1. Introduction
During the summer season, a driving factor of pollutant buildup and transport is due to local circulations, including the sealand and bay breezes produced by the temperature contrasts between land and the Gulf of Mexico or Galveston Bay in the Houston/Galveston Area. Pollutant dispersion and transport from a major source area like the Houston Ship Channel (HSC) is of particular importance because it is a major distributor of ozone and its precursors from its many petrochemical refineries to more populated areas of Houston. This study focuses on mesoscale circulations during ozone episode day September 26, 2006 when rawinsonde soundings were conducted inside the HSC and on the University of Houston campus. Analysis of the vertical wind structure from the datasets can indicate the strength of the sealand and bay breezes. The breezes are most prominent when the ambient winds are weak, or when the large scale pressure gradient is not strong (Fisher et al., 2000).

2. Meteorological Data
To document the vertical wind profile and the planetary boundary layer, rawinsonde soundings were launched at the Lynchburg Ferry site next to the Houston Ship Channel (Figure 5) and a Wind Profiler/RASS instrument was placed in La Porte, TX which is adjacent to Galveston Bay (Figure 7). In addition, numerous rawinsonde soundings were launched during the 2006 summer ozone season on the University of Houston campus to provide information on mixed layer depths and the vertical seal-and-breeze structure. Figure 3 is a map showing the spatial distribution of the measurement platforms. The breezes are most prominent when the ambient winds are weak, or when the large scale pressure gradient is not strong (Banta et al., 2005). The onset of sea and bay breeze circulation is indicated by the decrease of temperature, the rise of relative humidity, and the increase in wind speed from the corresponding wind direction.

3. Results
- Both the rawinsonde soundings and the surface data show that during high pollutant days, there was a distinct diurnal wind oscillation with northeastern flow during the morning hours and a south-easterly wind in the early afternoon and a more southerly wind in the late afternoon.
- The vertical profiles distinctive show the growth of the boundary layer at both locations. On September 26, the height of the boundary layer is around 1100 meters at HSC, however, the growth of the boundary reaches 1500 m at UH. This is true because there is less convective mixing over water surfaces.
- The model outputs of wind for this day did not capture the bay breeze too well; however it did do somewhat better on the onset of the sea breeze. The modeled boundary layer height for the Lynchburg Ferry site did capture the boundary layer height fine (1100 m) but faller in the day rather than the measured maximum at 1800 CST (Figure 6).

4. References

Acknowledgements
Thanks to the RPI team for being part of their study campaign, and C2O2 for the sounding. The authors would like to thank Pinyu Ngiu (Pinyu) and Dr. Jiyoung Lee for their assistance with the model outputs and also to Craig Clements for his guidance.