Horizontal Variability of Mixed-Layer Height from Airborne Lidar Measurements

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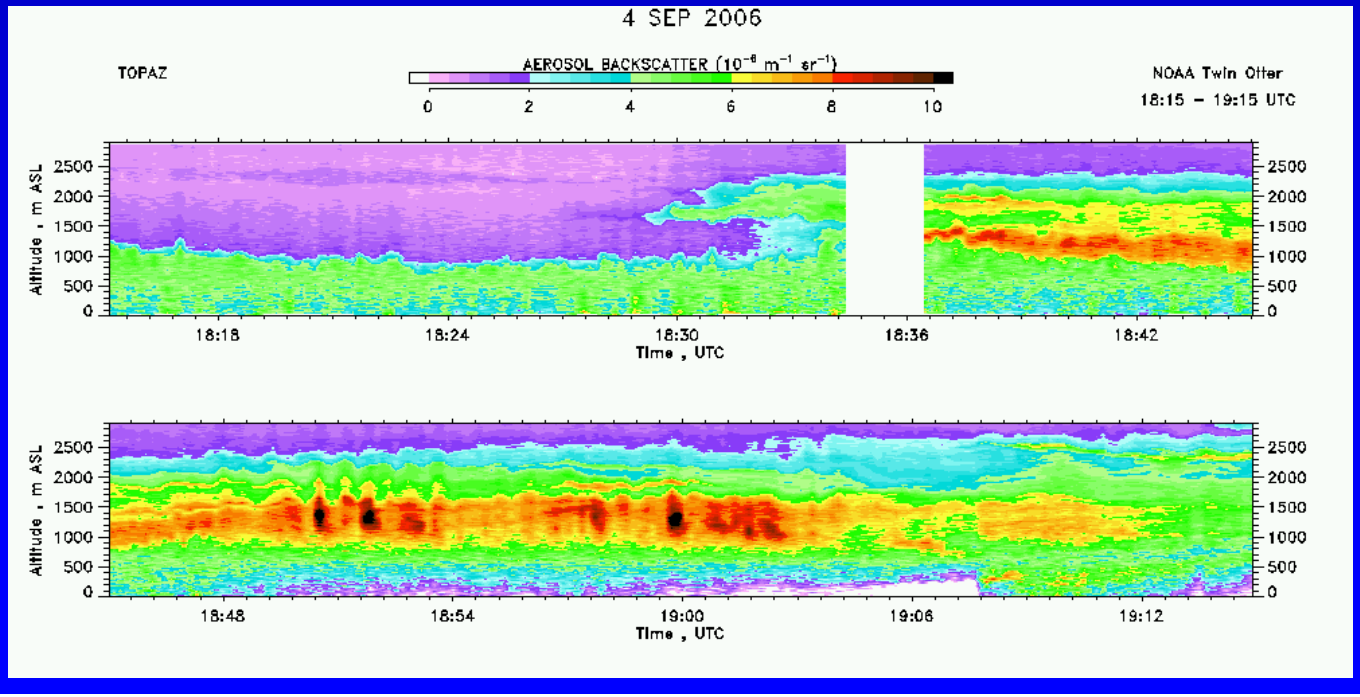
TexAQS II - RSST Meeting
12 - 13 October 2006

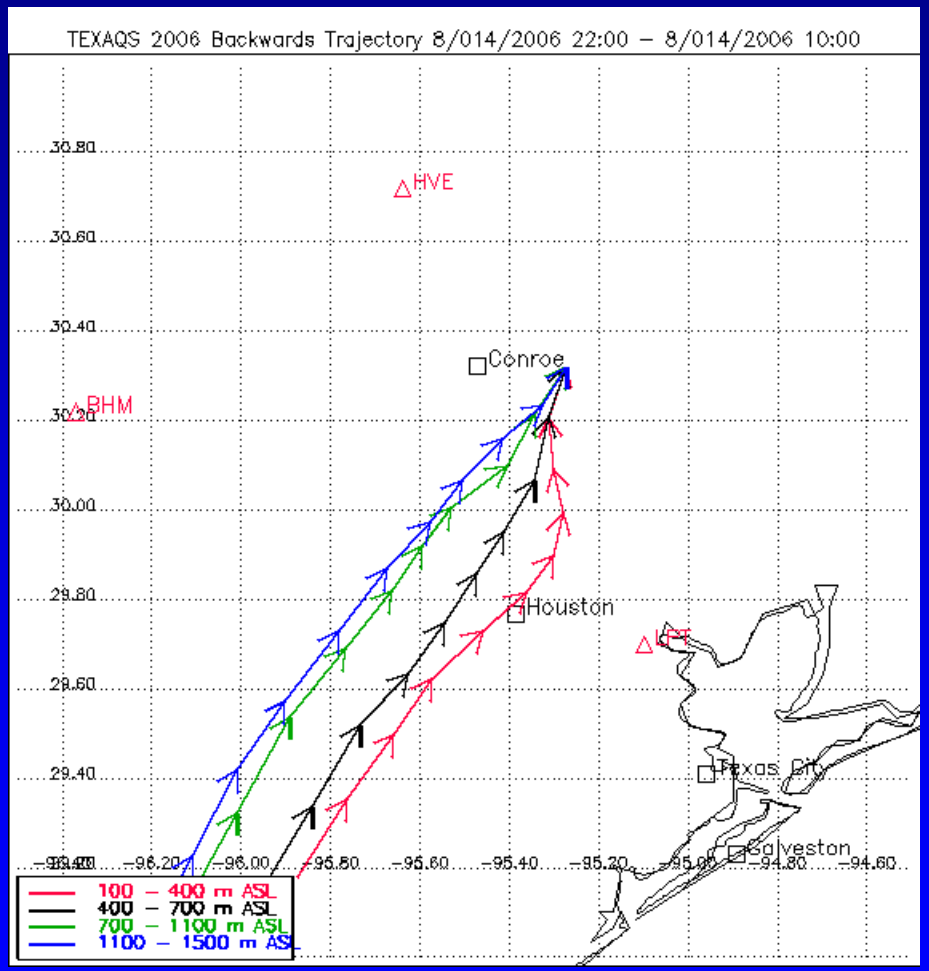
<u>Reminder:</u> Data and findings are preliminary

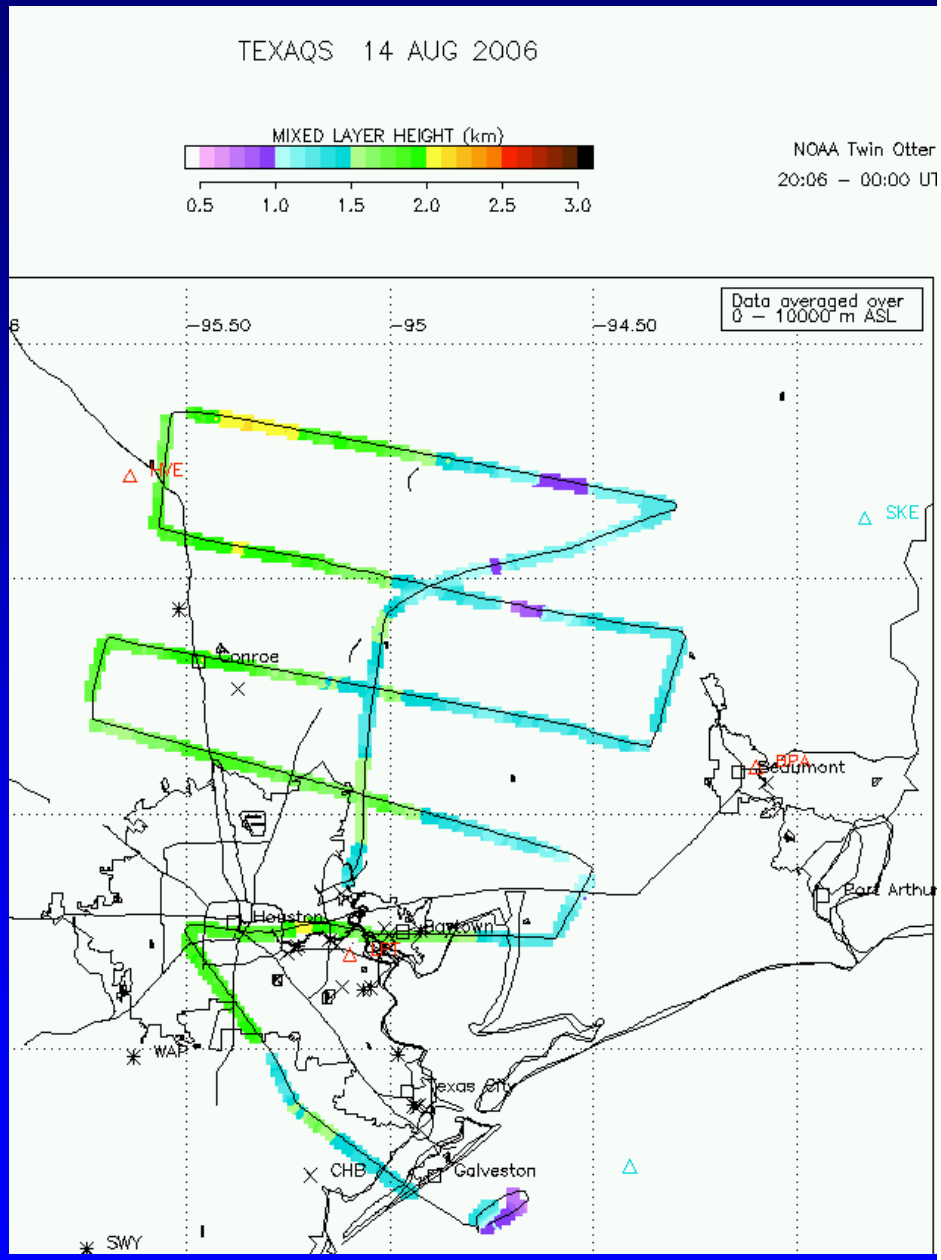
BL height retrieval with airborne lidar TOPAZ

- Use aerosol backscatter contrast between free troposphere and boundary layer
- Apply wavelet technique to detect maximum backscatter gradient at top of mixed layer
- Technique works well if lower free troposphere is clean, but retrieval becomes difficult if contrast in aerosol loading between free troposphere and mixed layer is poor



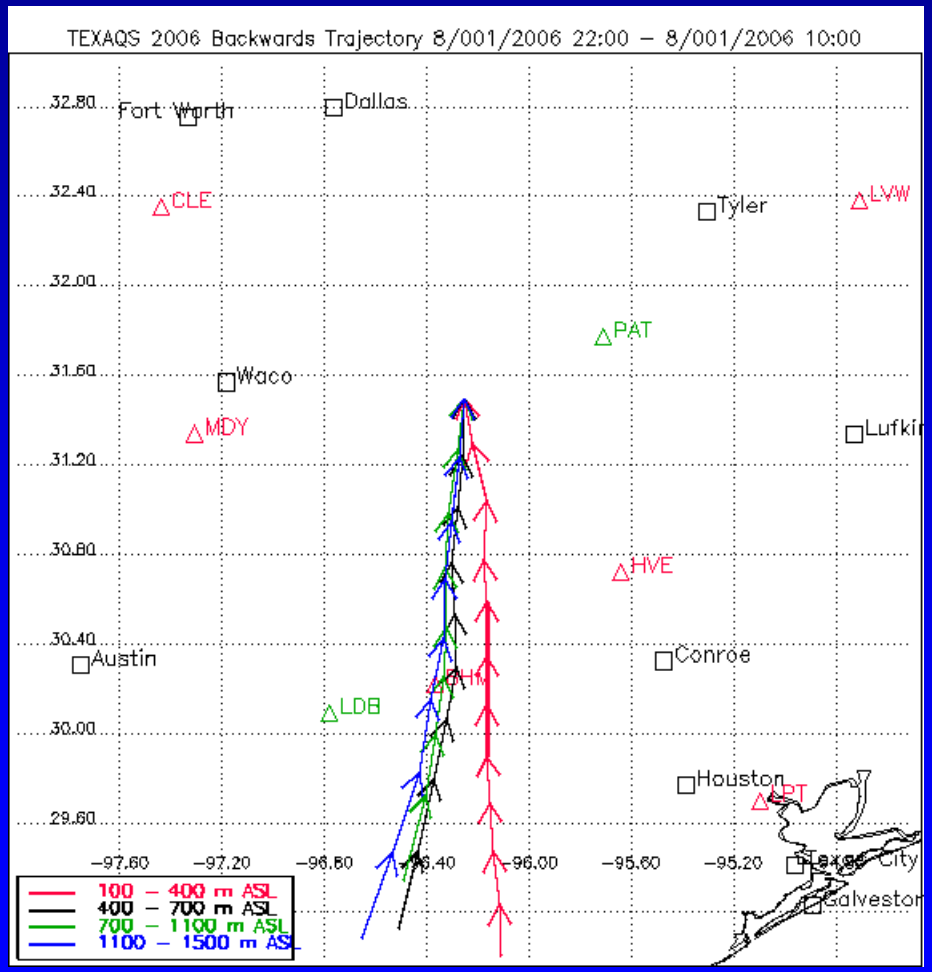
Southerly flow: Aug 14

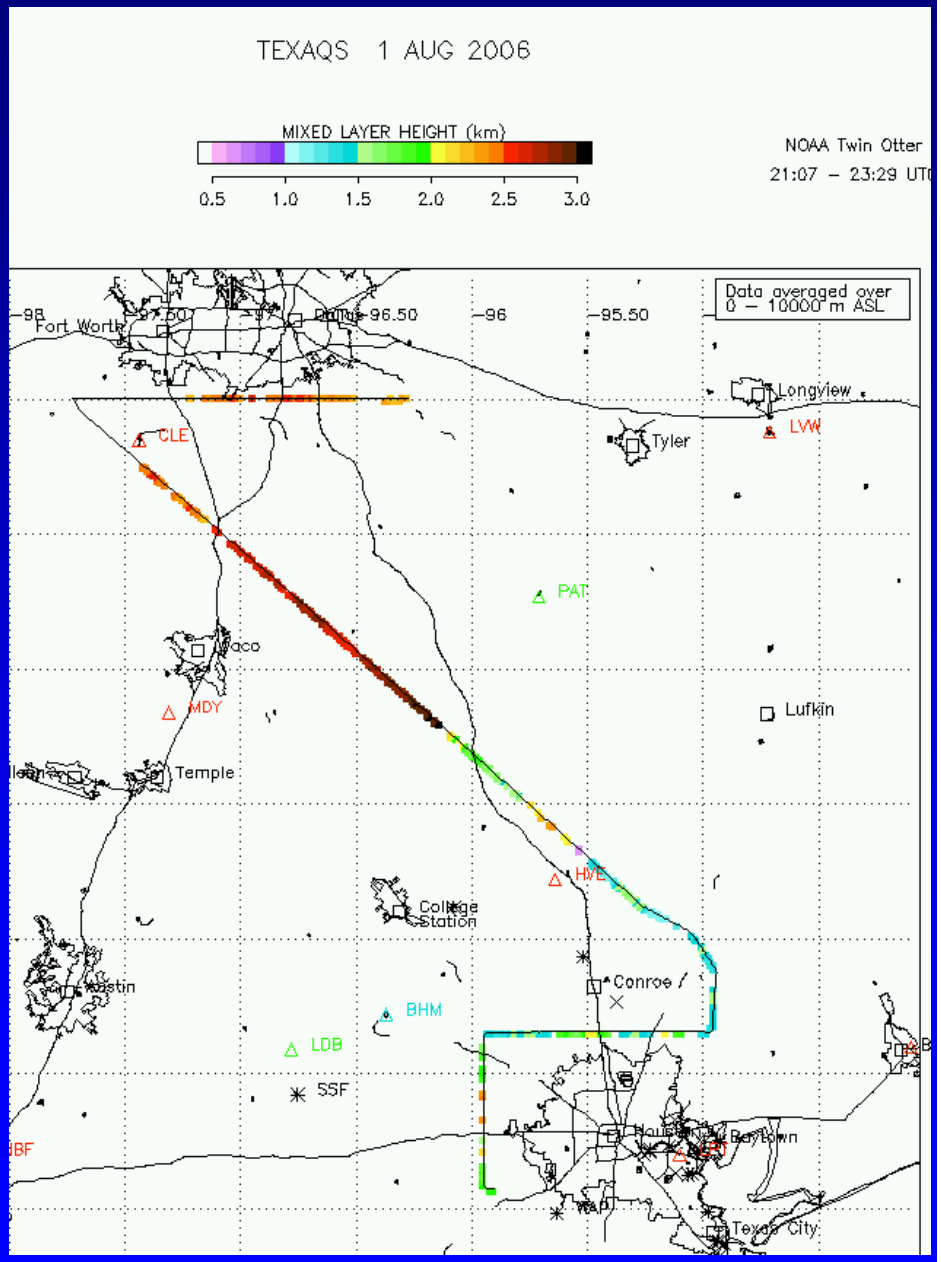




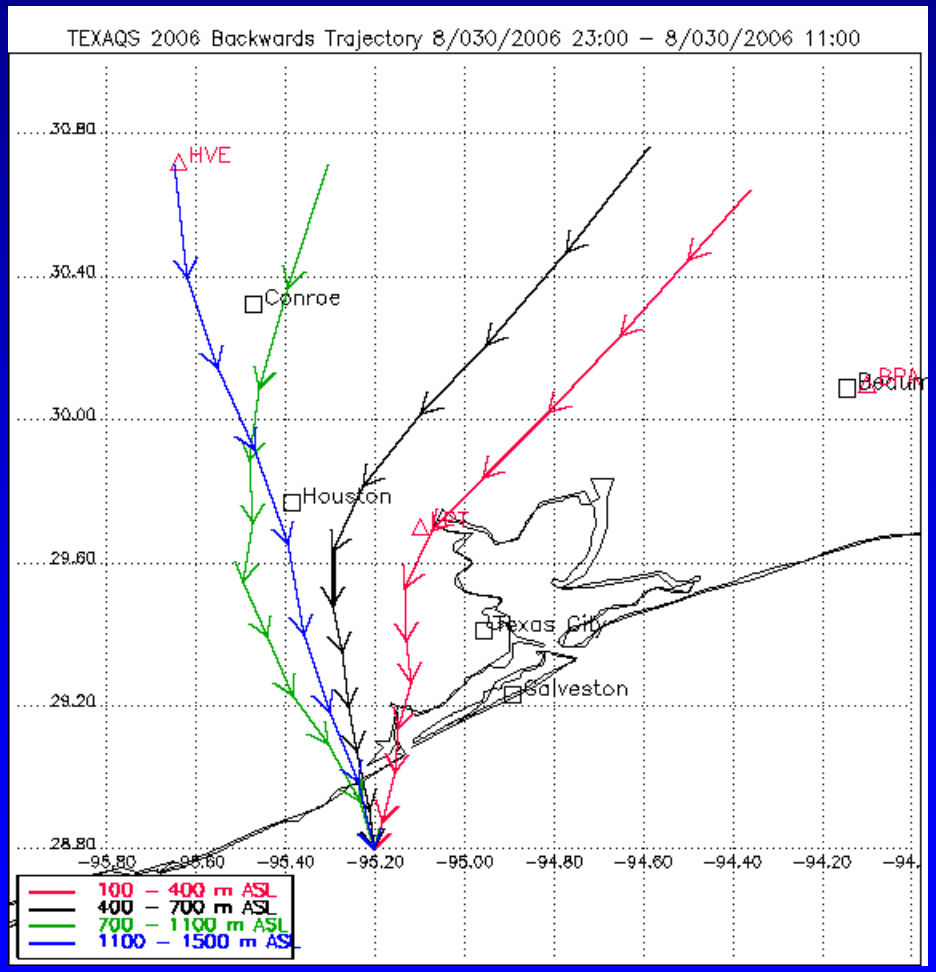
Southerly flow: Aug 01

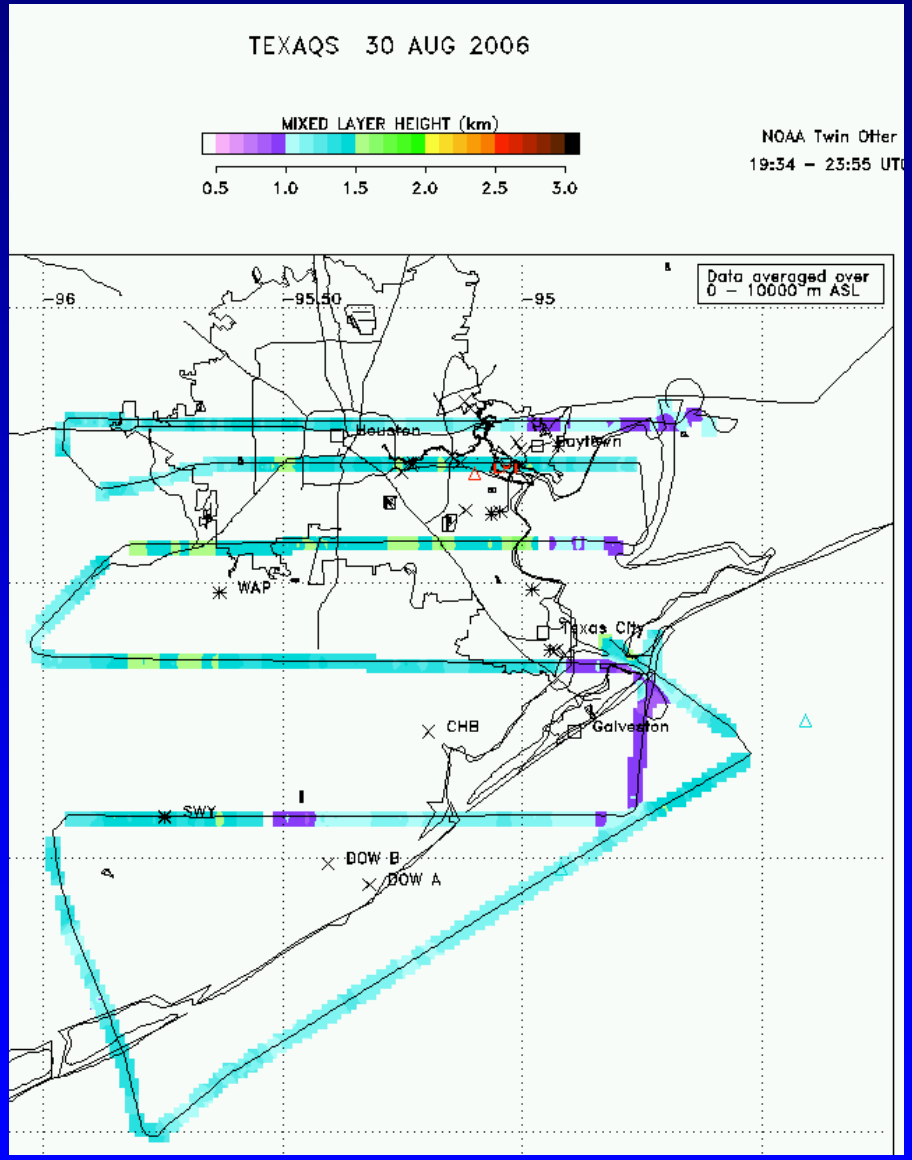
Dallas – Houston on transit flight





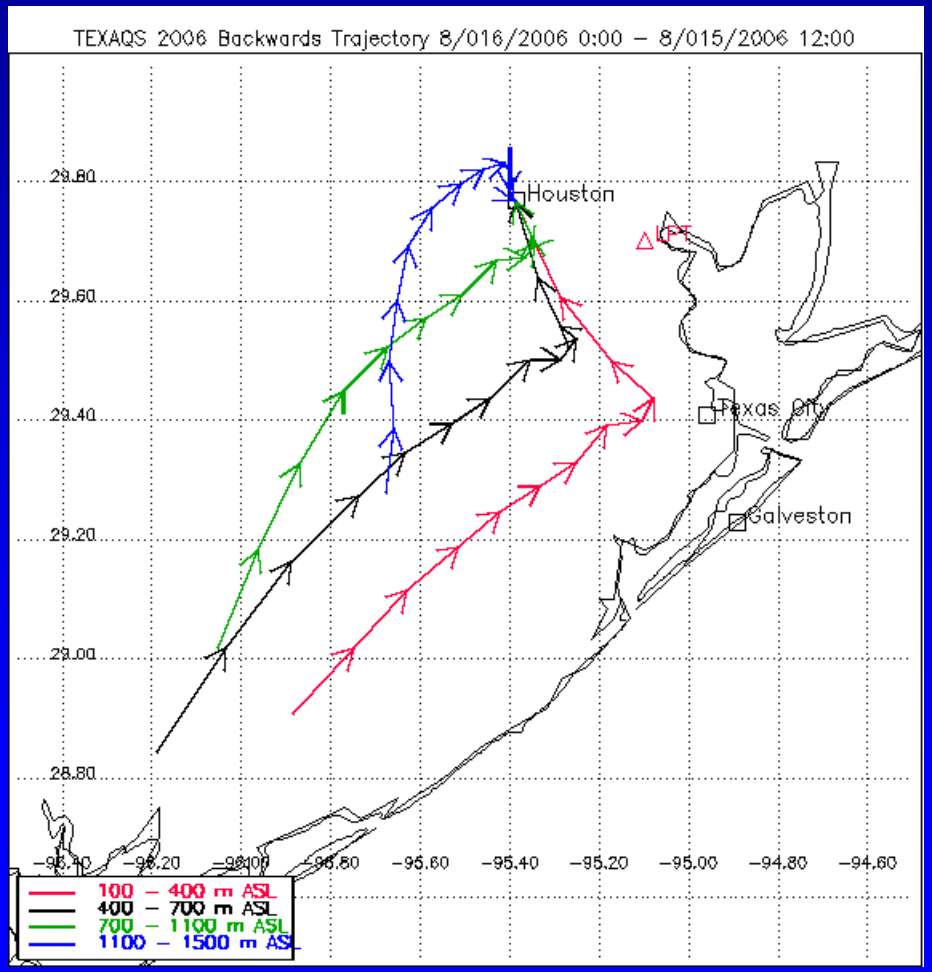
Northerly flow: Aug 30

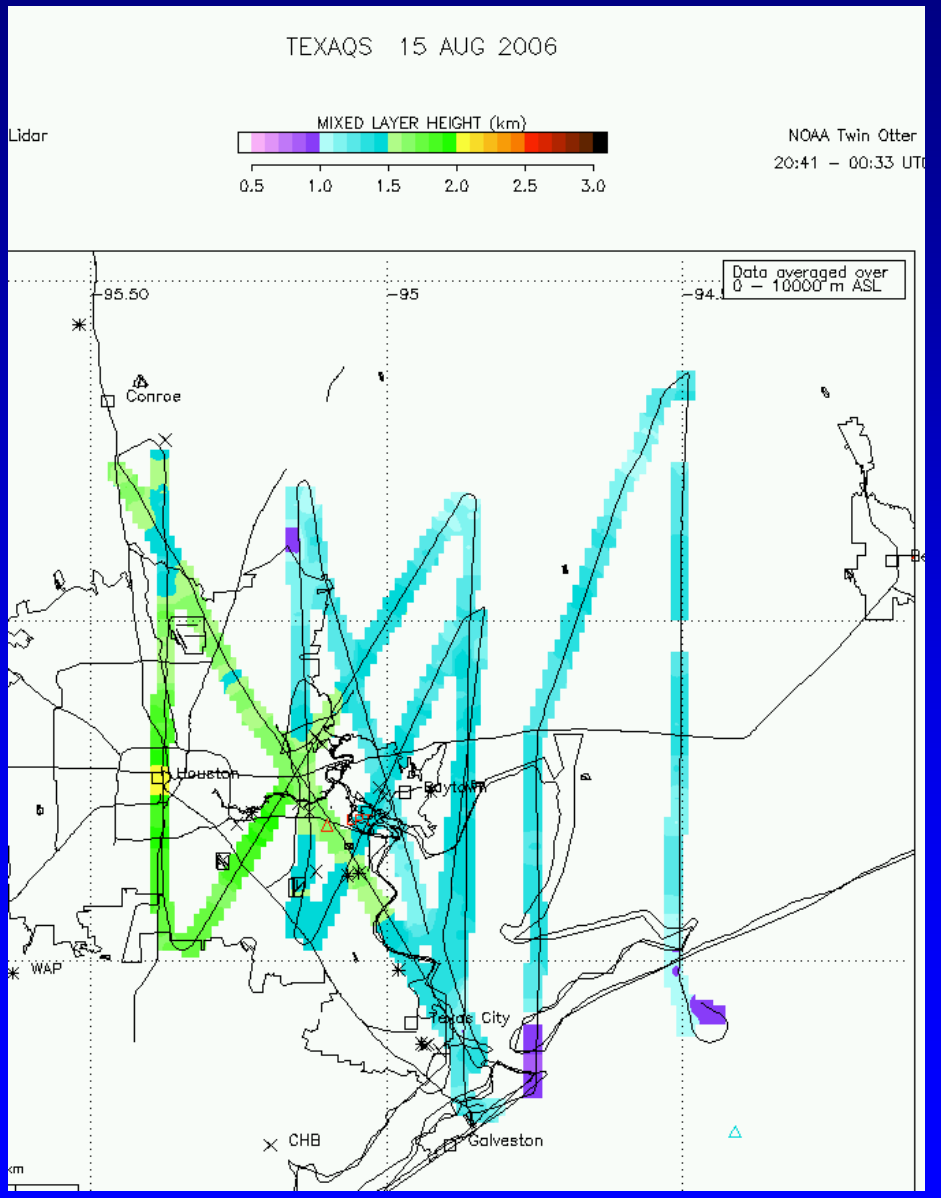




Flow reversal: Aug 15

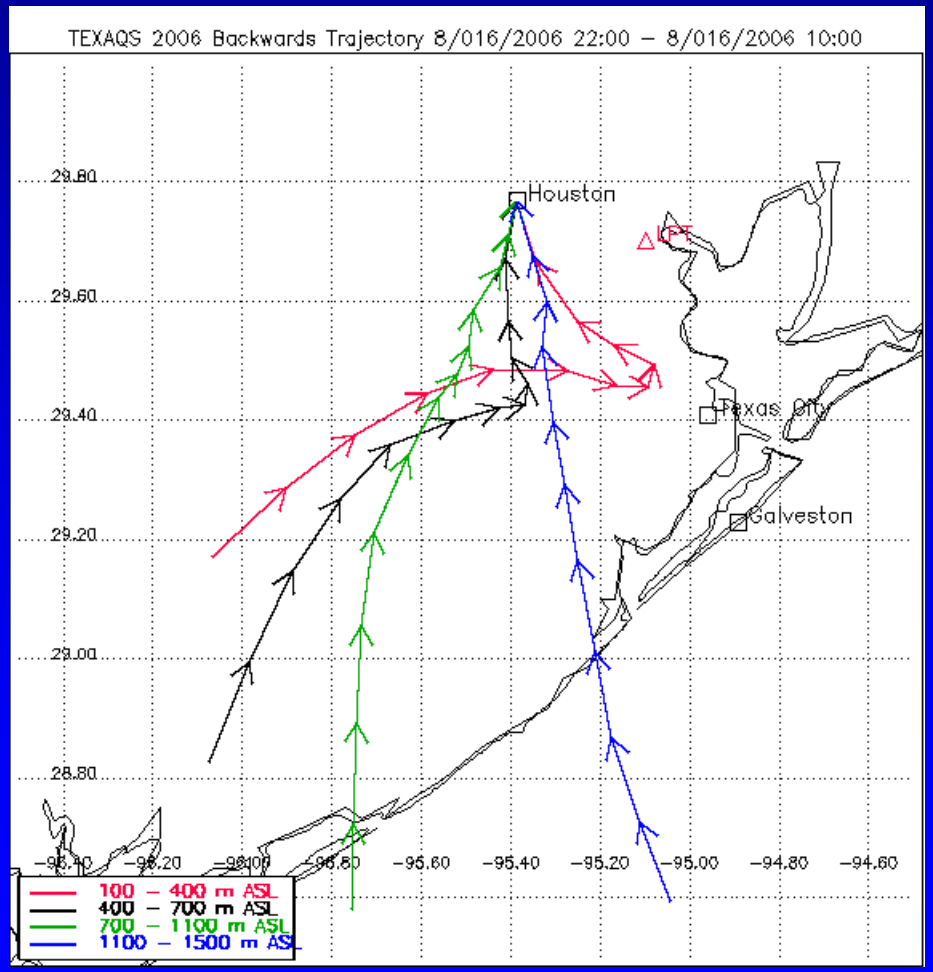
Sea breeze onset: ~ 15 CDT

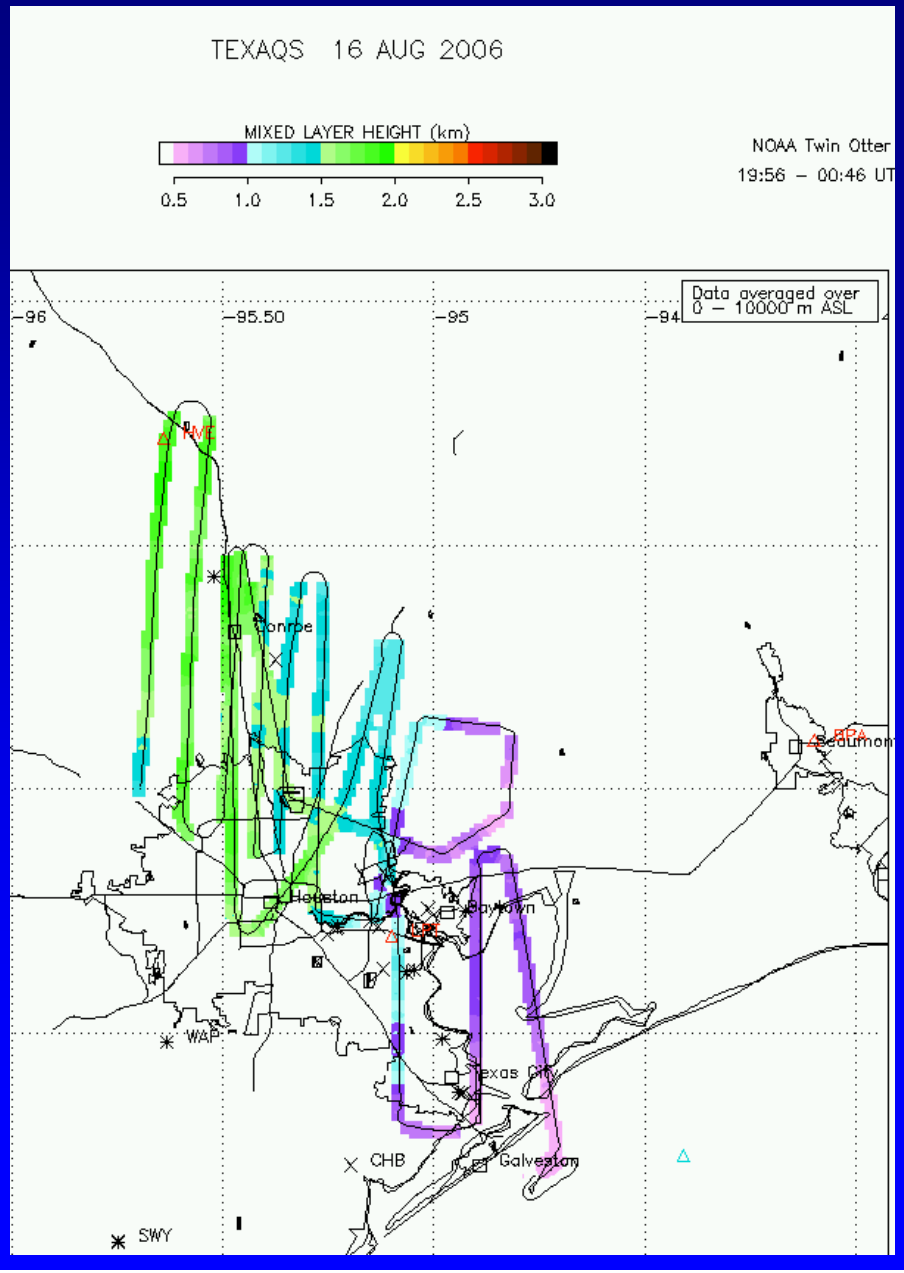




Flow reversal: Aug 16

Sea breeze onset: ~ 12 CDT





Preliminary Findings

- Patterns of mixing height spatial variability in the Houston area are generally very similar to what was observed during the TexAQS 2000 study.
- Boundary layer heights over land in the Houston area (in particular north of Houston) appeared to be somewhat lower compared to TexAQS 2000. This may be related to the fact that 2000 was a drought year in SE Texas (warmer temps, lower soil moisture), while the summer of 2006 was close to the climatological norm in terms of temperature and wetter than normal in June & July.

<u>Further analysis:</u>

- Correlate radiometric surface skin temperature measurements with lidar-derived mixing heights
- Investigate the impact of mixing height variability on peak ozone concentrations and compare to TexAQS 2000 findings

Stay tuned!