

Question D: What distribution of anthropogenic and biogenic emissions of ozone and aerosol precursors can be inferred from observations?

Temporal and spatial variation of NO_x , CO and O_3 as retrieved from Moody Tower measurements

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Overview - Methods

- Instrumentation
- Daytime (9 am – 9 pm LT) vs nighttime (9 pm – 9 am LT) distribution on wind direction using polar plots
- Tentative conclusions

Instrumentation

- Instrumentation:
 - NO, NO₂, NO_x: Chemiluminescence (TE 42C TL) coupled to a Blue Light Detector (DMT)
 - CO: Gas Filter Correlation (TE 48C TL)
 - O₃: UV Photometry (TE 49C)
 - so far 10 s data available (averaging still to be done)

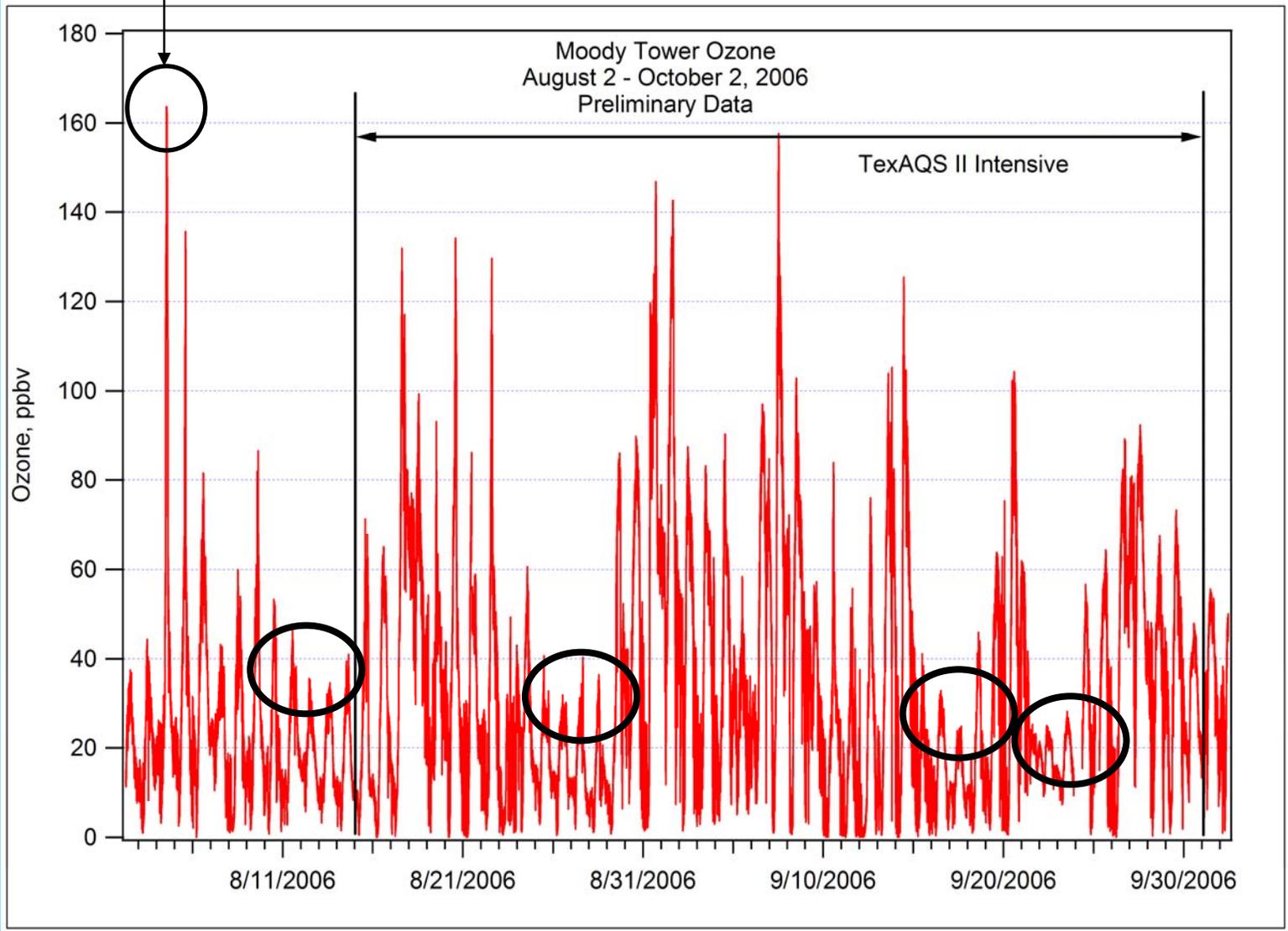
Instrumentation

- Location: Moody Tower (60 m a.g.l.)

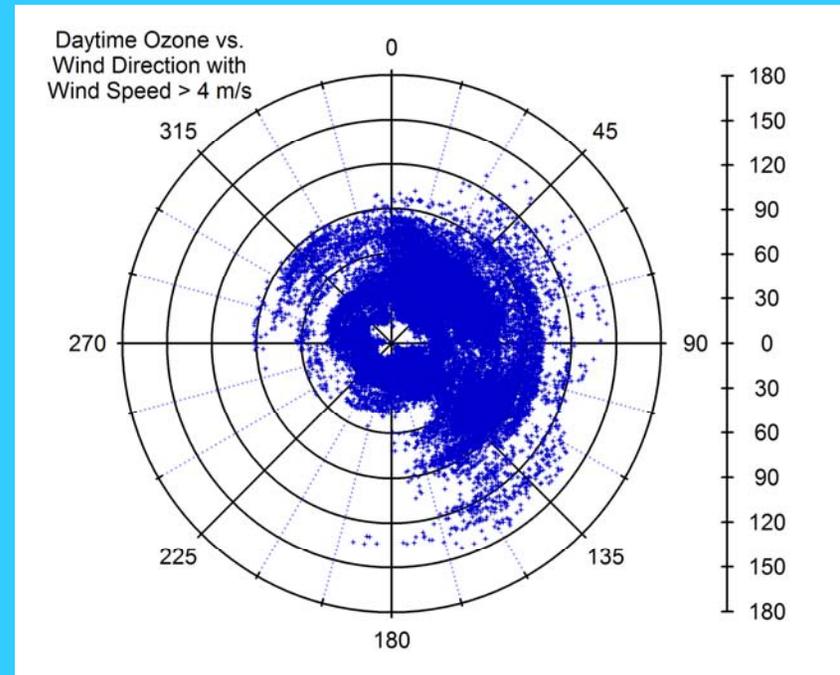
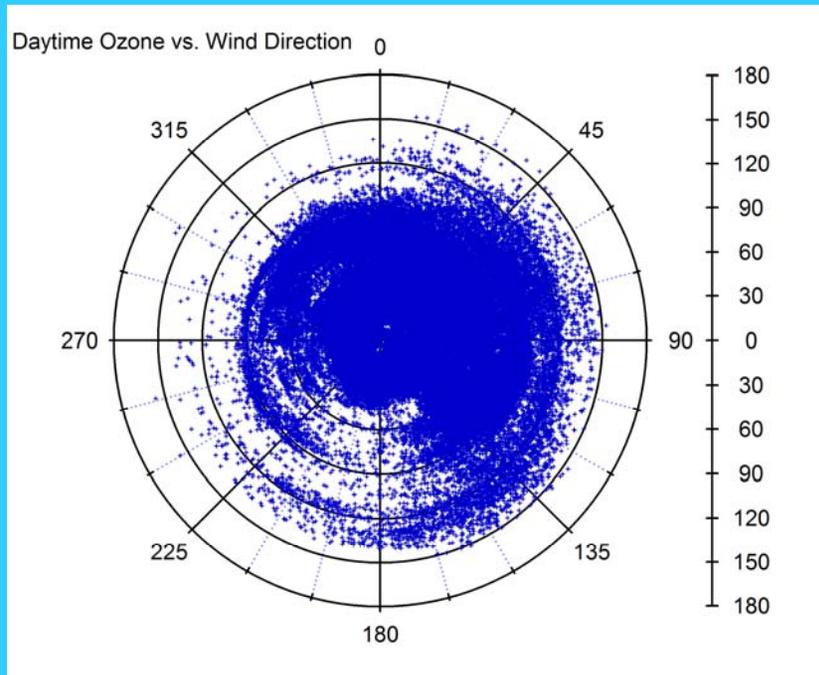


O₃ Time Series

Max O₃ value



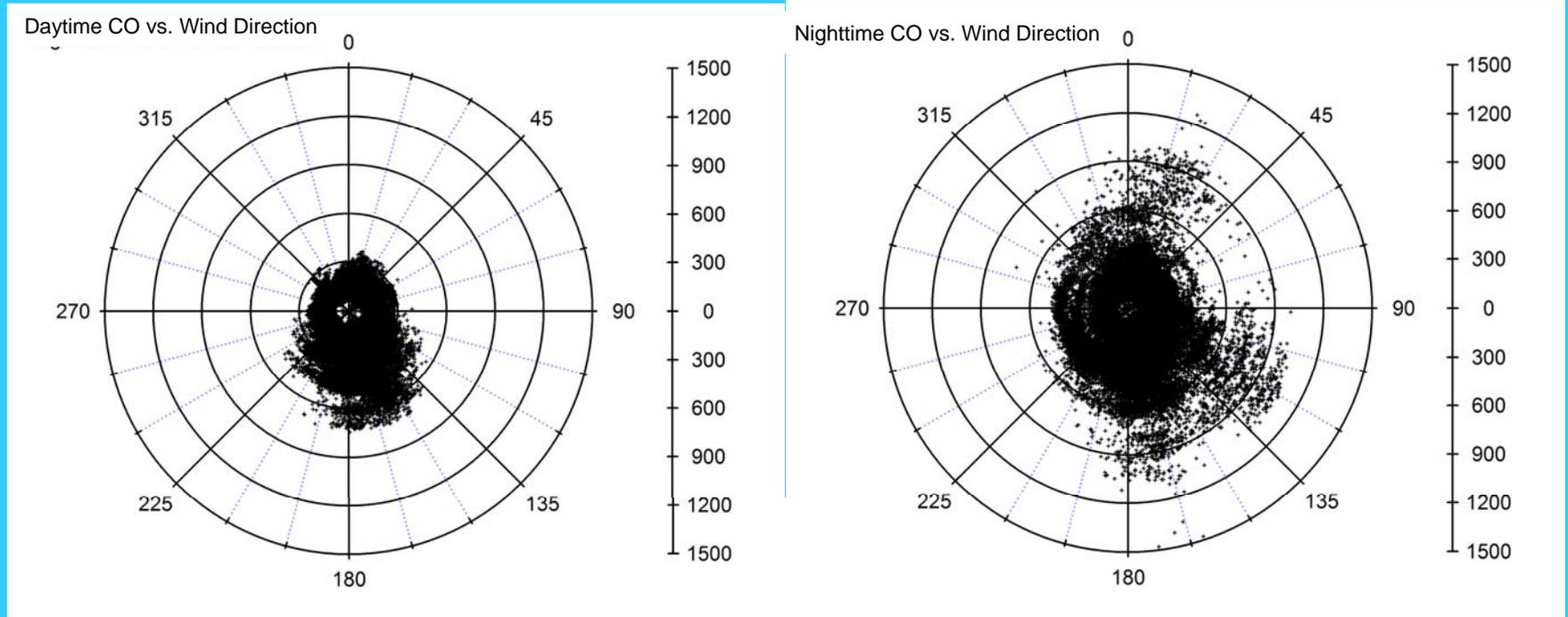
Polar Plots – O₃



High O₃ values associated with easterly wind flow conditions, even under higher wind speed conditions.

Under higher wind speed conditions O₃ values close to 30 ppbv are observed at SW wind directions in coincidence with low level O₃ days in O₃ time series.

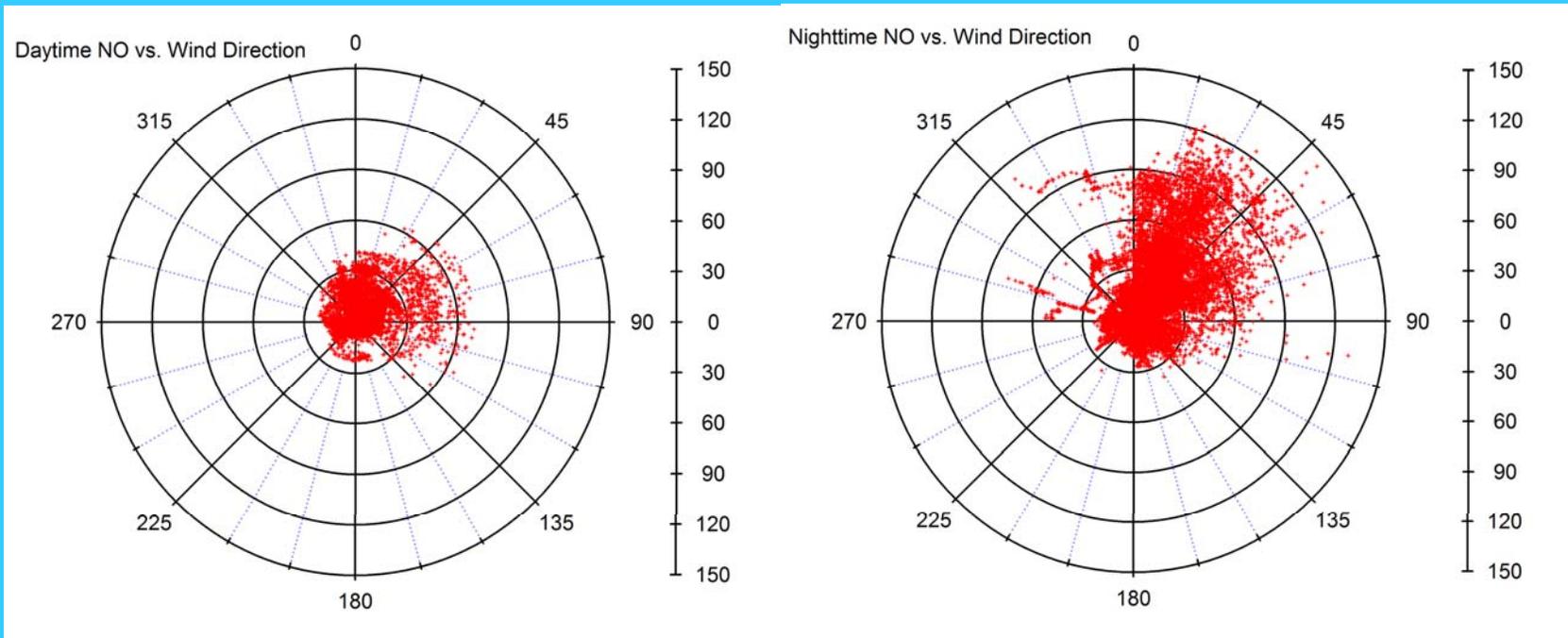
Polar Plots – CO



Daytime: enhanced CO levels associated with SSE directions

Nighttime: enhanced CO levels associated with SE and NE directions

Polar Plots – NO

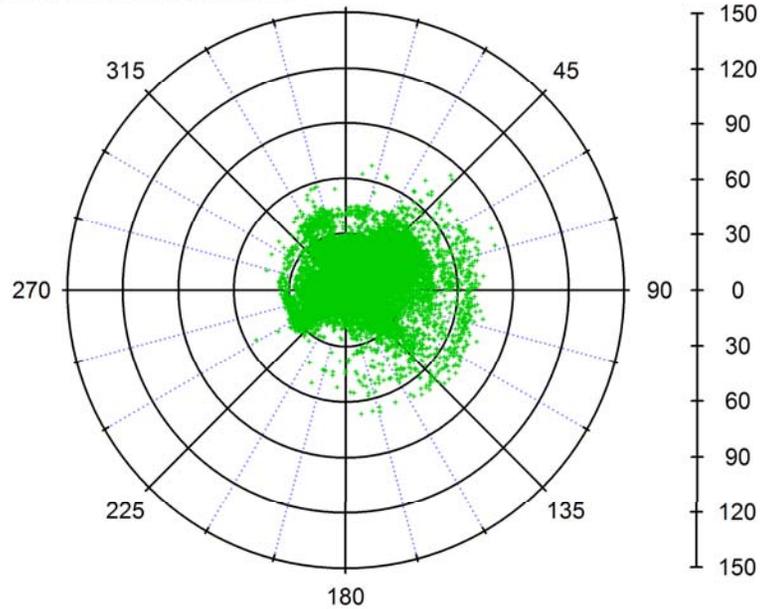


Daytime: enhanced NO levels associated with NE directions (I-45)

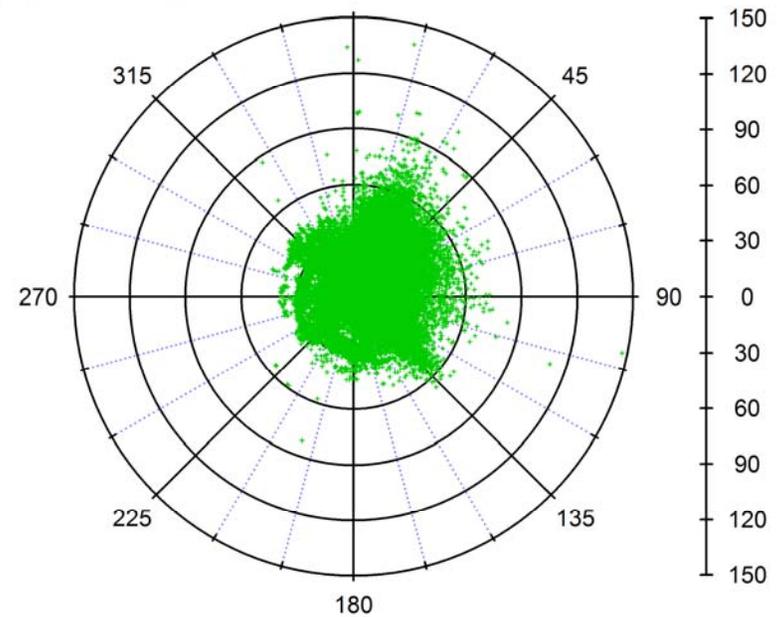
Nighttime: enhanced NO levels associated with NE directions (I-45)

Polar Plots – NO₂

Daytime NO₂ vs. Wind Direction 0

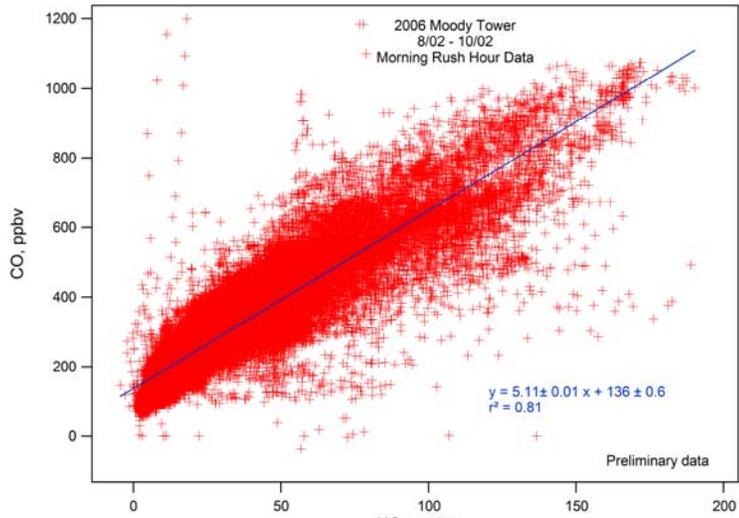


Nighttime NO₂ vs. Wind Direction 0

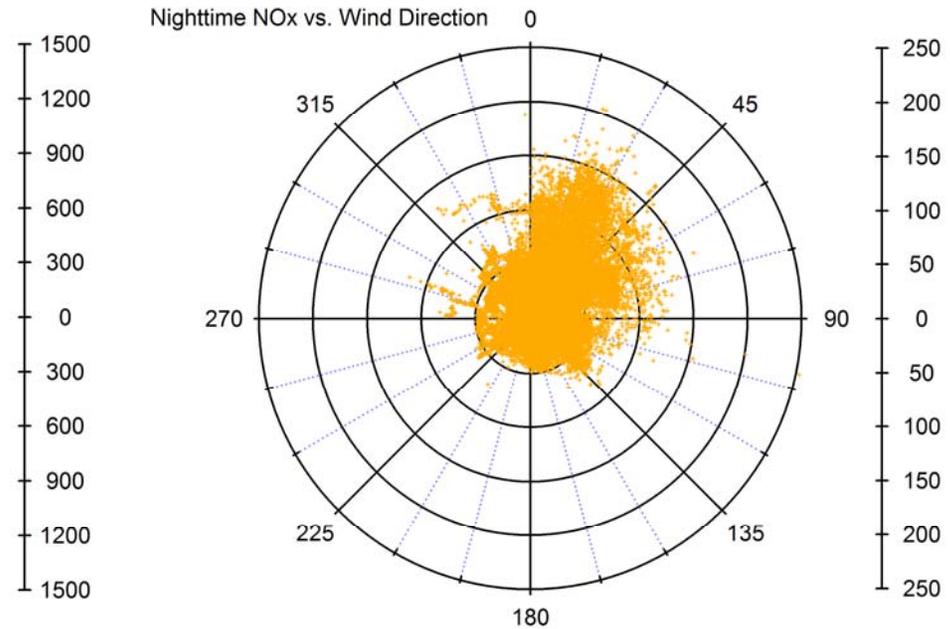
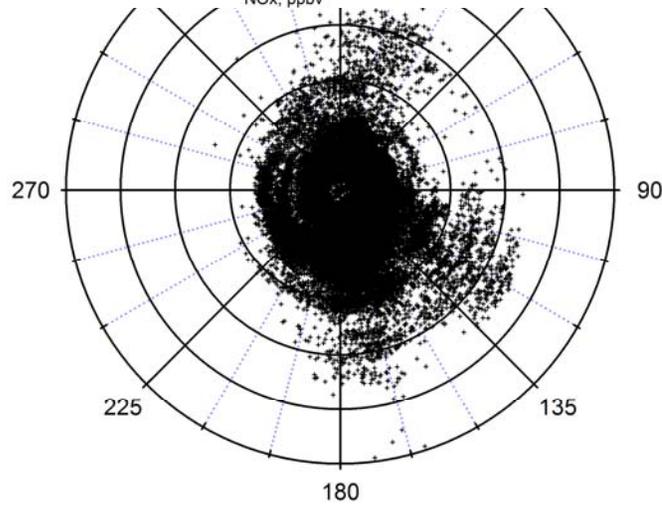


Daytime: enhanced NO₂ levels associated with E directions

Nighttime: enhanced NO₂ levels associated with E directions

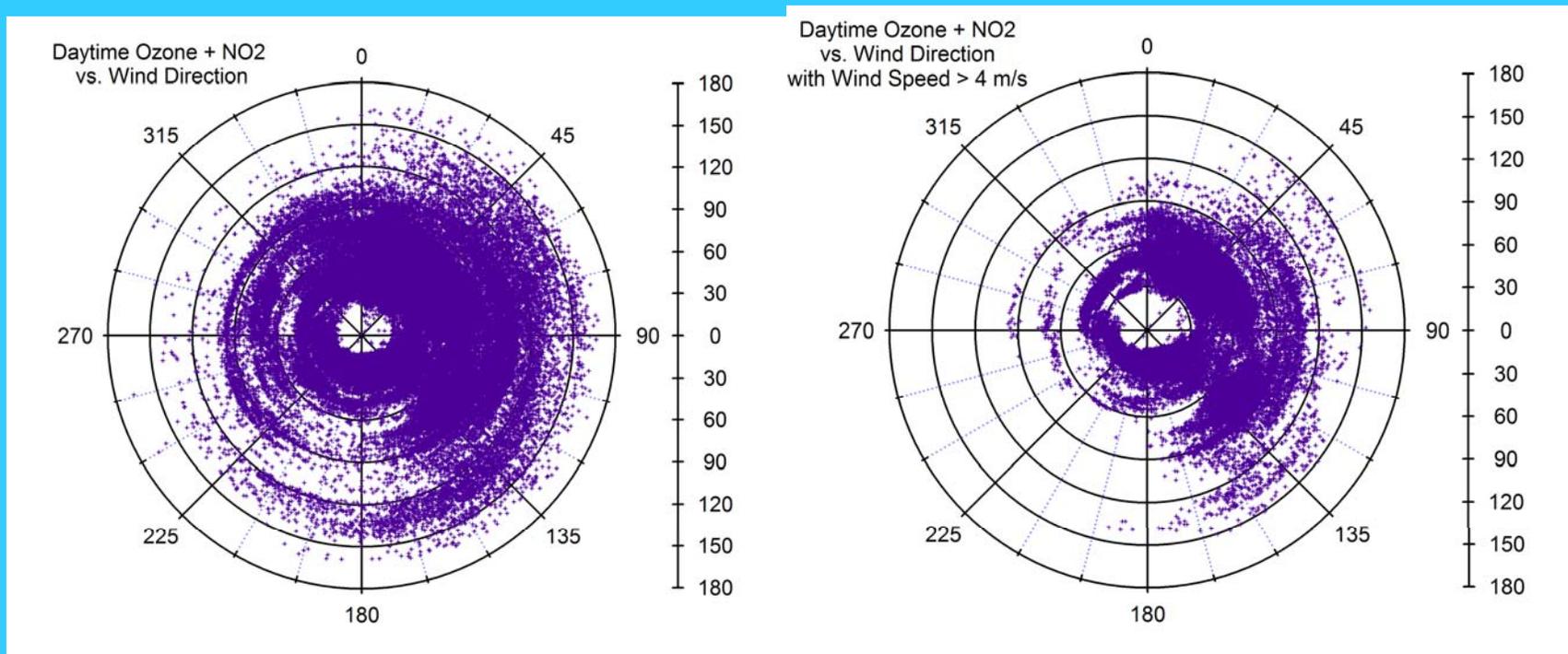


CO/NO_x



Distribution of NO_x and CO on wind direction is different. CO also shows enhancements under S, in particular under SE wind conditions (source?)

Polar Plots – O_x



Potential O_3 (i.e. O_3+NO_2) clearly associated with E flow conditions, in particular under higher wind speed conditions

Tentative Conclusions

- Distribution of CO on wind direction is different during day and nighttime. It also differs from NO_x distribution.
- Potential O₃ is clearly associated with E flows (pointing to Ship Channel)
- Under higher wind conditions O₃ values about 30 ppbv can be observed under SW wind conditions (indications for background O₃?)