Data Visualization Activities

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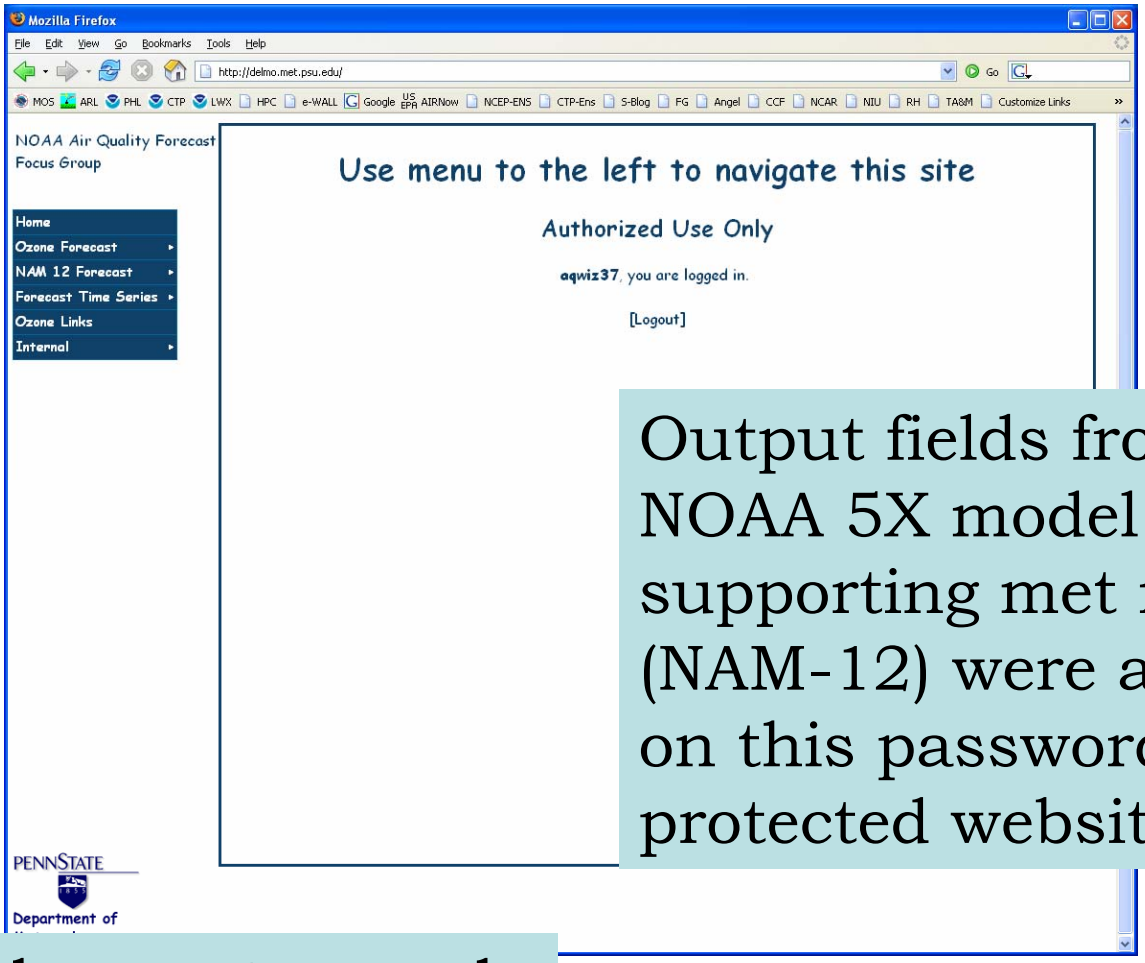
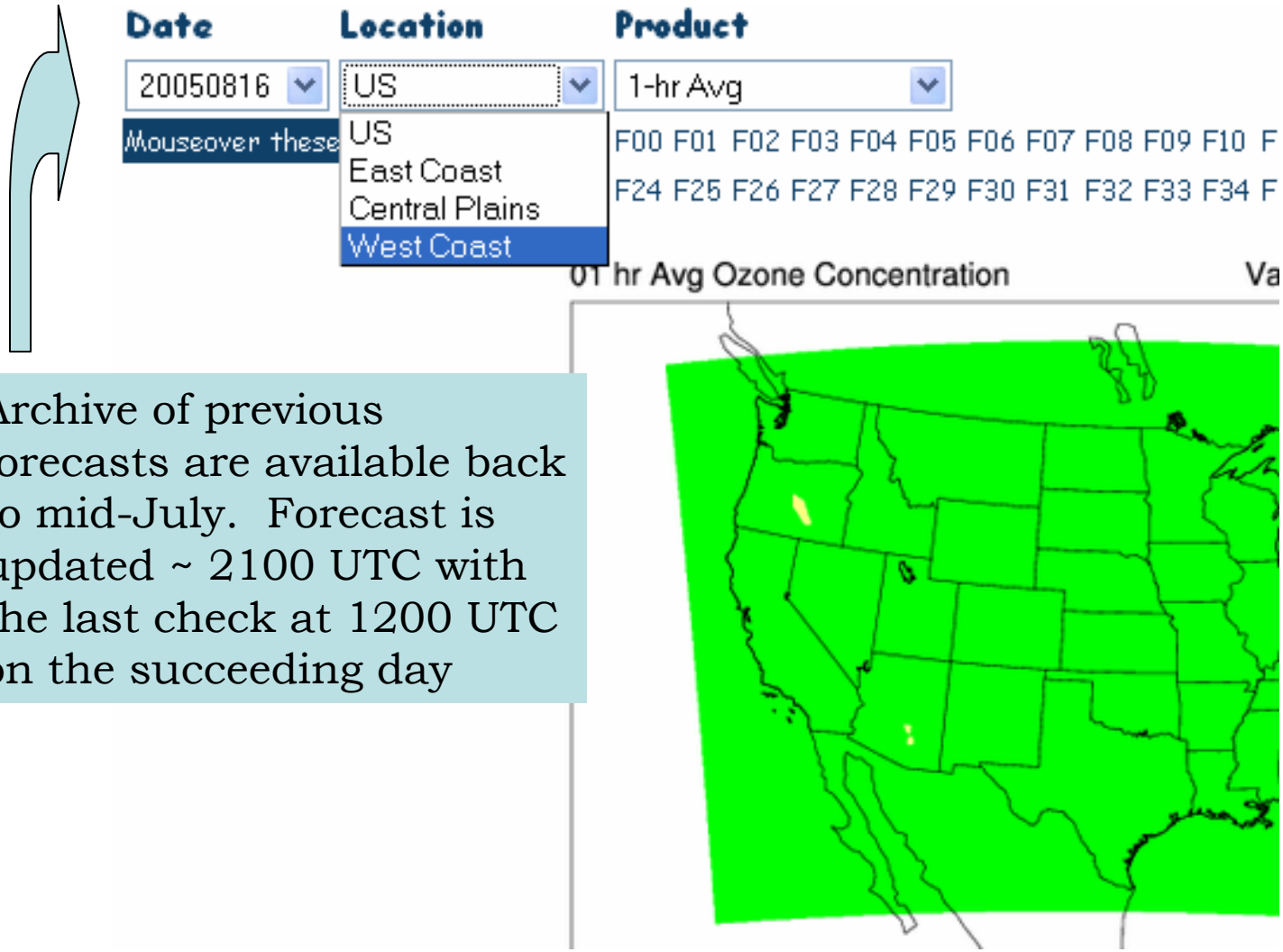
Integrated Meteorology-Air Quality Website



Output fields from both NOAA 5X model and the supporting met model (NAM-12) were available on this password-protected website.

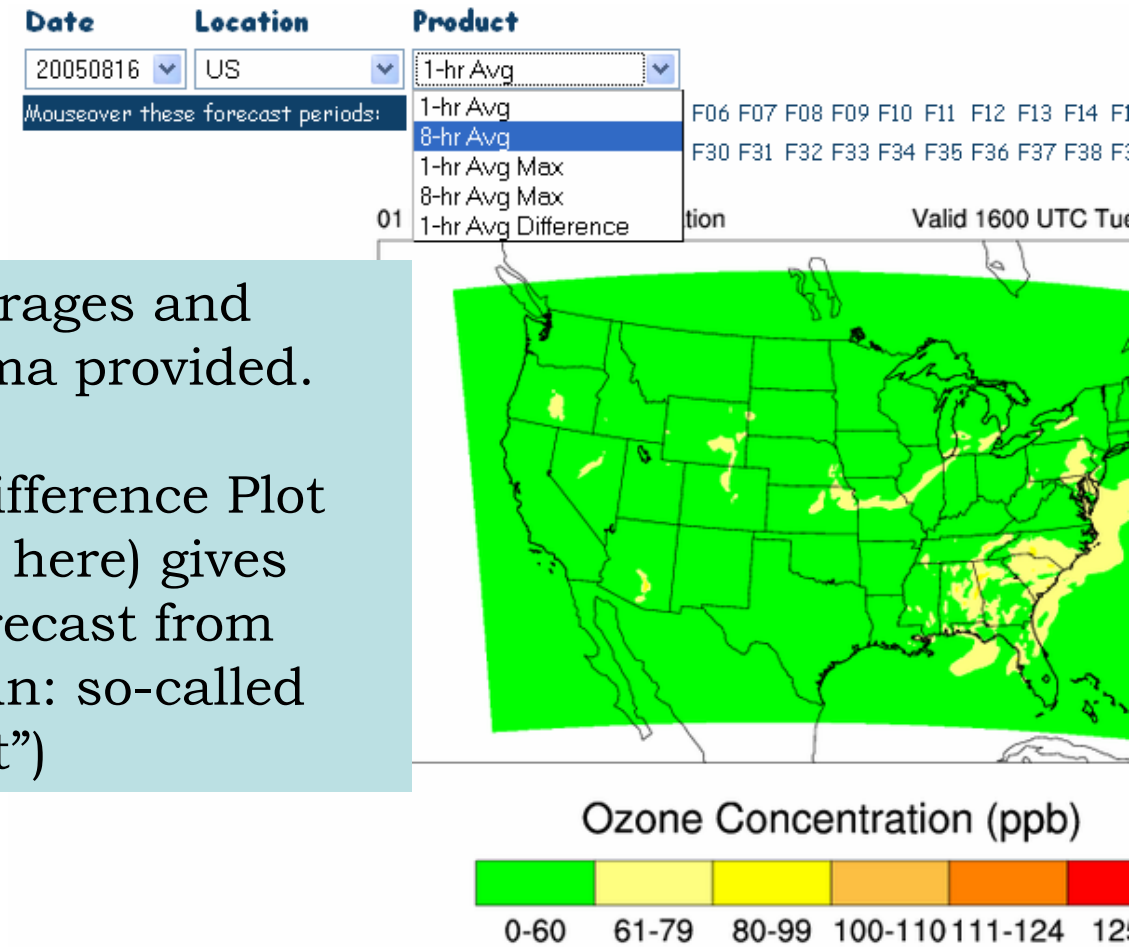
http://delmo.met.psu.edu

Nationwide and Regional Sub-Domains



Archive of previous forecasts are available back to mid-July. Forecast is updated ~ 2100 UTC with the last check at 1200 UTC on the succeeding day

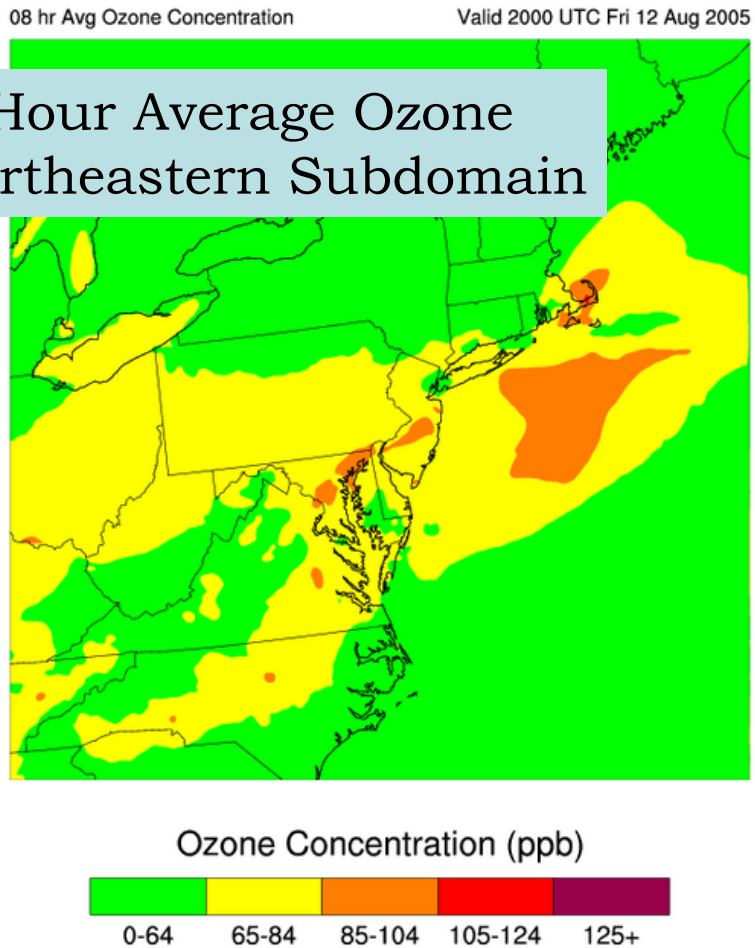
Variety of O_3 Forecast Products



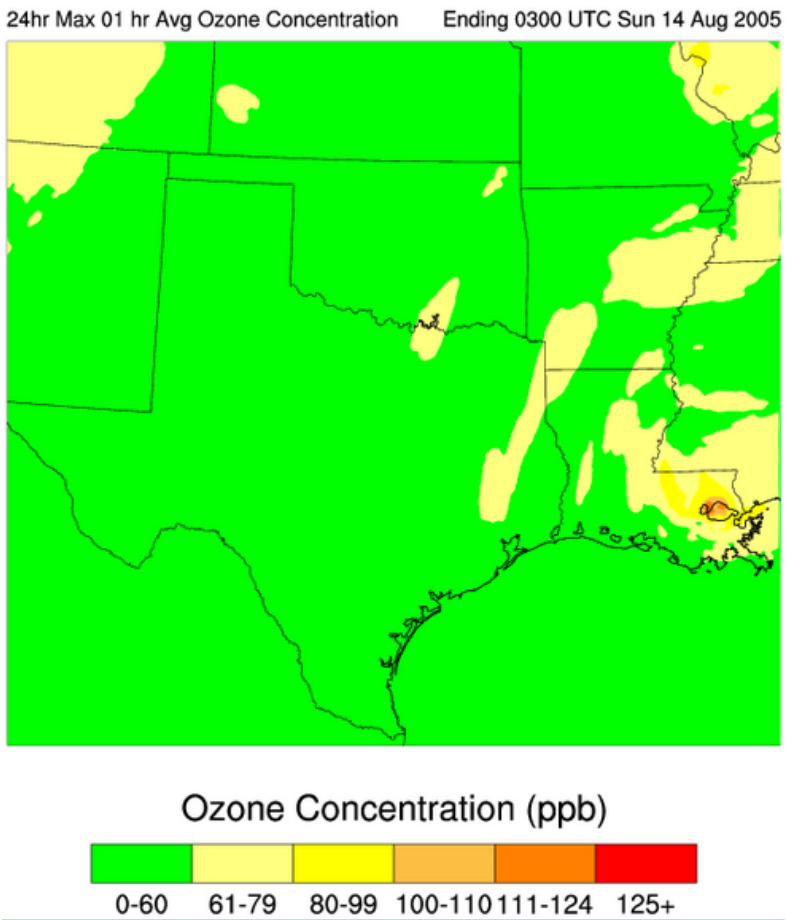
1-Hour averages and daily maxima provided.

1-hr Avg Difference Plot (not shown here) gives trend in forecast from previous run: so-called ("d(prog)/dt")

Subdomains and Products -1

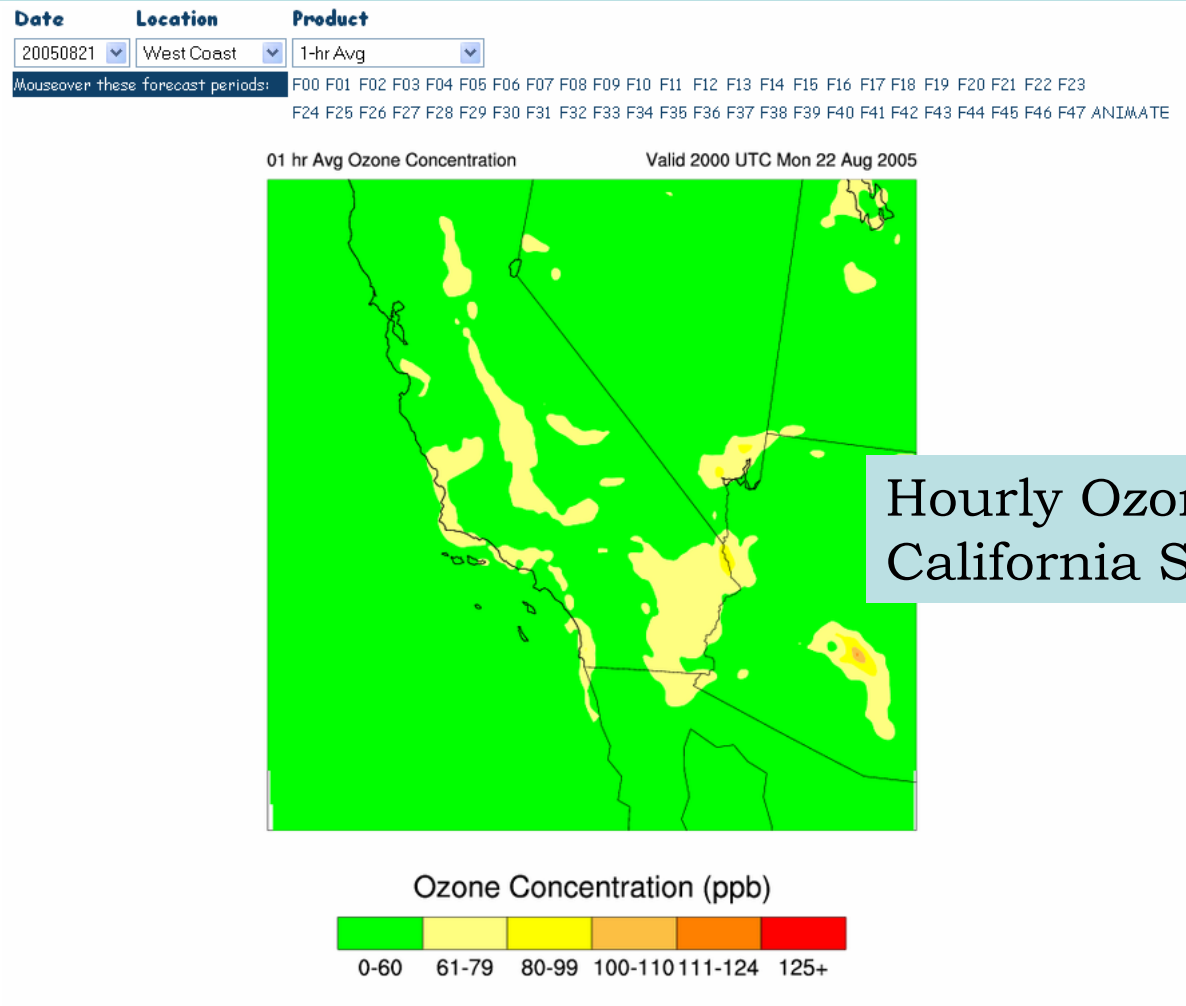


8-Hour Average Ozone
Northeastern Subdomain



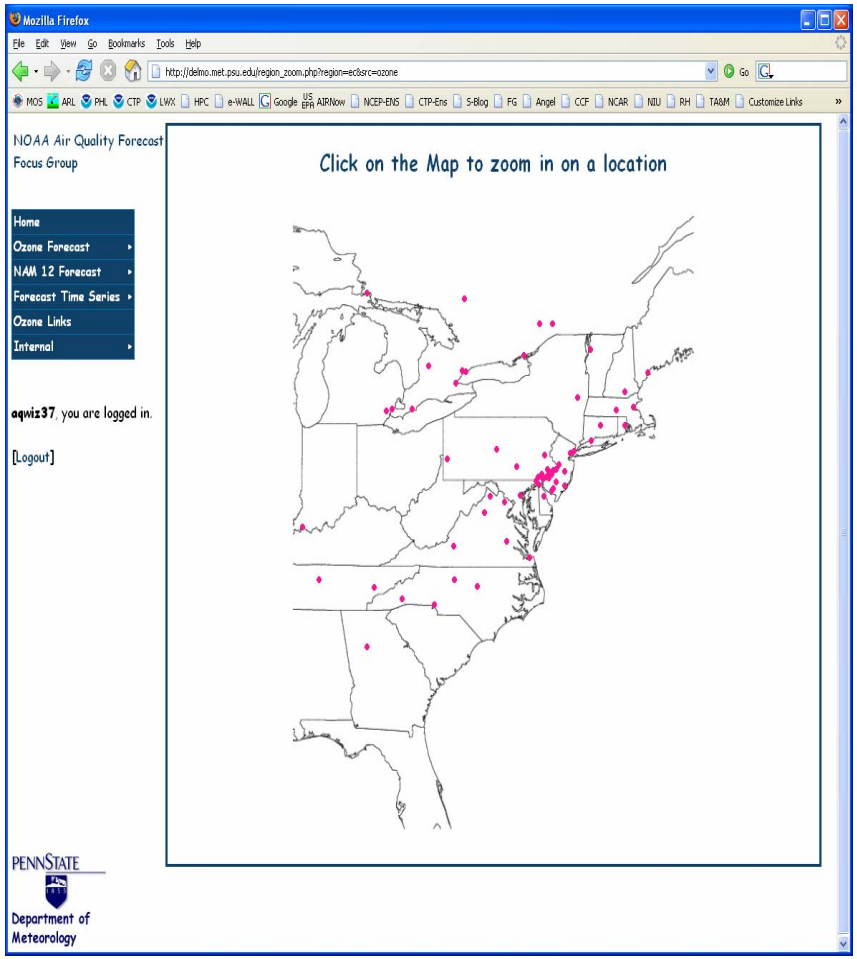
24-Hour Peak 1-Hour Ozone
Central Plains Subdomain

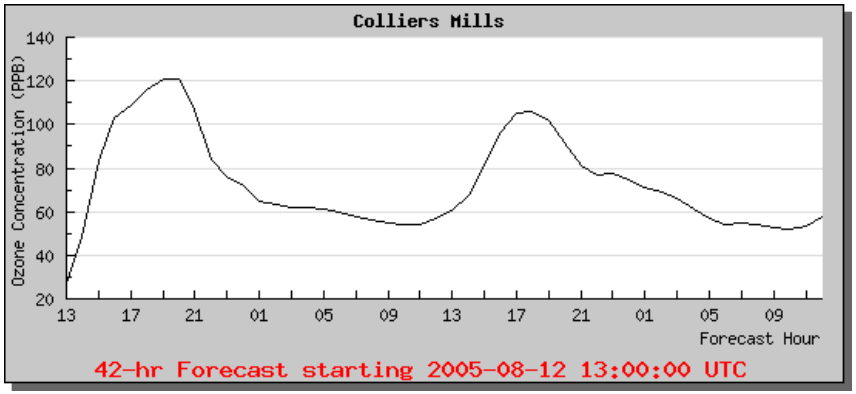
Subdomains and Products - 2



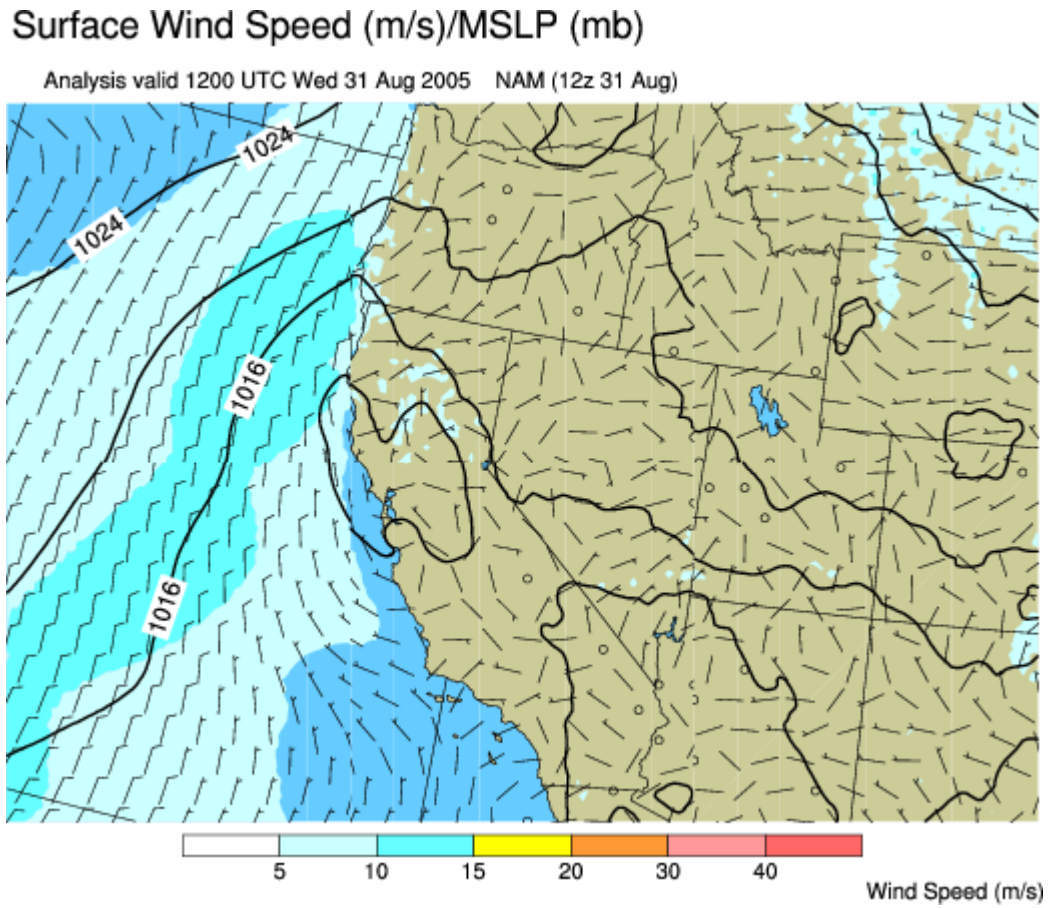
Hourly Ozone
California Subdomain

Ozone Time Series for Monitor Locations

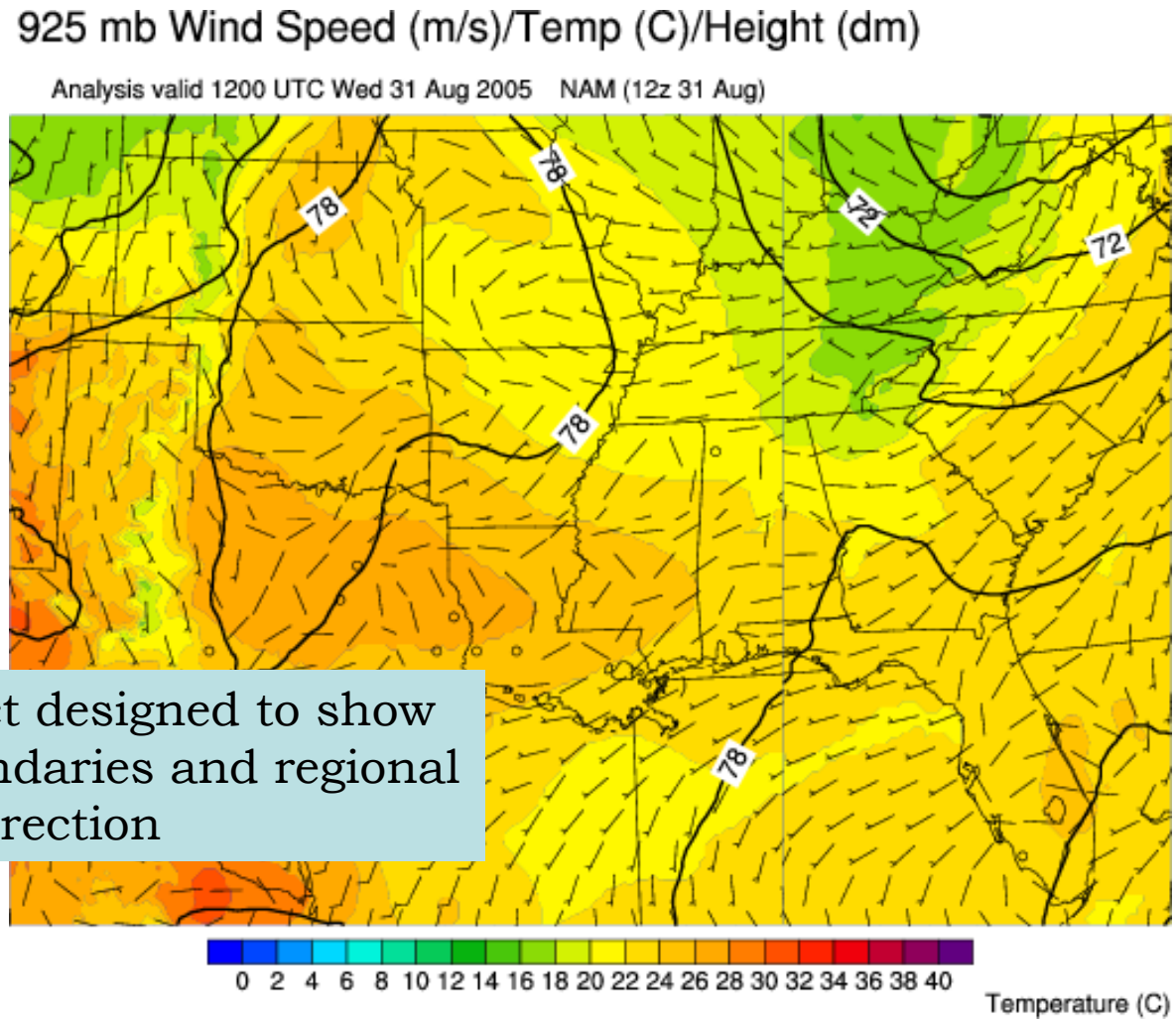




NAM-12 Meteorological Fields - Surface

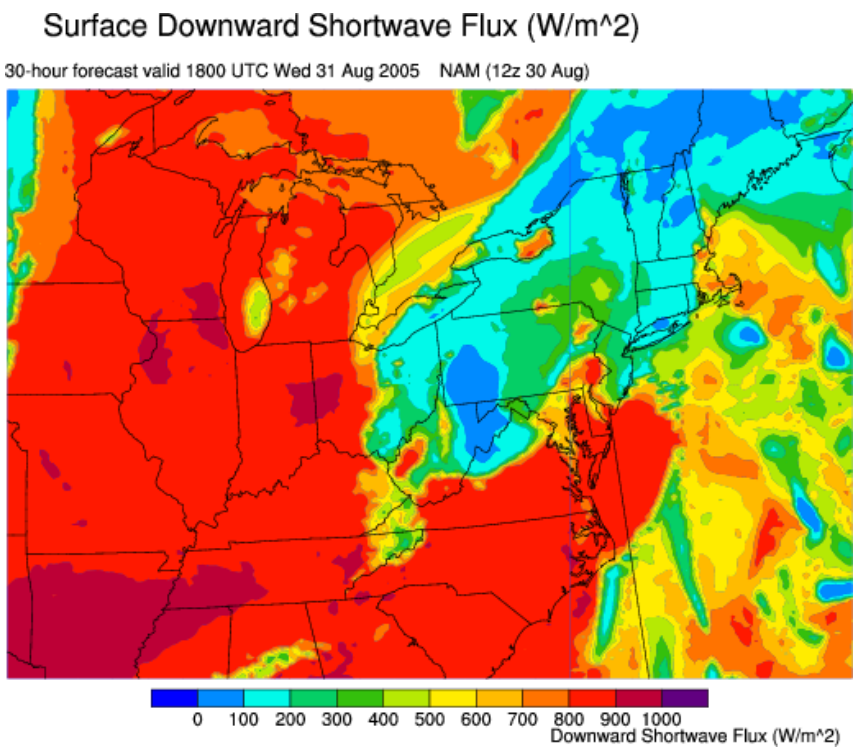


NAM-12 Meteorological Fields: 925 mb

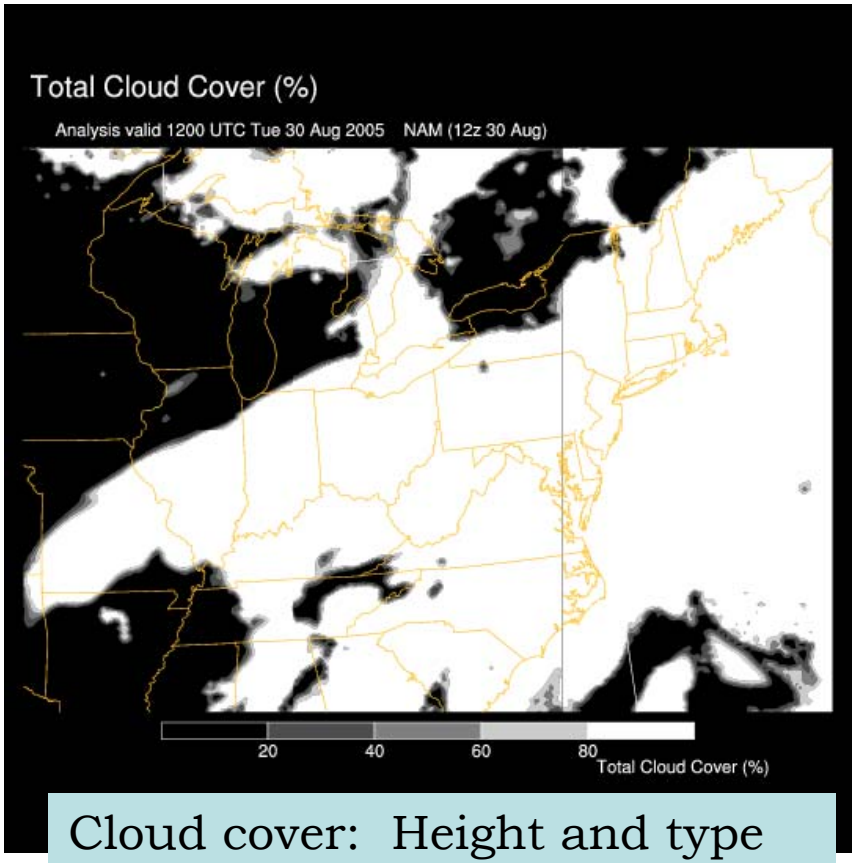


This product designed to show frontal boundaries and regional transport direction

NAM-12 Meteorological Fields: Radiation

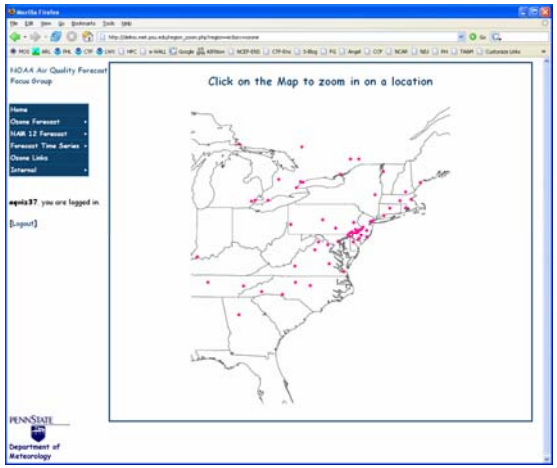


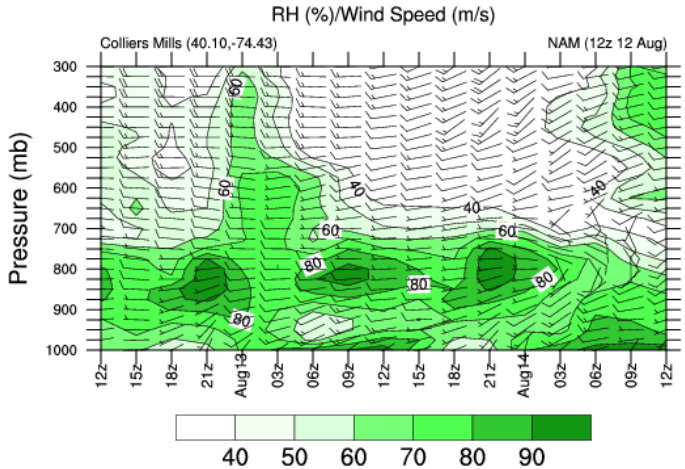
Short wave radiation flux – maybe should be normalized for time of day?

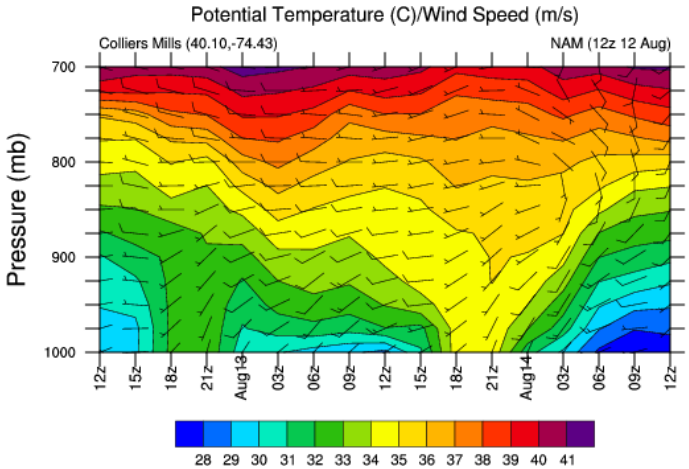


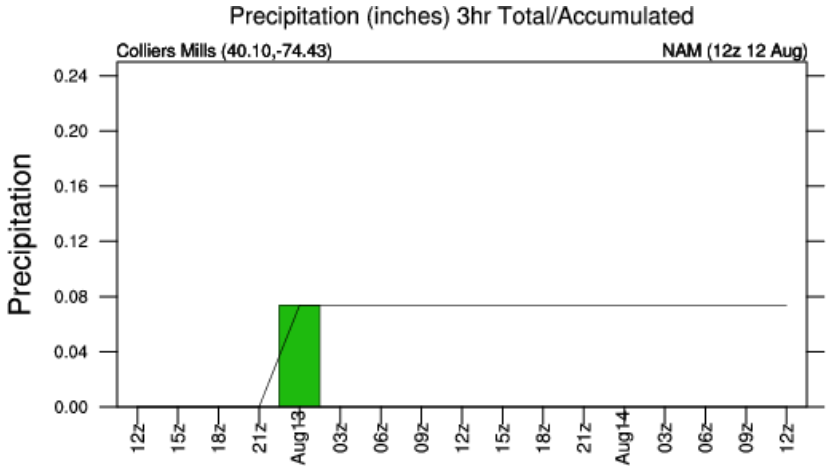
Cloud cover: Height and type of clouds can affect radiation received.

Meteorological Time Series at Monitor Locations









Future Plans

- Archive of NAM-12 and 1X model O_3 data (5X data base not large enough) for summer of 2005 (Complete).
- Extract data from the met and O_3 models for the Philadelphia forecast area: domain wide and for a subset of 8 “representative” monitors (Fall, 2005).
- Pilot test of “hybrid” forecast system using this database: Combination of model output and statistical approaches (Spring, 2006).

Hypothesis and Caveats

- Numerical O_3 model contains systematic errors on the metropolitan scale that can be statistically corrected yielding a more skillful forecast.
- Sources of systematic model error can include: emissions, land/water surface effects.
- Short historical data set and lack of “frozen” model going forward limit this study to simply a “proof of concept”.

Approaches

- Analysis of Bias
  - Overall and variations at higher frequencies
  - Synoptic influences
- Model Output Calibration (MOC)
  - Linear regression with forecast error as predictand.
  - Useful with non-frozen model
- Simple Model Output Statistics (MOS)
  - Since we're here, why not take a whack at it?