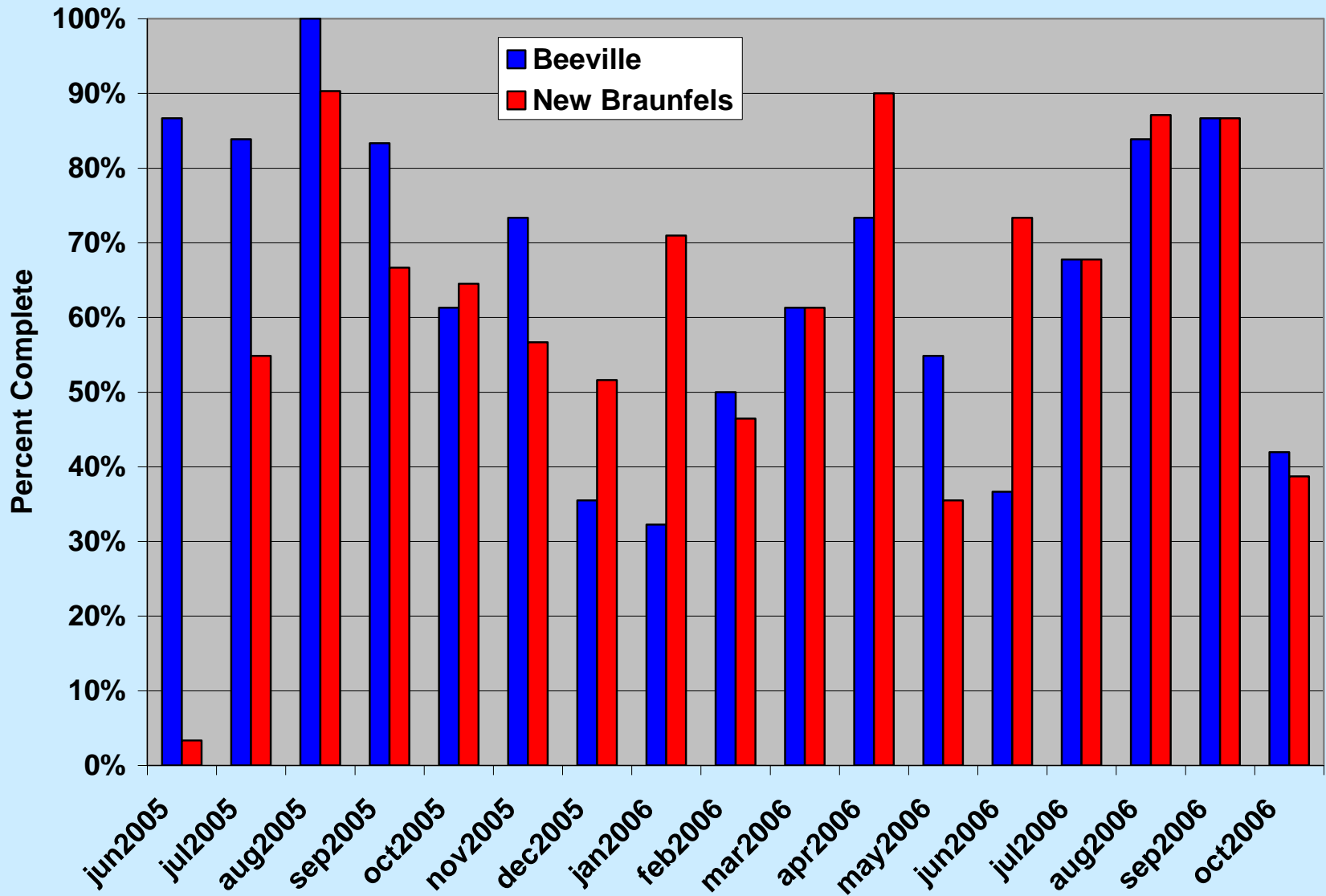
- Mixing Heights (cont.)
 - How do the measured mixing heights compare to those used by photochemical models?
 - September 1999 Episode
 - 2002 Seasonal Model
- Other Analyses:
 - How does wind speed and wind direction vary with height on low and high ozone days?
 - Indicative of the large-scale weather and transport patterns
 - Can we use the TexAQS II ozonesonde observations to quantify the vertical distribution of ozone above the surface?
 - Do high ozone concentrations occur throughout and above the mixing layer in the upwind region prior to high ozone measured at CAMS 87?

Today's Presentation

Mixing Height Preliminary Results

- Data Completeness
- Seasonal variability
- Variability on low vs. high ozone days

Percentage of days by month with 5 or more hours of valid mixing height observations

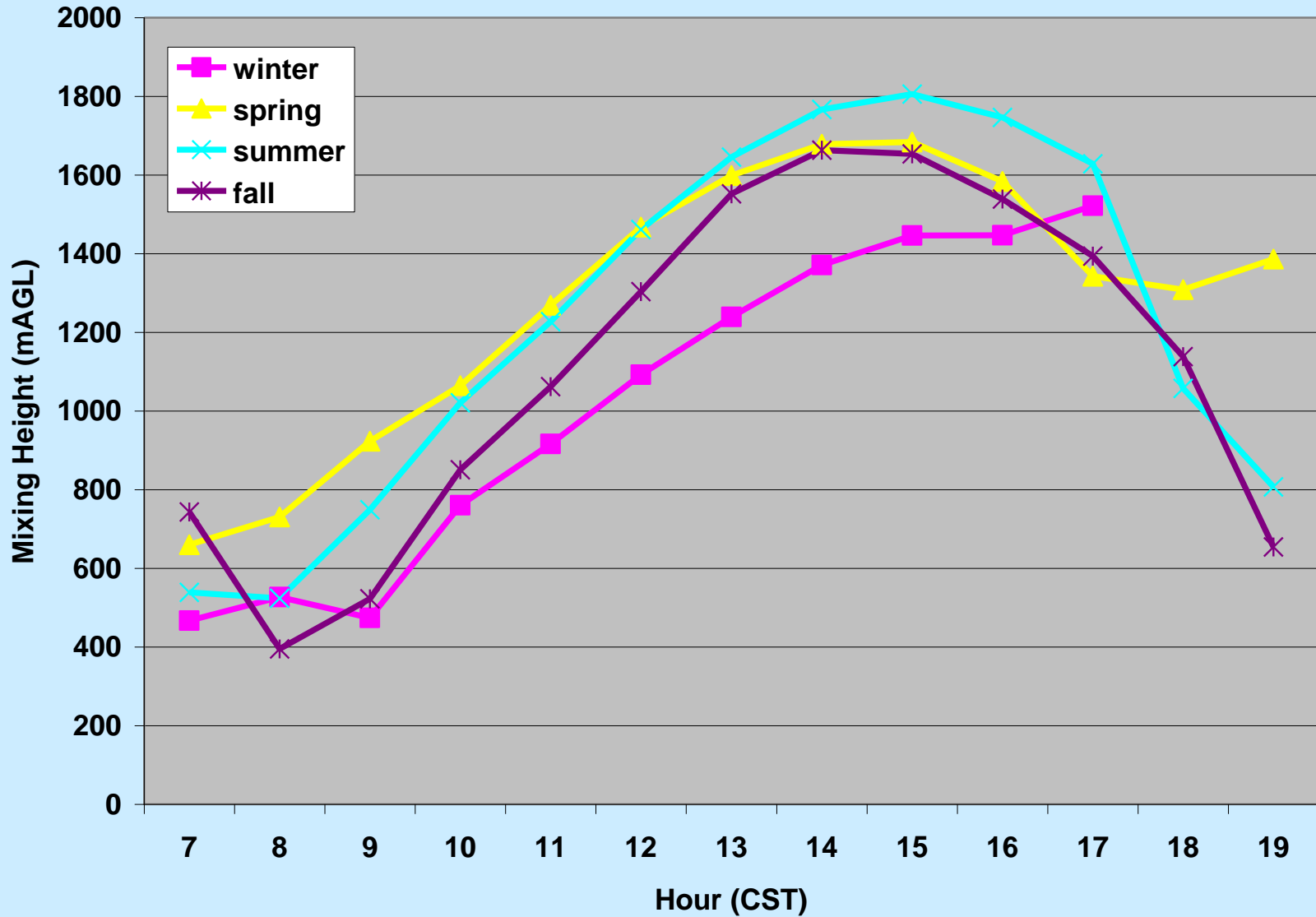


Today's Presentation

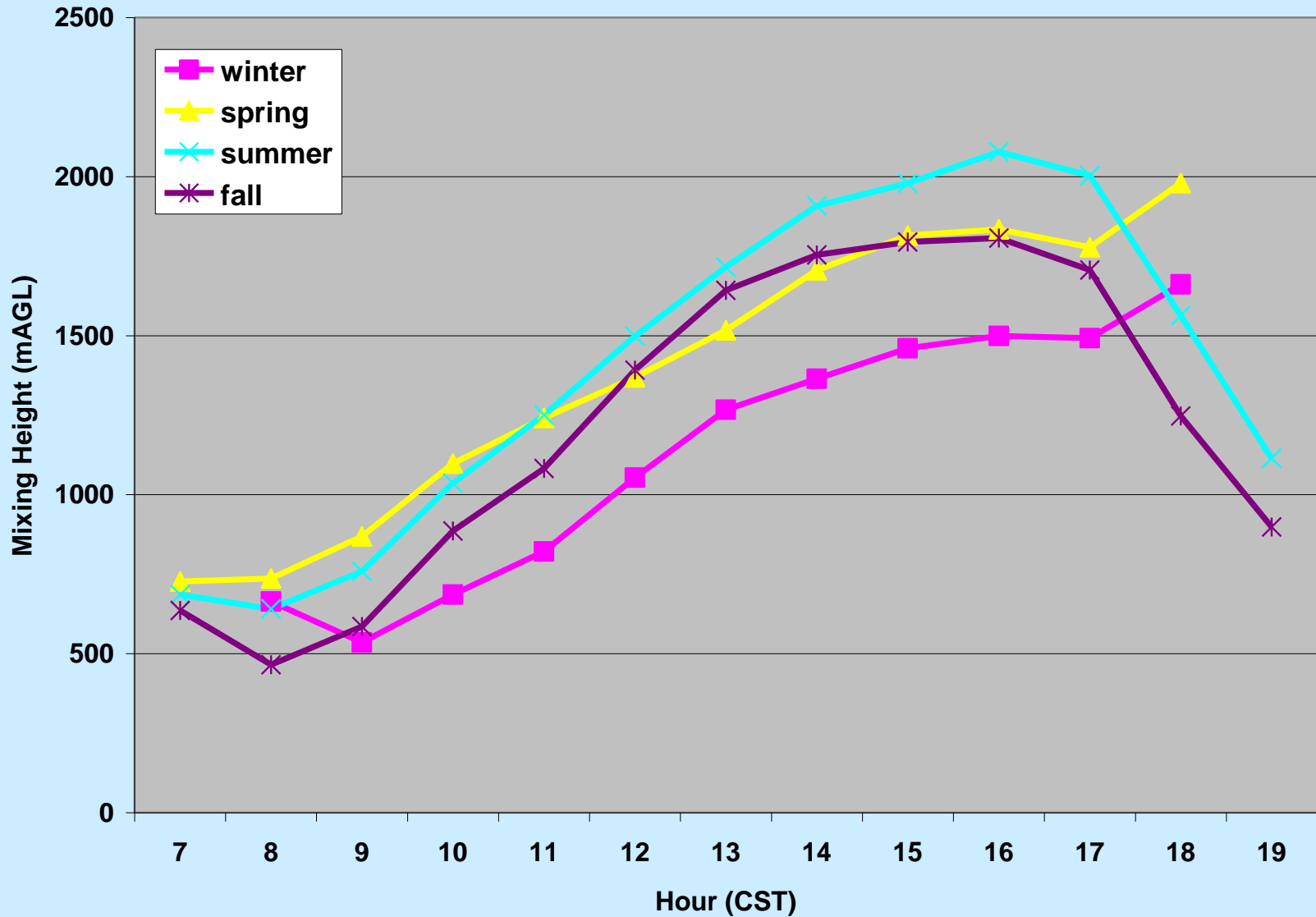
Mixing Height Preliminary Results

- Data Completeness
- Seasonal variability
- Variability on high vs. low ozone days

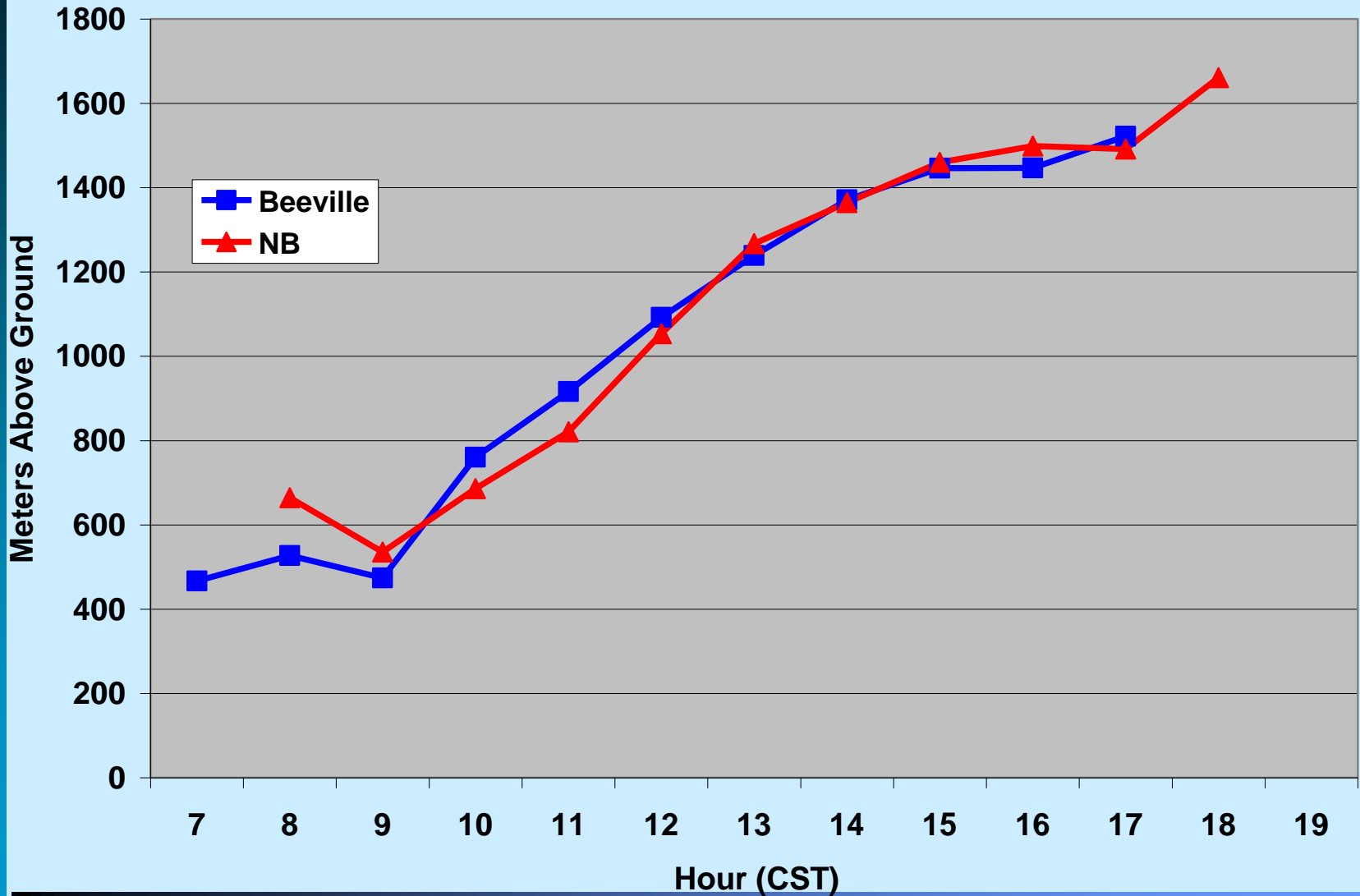
Average Mixing Height Profile by Season Beeville



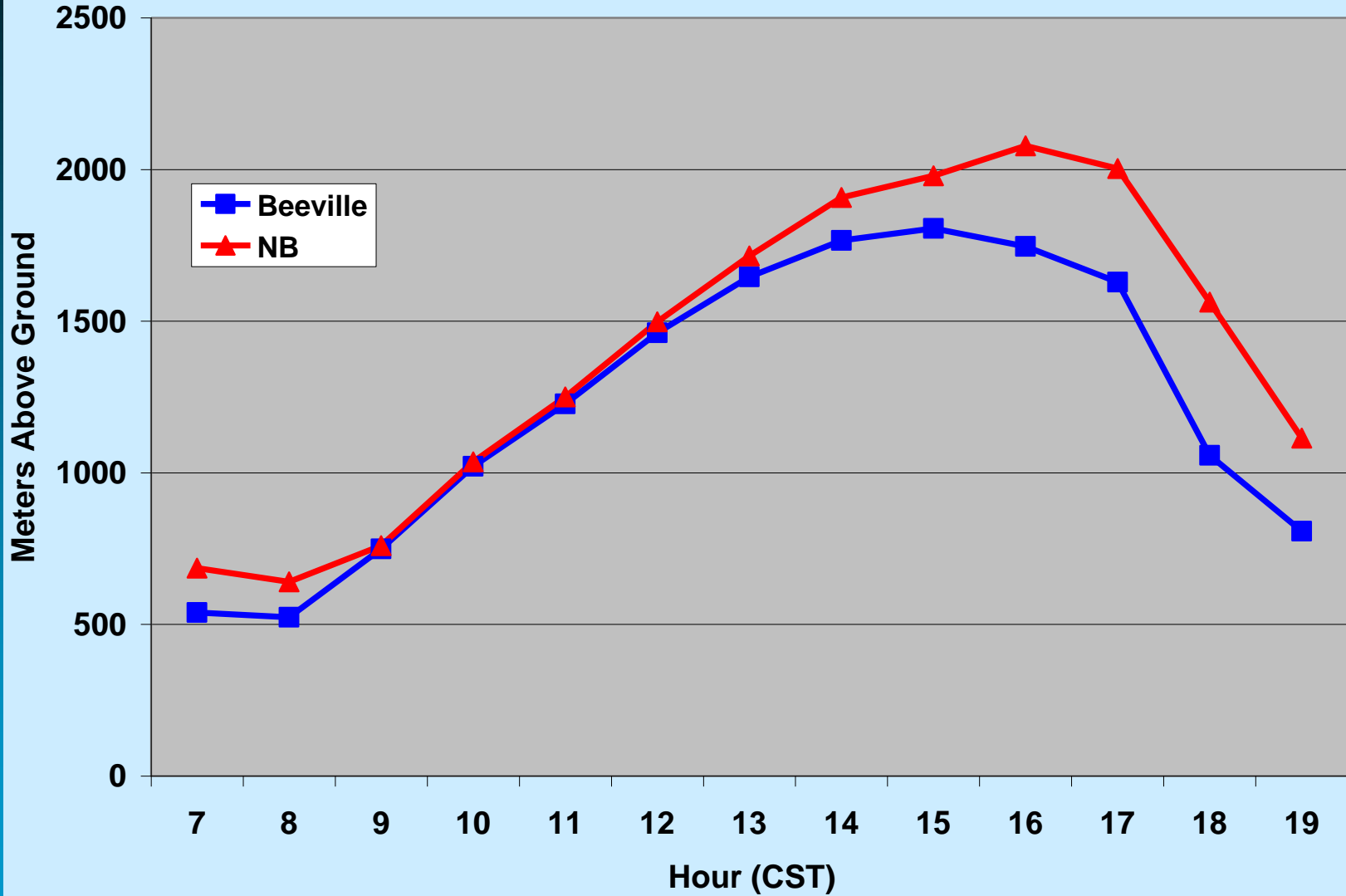
Average Mixing Height Profile by Season New Braunfels



Comparison of Winter Profiles Beeville and New Braunfels



Comparison of Summer Profiles Beeville and New Braunfels



Preliminary Seasonal Mixing Height Results

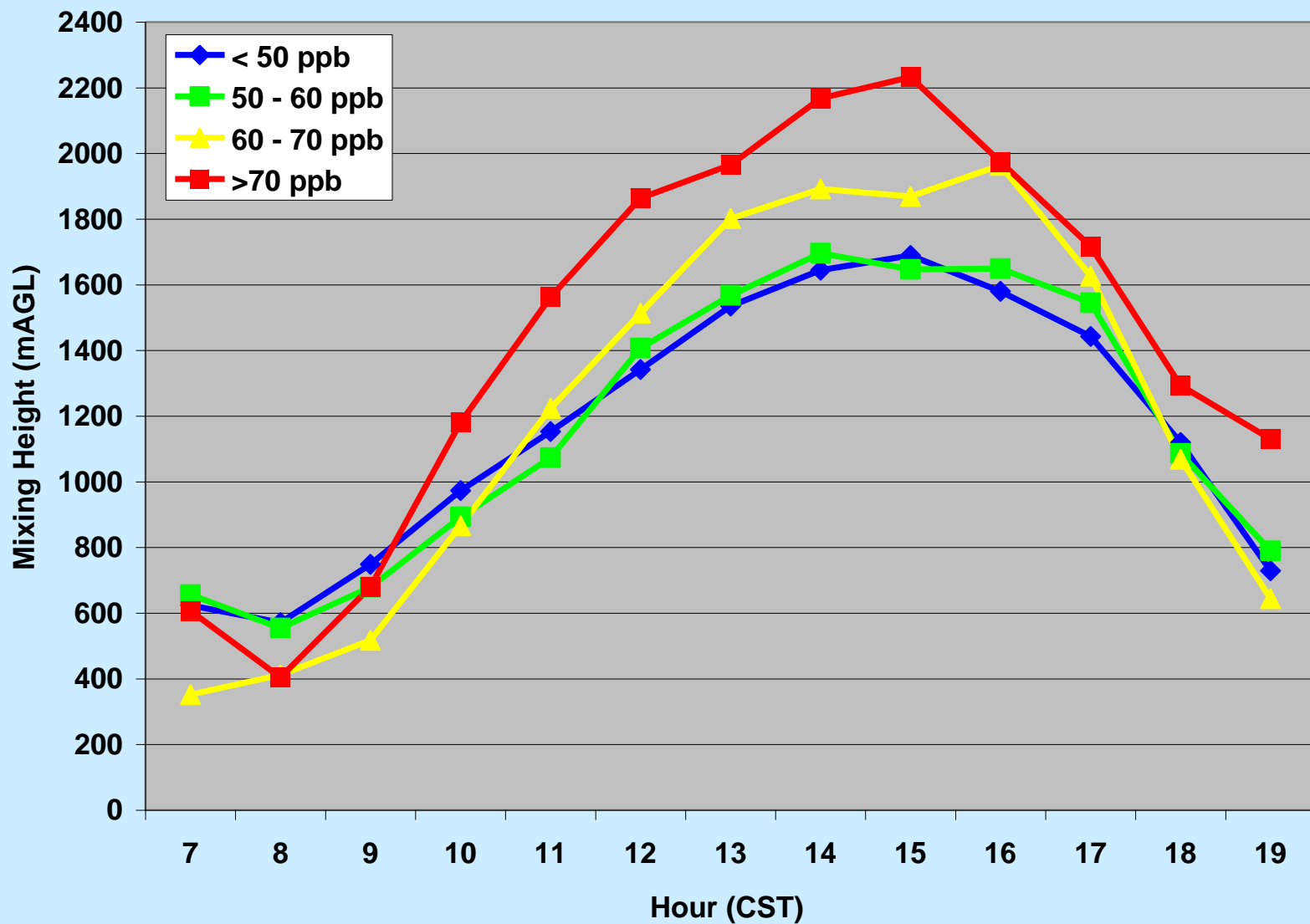
- Lowest mixing heights during winter
 - Beeville and New Braunfels characterized by similar profiles
 - Suggests relatively low spatial mixing height variability during winter
- Highest mixing heights during summer
 - Beeville and New Braunfels have similar profiles during the morning hours
 - Afternoon mixing heights are relatively higher at New Braunfels compared to Beeville
 - Afternoon difference due to Gulf of Mexico influence (e.g., afternoon bay and sea breezes)?
 - Suggests relatively higher spatial mixing height variability during summer

Today's Presentation

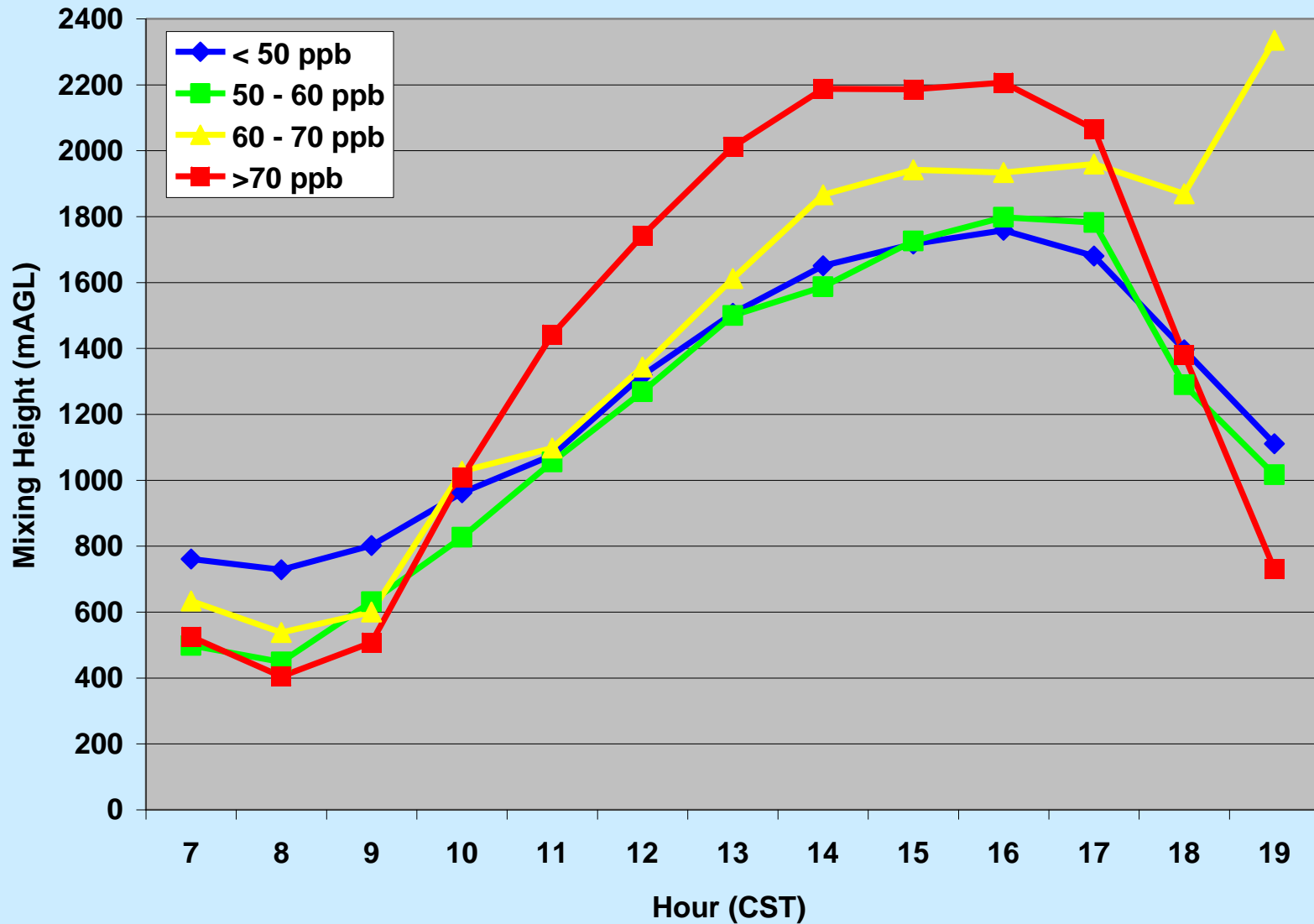
Mixing Height Preliminary Results

- Data Completeness
- Seasonal variability
- Variability on low vs. high ozone days

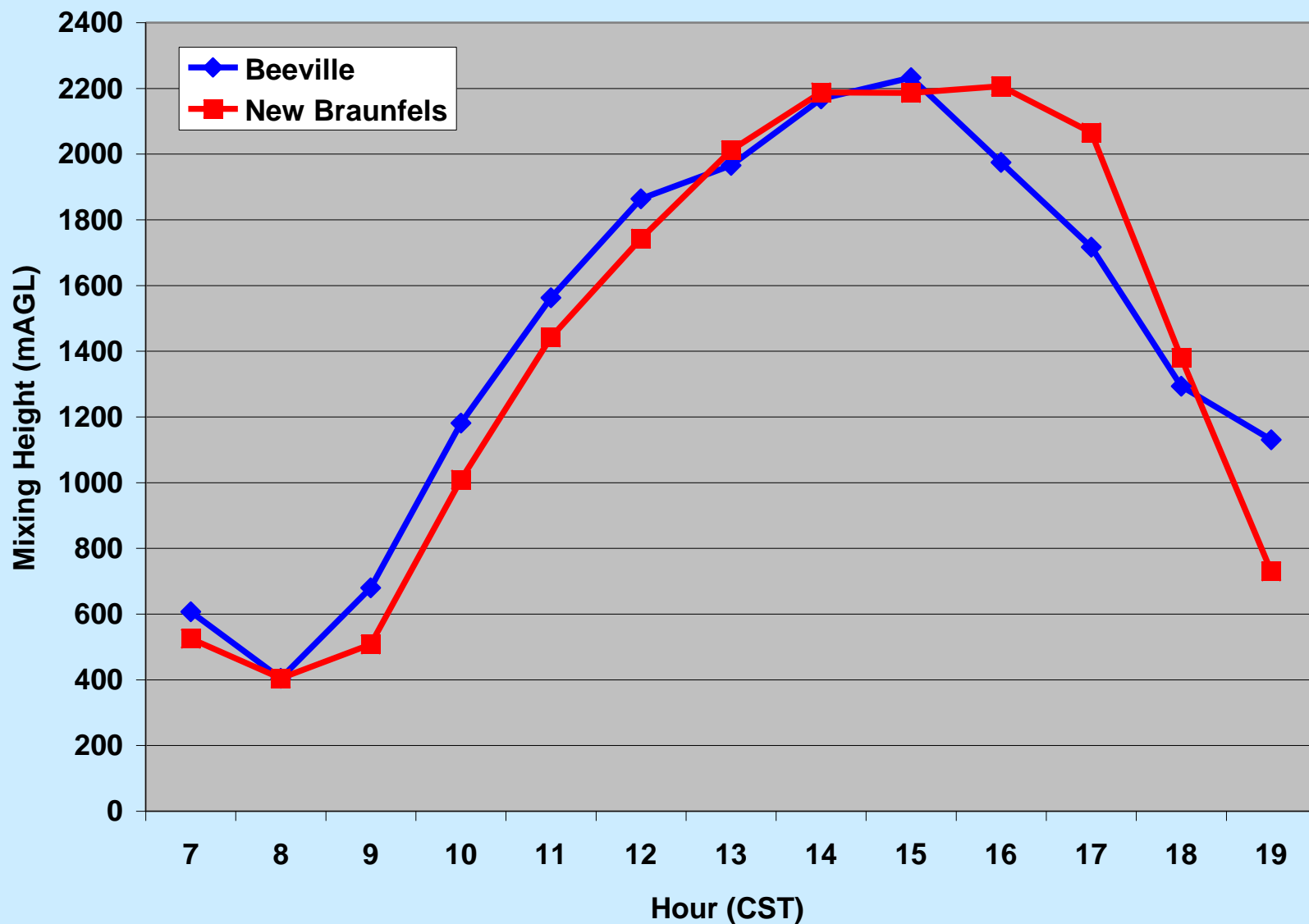
Average Beeville Mixing Height Profile by CAMS 87 Maximum 8-Hour Ozone



Average New Braunfels Mixing Height Profile by Austin Maximum 8-Hour Ozone



Comparison of Mixing Height Profiles on High Ozone Days: Beeville (using VCT ozone) and New Braunfels (using AUS ozone)



Preliminary Mixing Height Results on Low and High Ozone Days

- Days characterized by relatively high ozone concentrations are associated with the highest mixing heights
 - ~1900 meters on 60 ppb – 70 ppb days
 - ~2200 meters on >70 ppb days
- Although the maximum mixing heights on high ozone days are similar between New Braunfels and Beeville, mixing heights remain high later in the day at New Braunfels.
 - Afternoon difference due to Gulf of Mexico influence (e.g., afternoon bay and sea breezes)?