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New England Air Quality Study, Summer 2002 Campaign

UNH - University of New Hampshire
AL - NOAA Aeronomy Lab
ETL - NOAA Environmental Technology Lab
NHDES - New Hampshire Dept of Environmental Services
ISSC - Isle of Shoals Steamship Company

New England Air Quality Study (NEAQS)
2002 Campaign, July 12 – August 10

Study Themes

- **The role of long-range transport in shaping the regional and extra-regional air quality of New England.**
- **The large spatial variability in O_3 mixing ratios and its diurnal variation at New England monitoring sites.**
- **The role of biogenic emissions in local and regional air quality in New England.**
- **The role of the seabreeze/land-breeze circuit in influencing air quality in New England.**
- **Evaluation of air quality forecast systems.**
- **Linkages between air quality and climate.**

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METEOROLOGICAL REVIEW OF CONDITIONS ENCOUNTERED DURING THE SUMMER 2002 NEW ENGLAND AIR QUALITY STUDY (NEAQS)

James Koermer*, Jessica Eldridge, Elizabeth Fouts, Michael Nahmias, Jeffrey Edry, Jason Cordeira, and Richard Giard

Meteorology Program

Plymouth State University

Outline

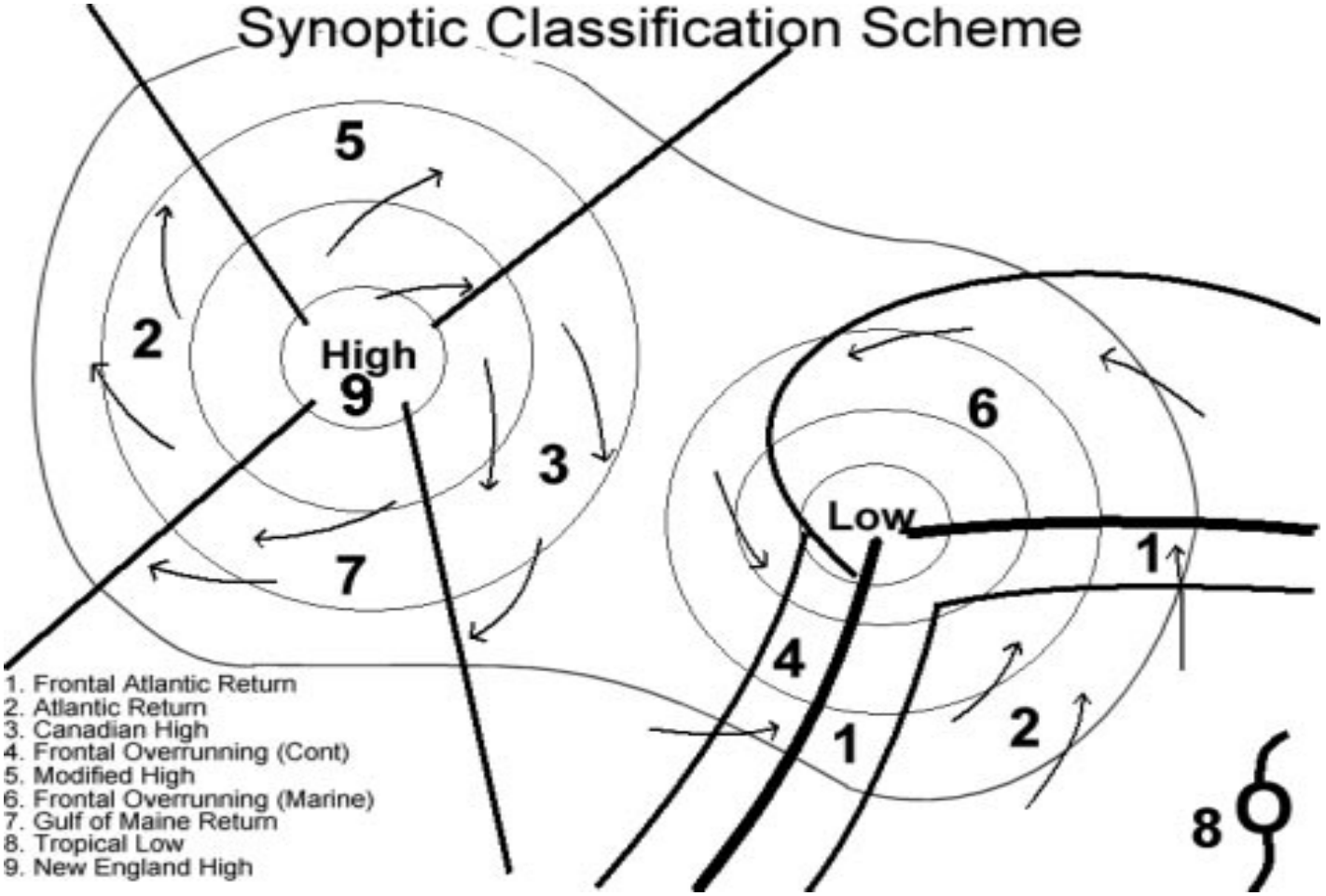
- Focus of this Review
- Comparison to Normal Synoptic Patterns
- Situations with High Pollution Episodes
- Backward Trajectory Source Regions
- Temperature Correlations
- Summary

Focus of this Review

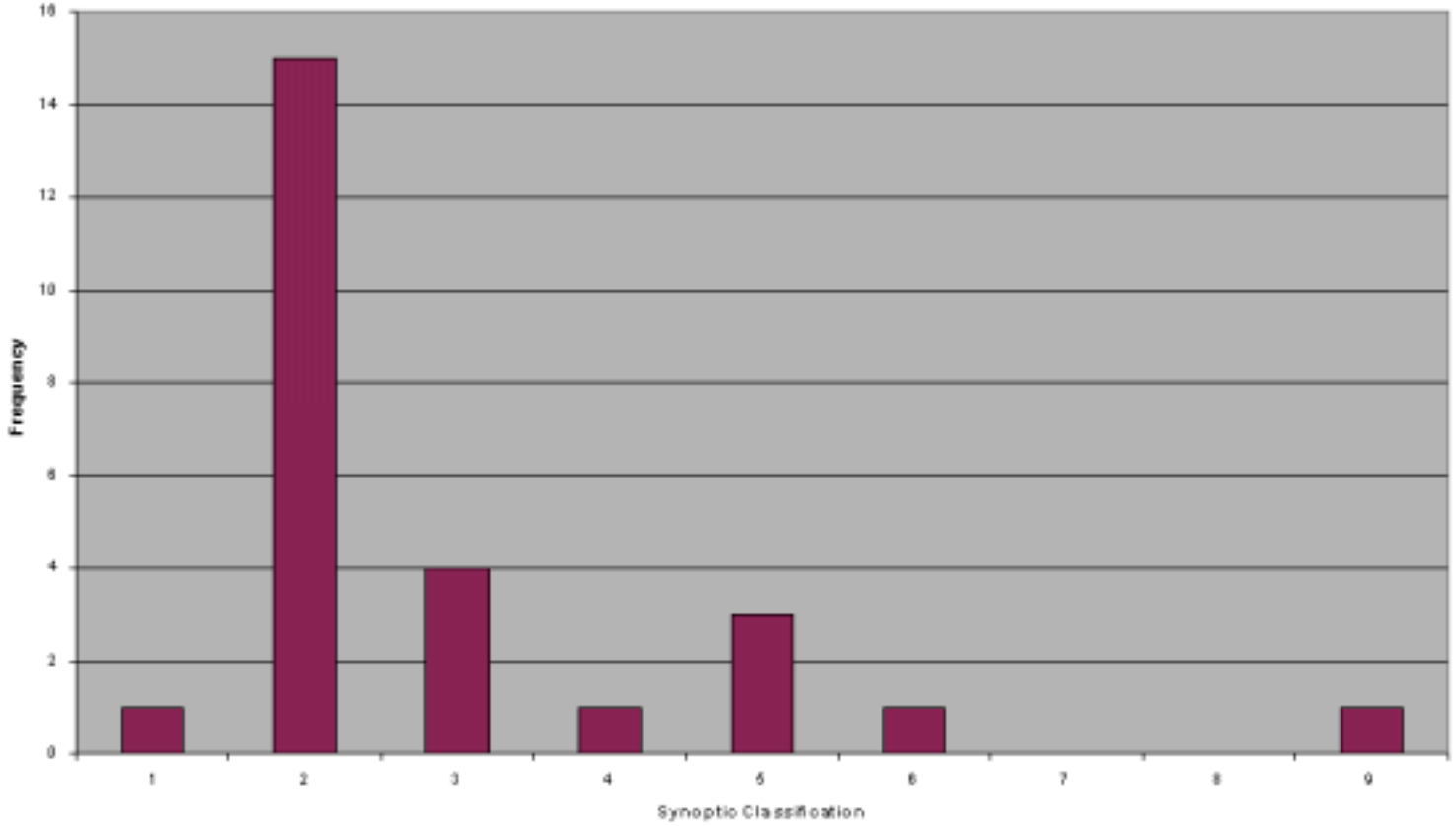
- Emphasis of elevated pollution episodes when O_3 > 100 ppb
  - July: 1-4, 8-9, 13-15, 17-19, 22-23
  - Aug: 2-4, 10-18
- > 125 ppb:
  - July 1-2,9,18,22-23
  - August 4. 11-14
- Seacoast areas of S. ME, NH, N. MA

Surface Synoptic Patterns

(after Keim and Meeker, 2001)



Elevated Pollution Occurrences vs. Synoptic Categories



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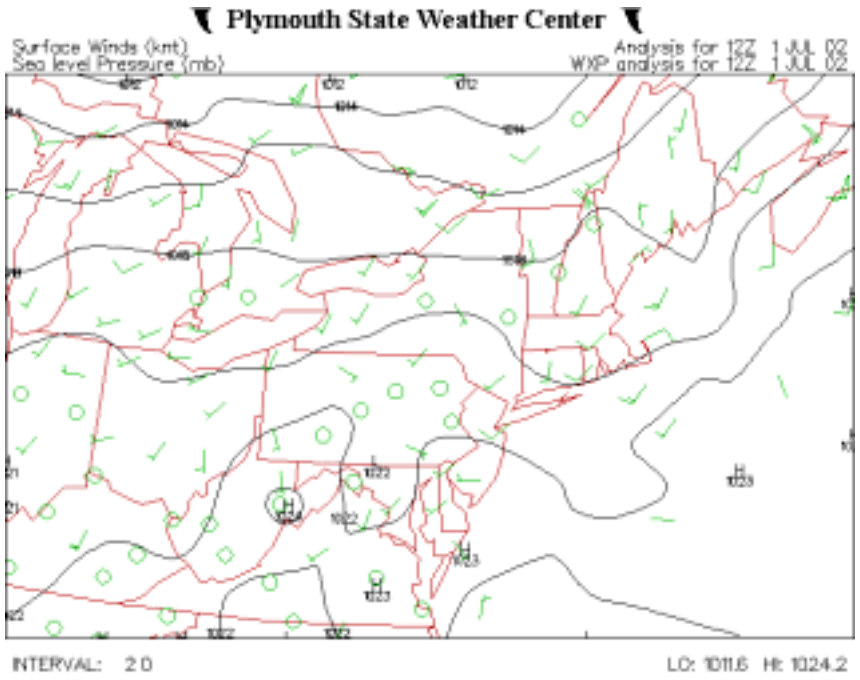
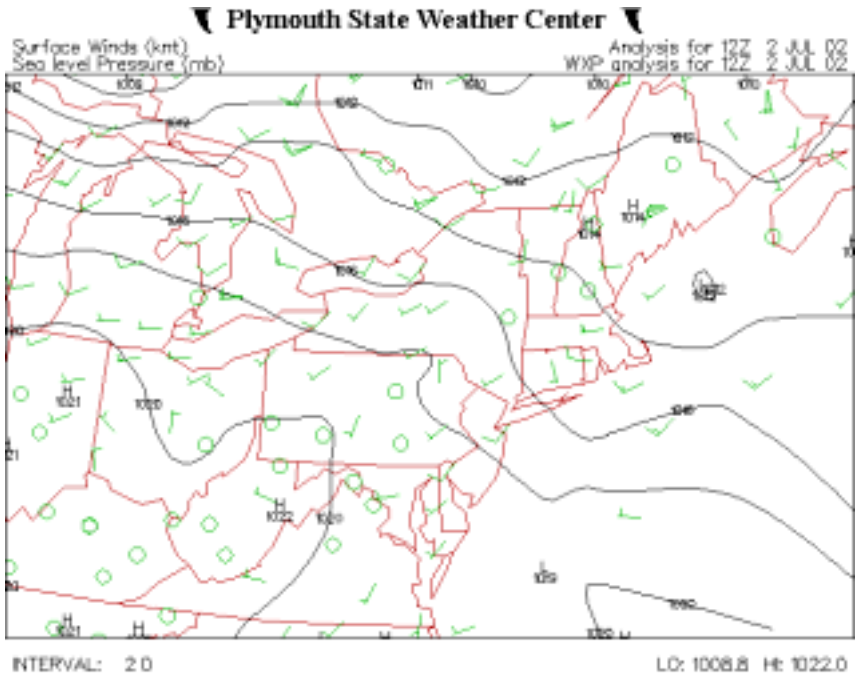
July 1-2 > 125 ppb





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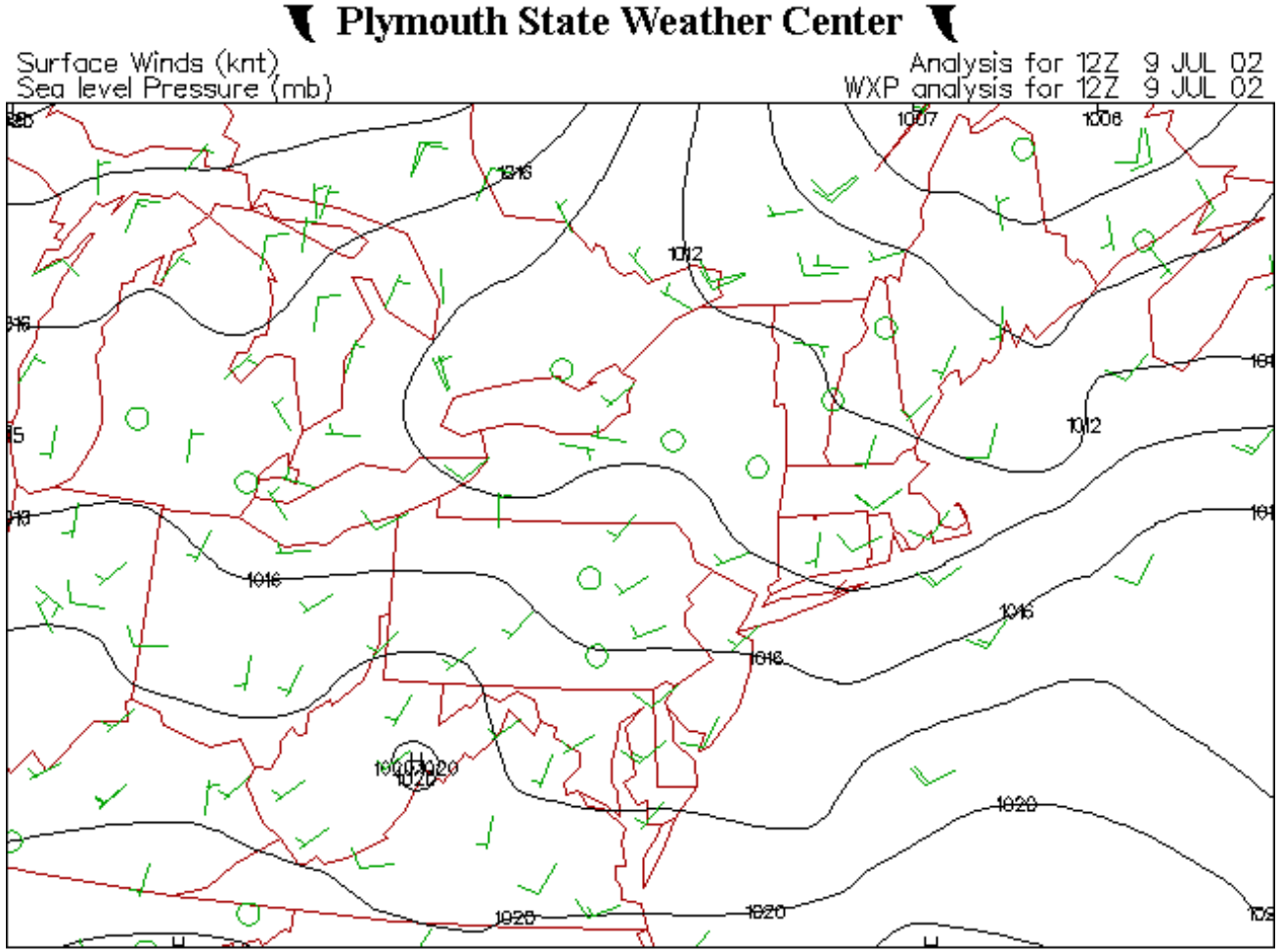
July 9 > 125 ppb



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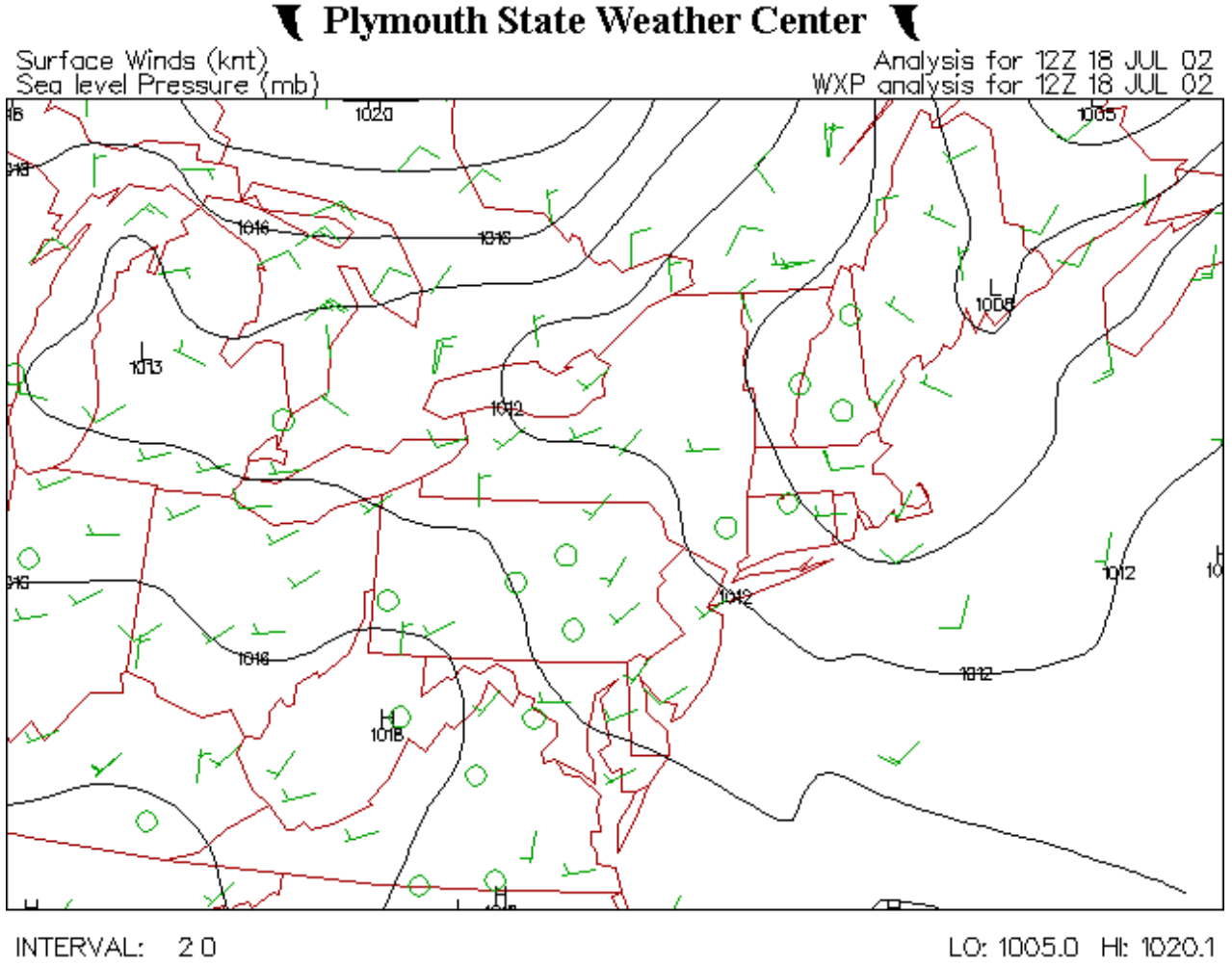
July 18 > 125 ppb



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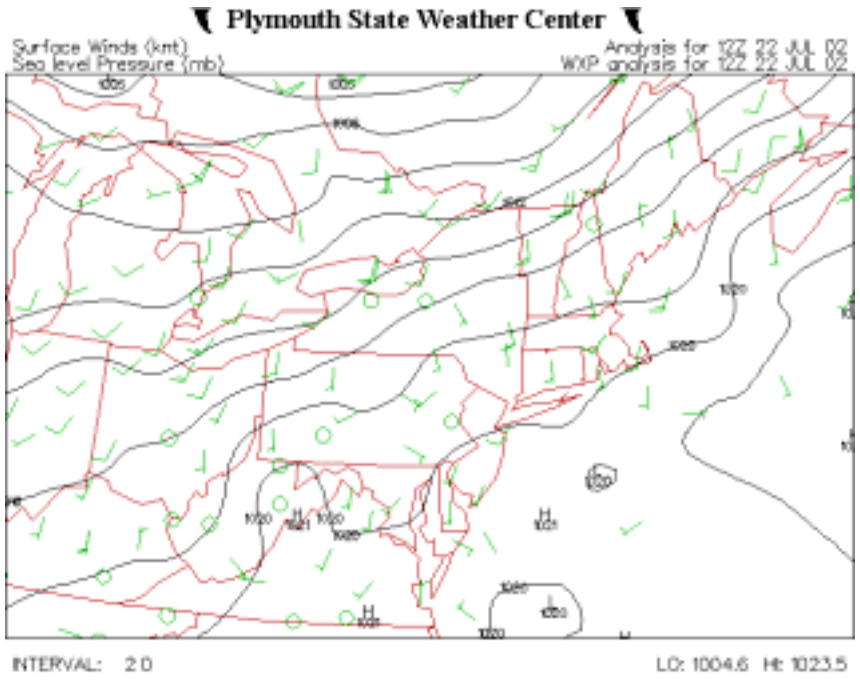
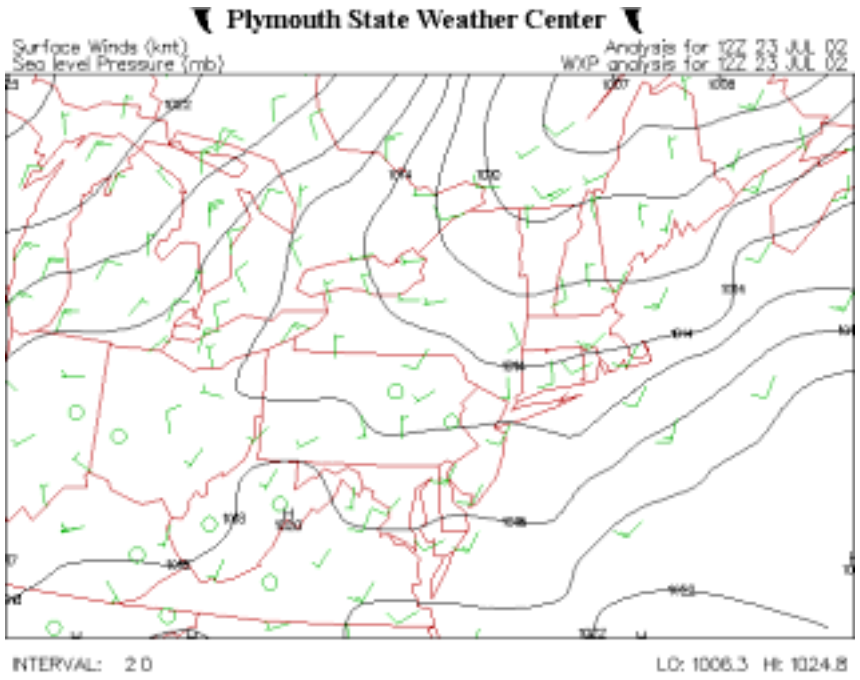
July 22-23 > 125 ppb





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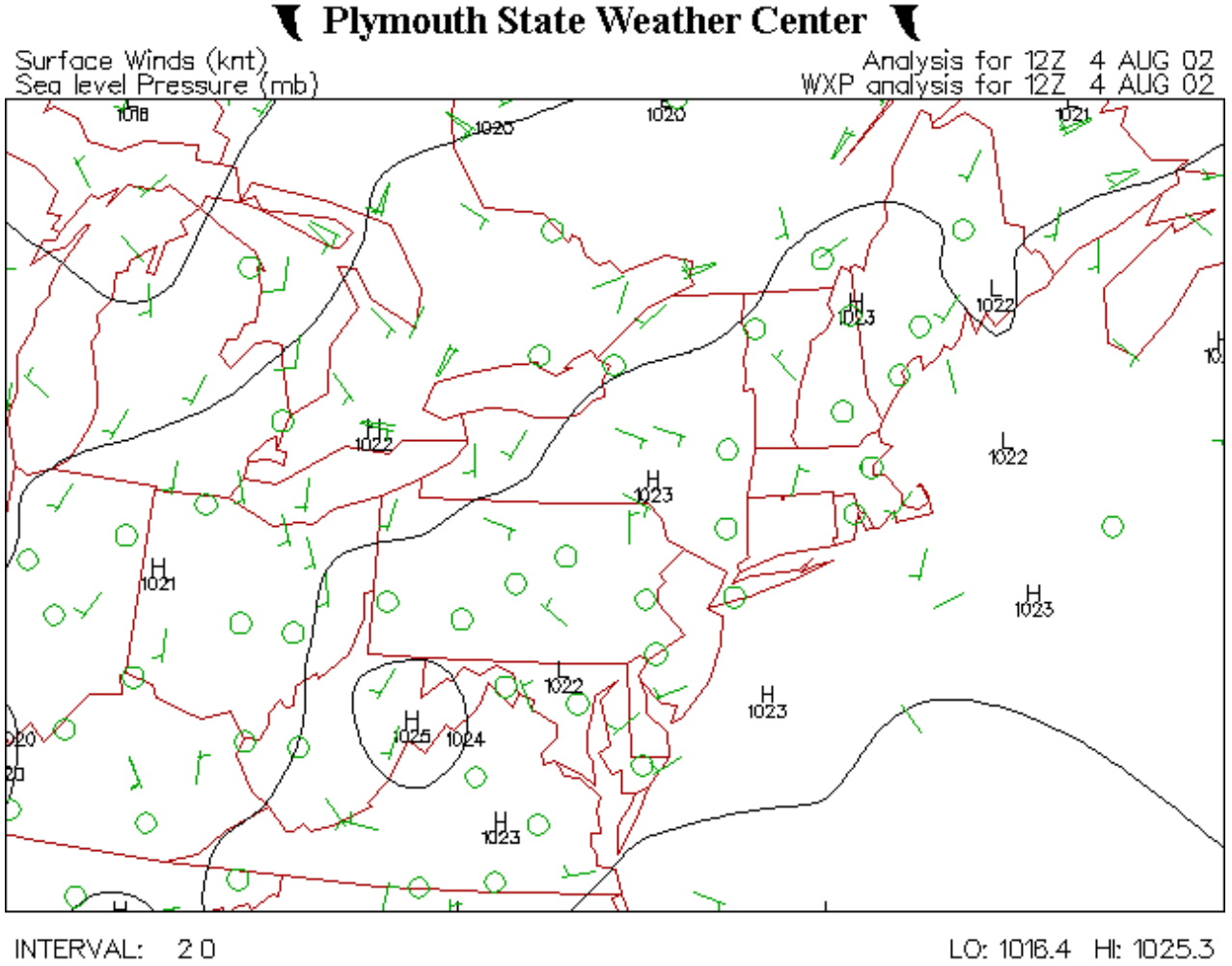
August 4 > 125 ppb



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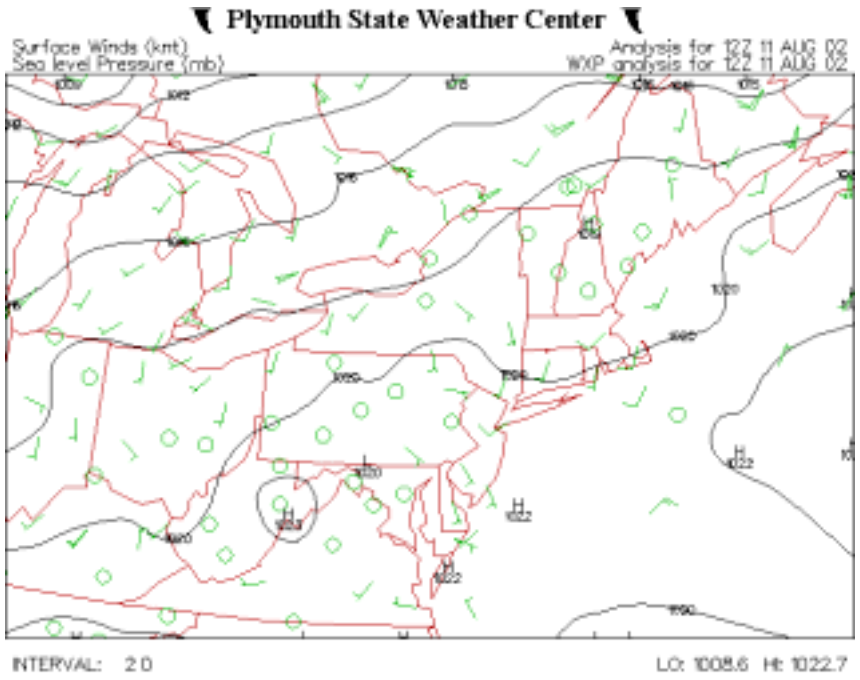
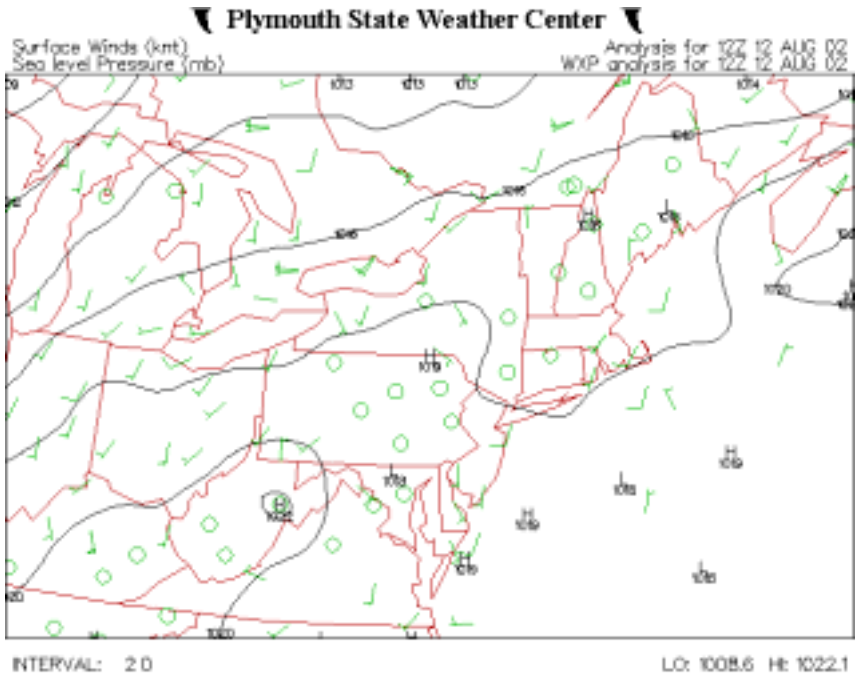
August 11-12 > 125 ppb





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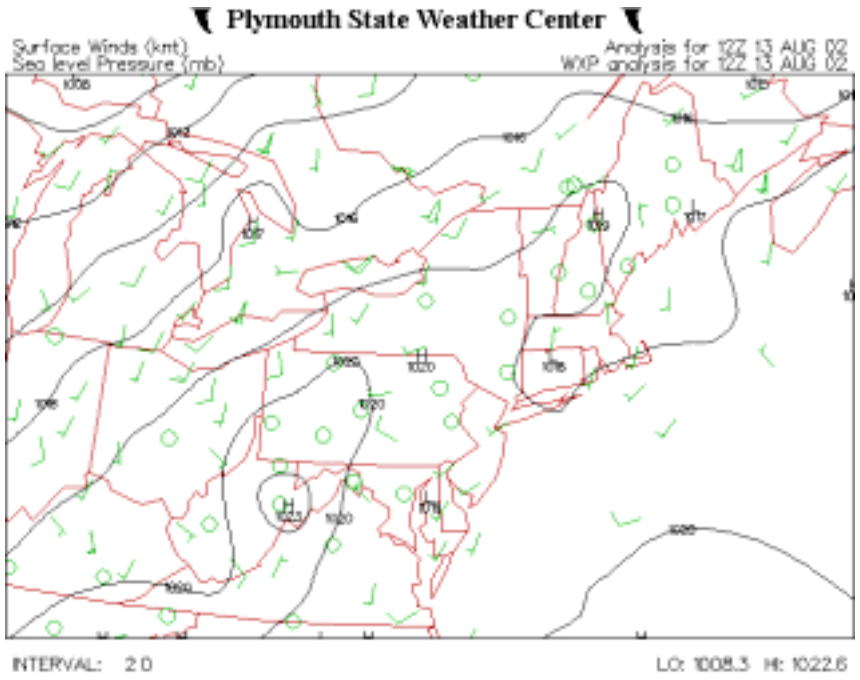
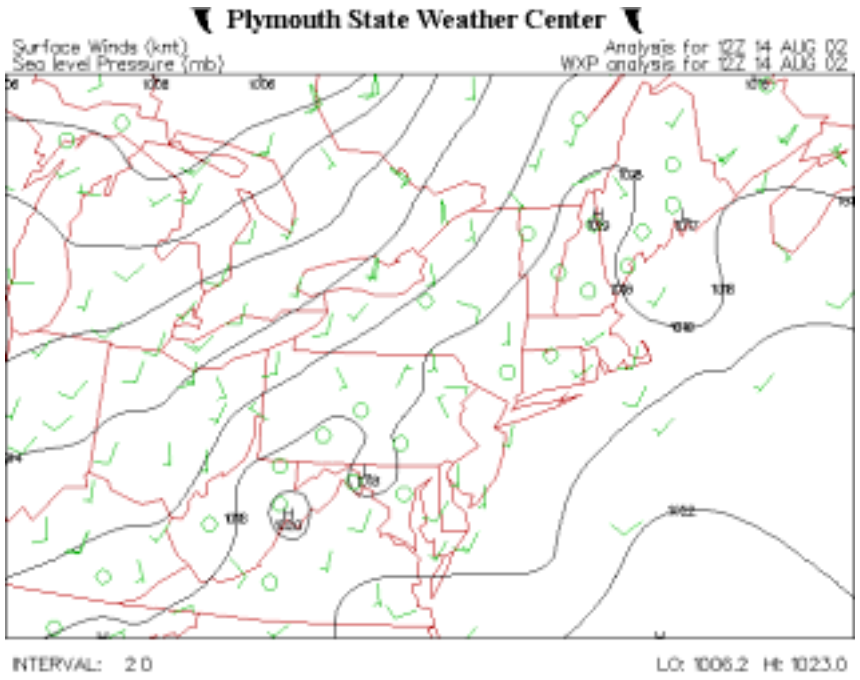
August 13-14 > 125 ppb





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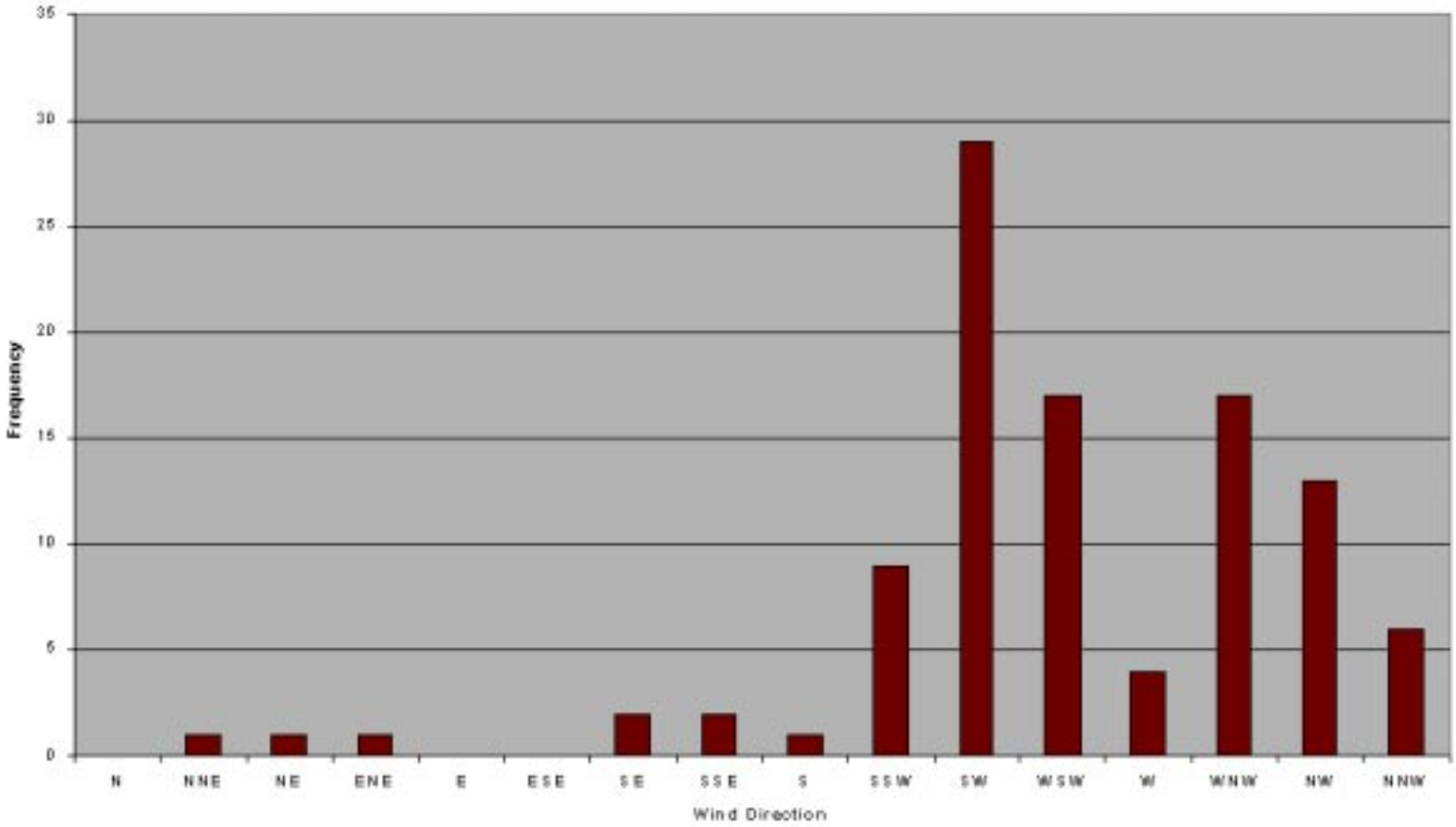
ETA Low-Level Wind Directions

on Elevated July-August 2002 Pollution Days



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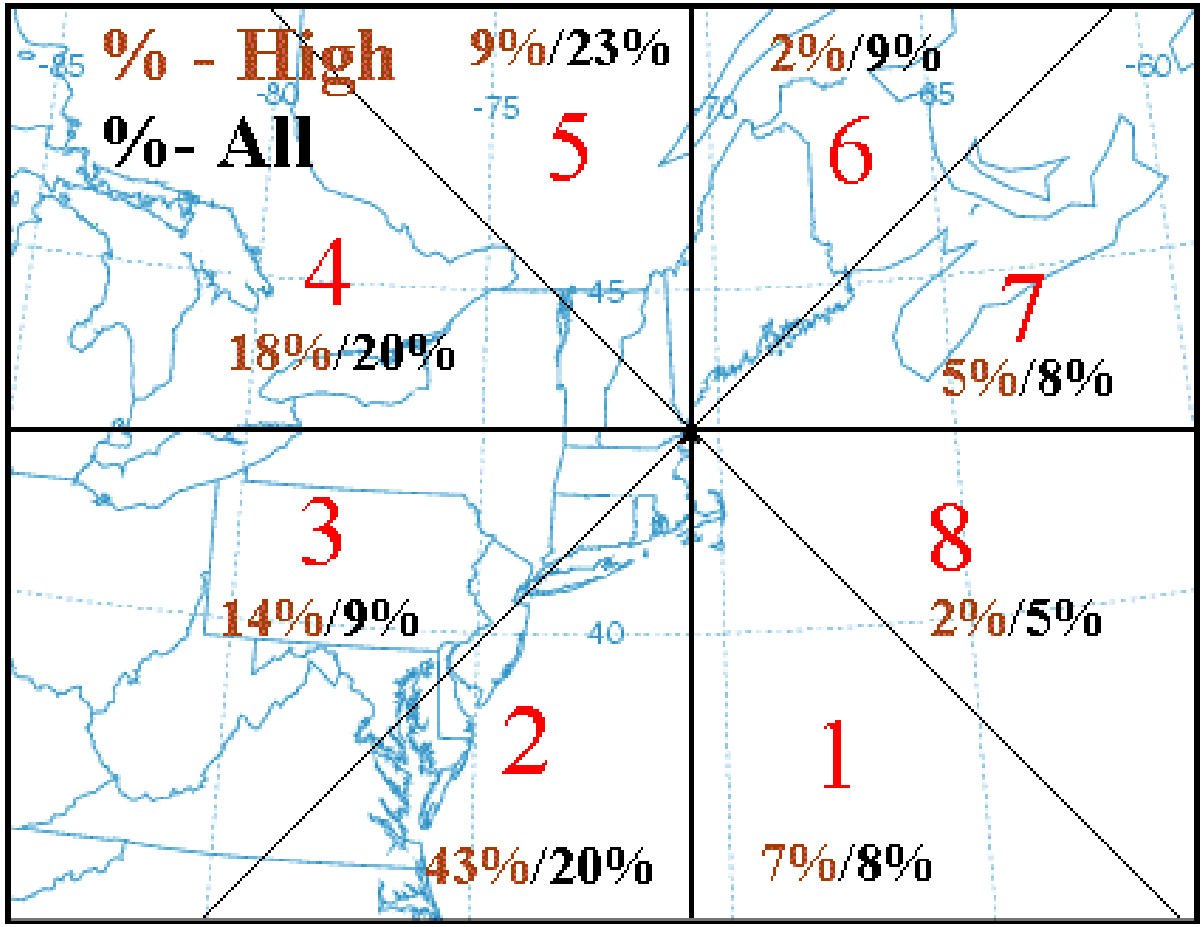
Source Characterization Scheme for IOSN3



10m AGL –12-HR Source Regions

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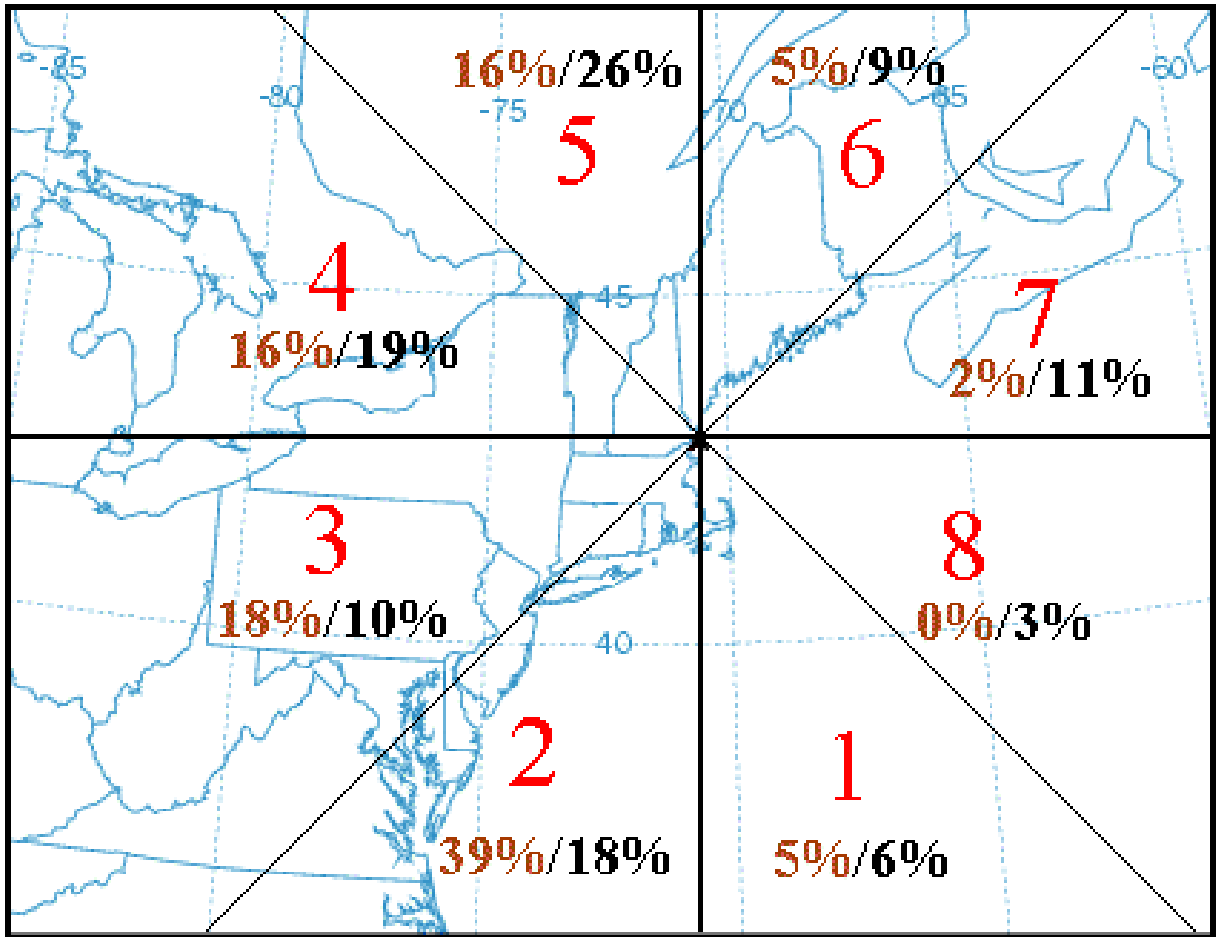
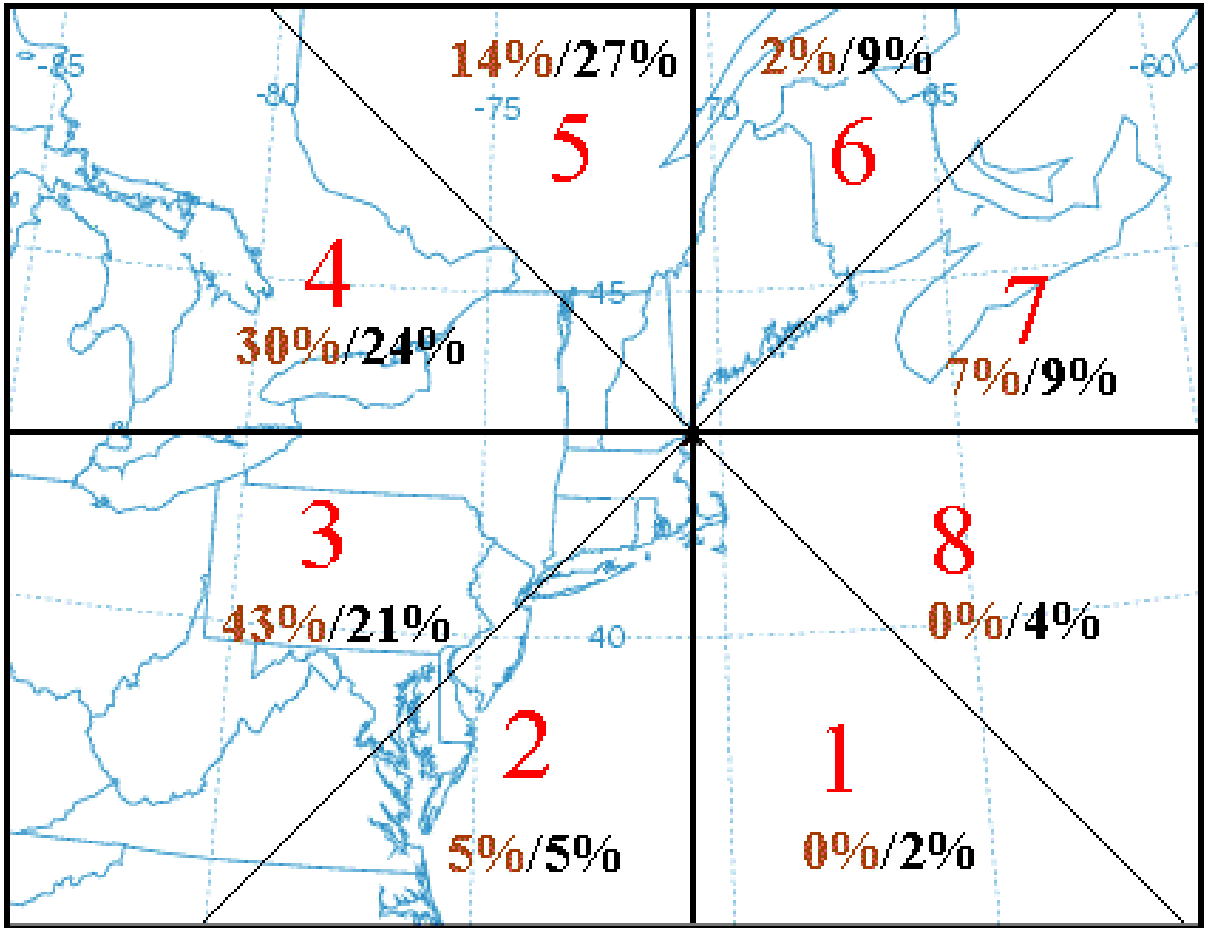
Source Characterization Scheme for IOSN3



10m AGL –24-HR Source Regions

Source Characterization Scheme for IOSN3



500m AGL –12-HR Source Regions

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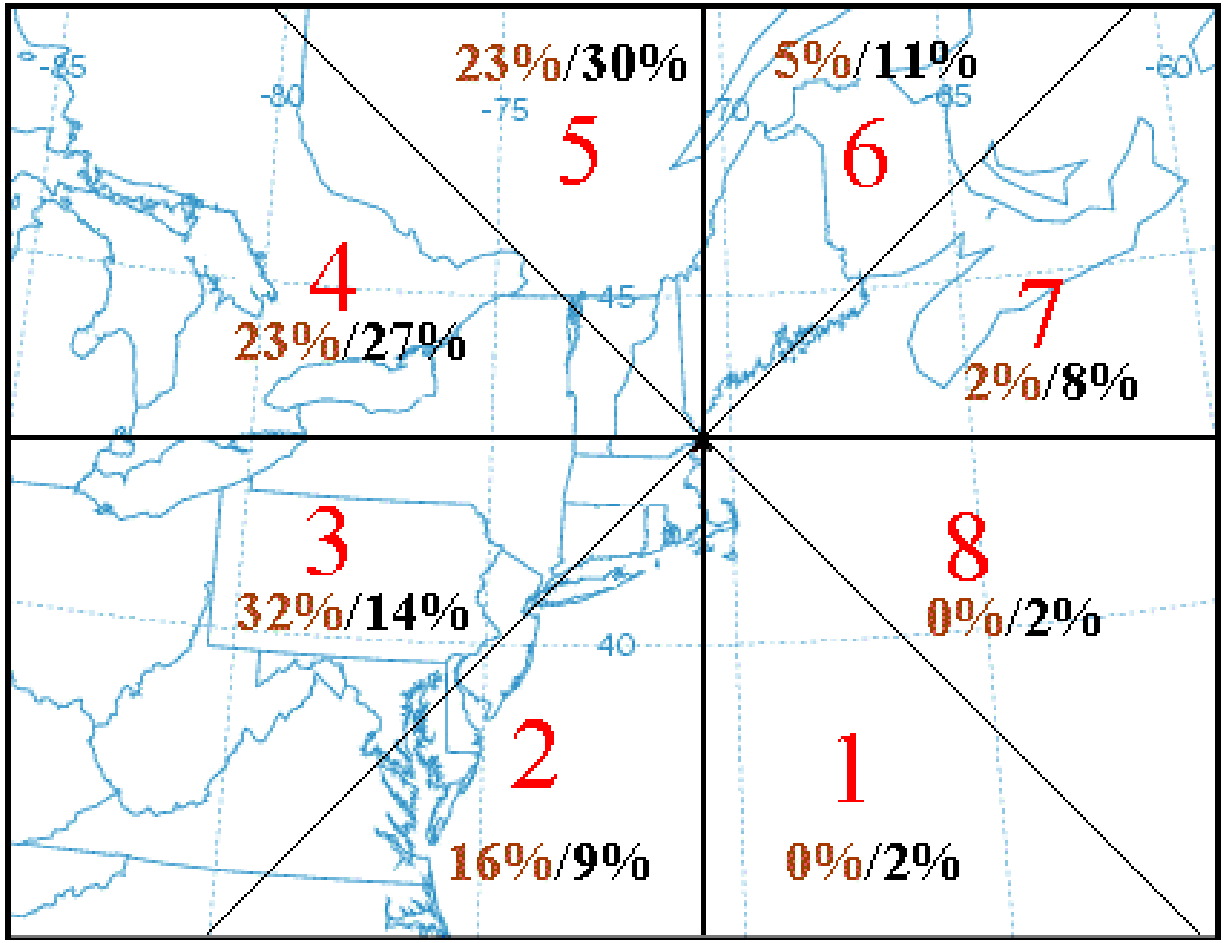
Source Characterization Scheme for IOSN3



500m AGL –24-HR Source Regions

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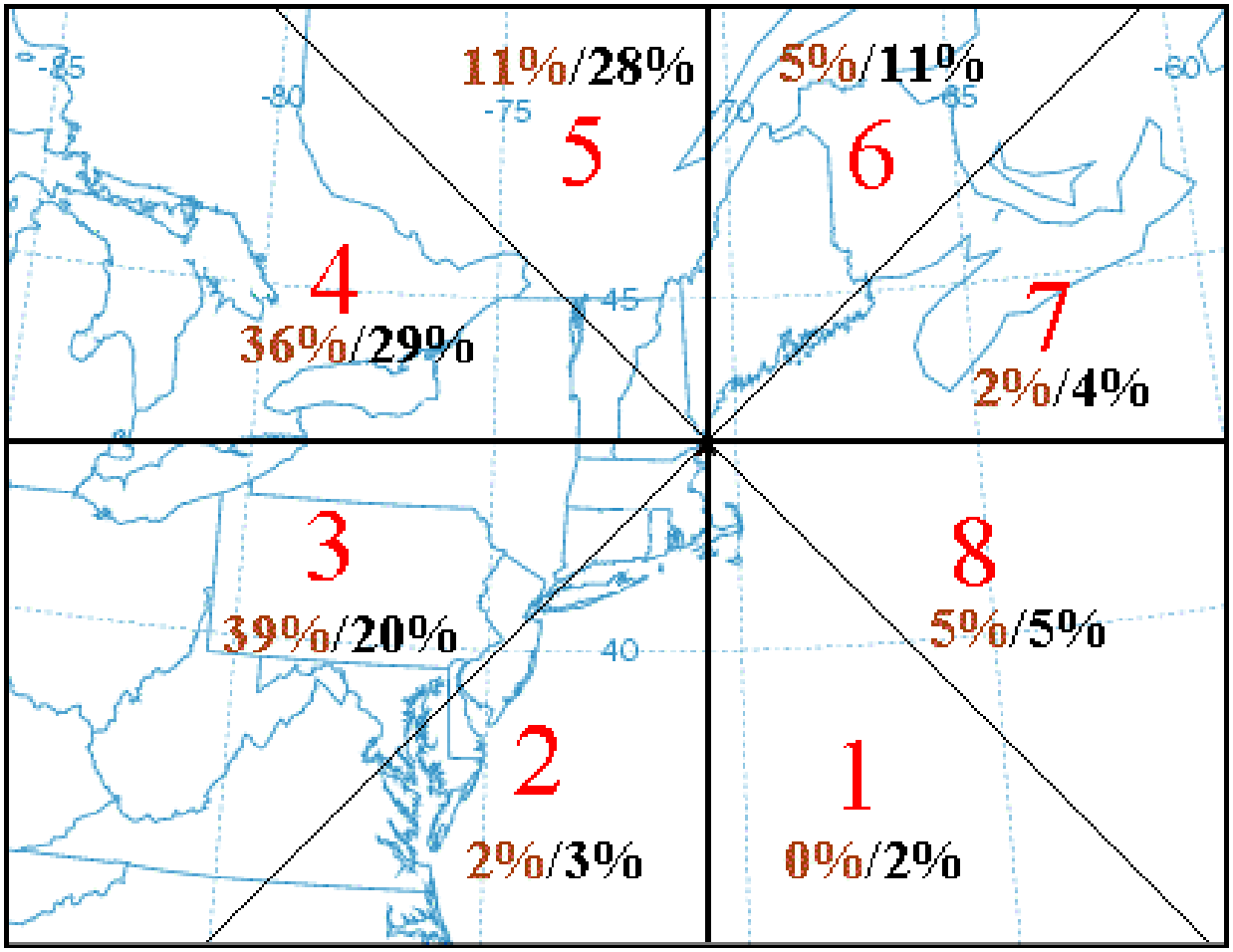
Source Characterization Scheme for IOSN3



1000m AGL –12-HR Source Regions

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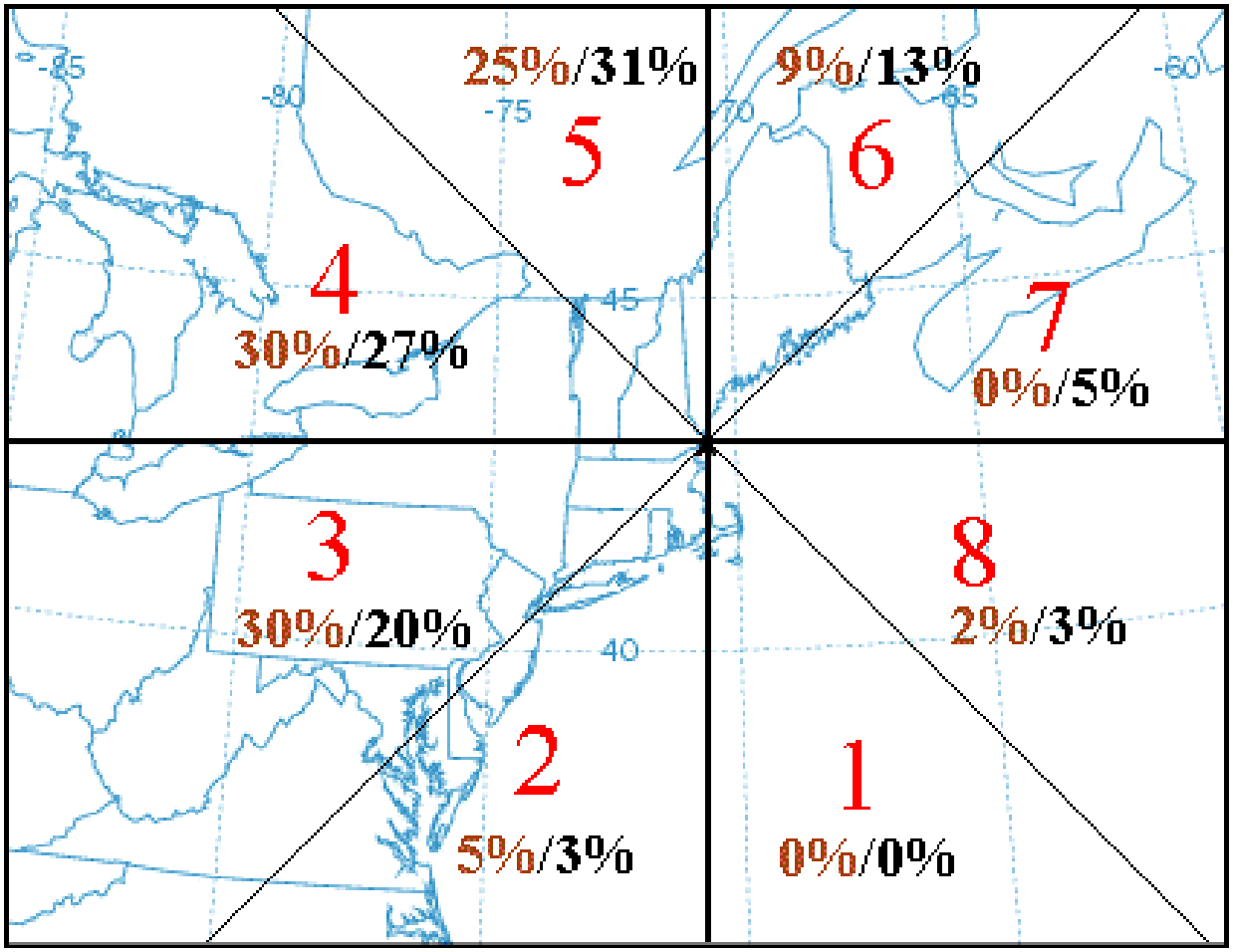
Source Characterization Scheme for IOSN3



1000m AGL –24-HR Source Regions

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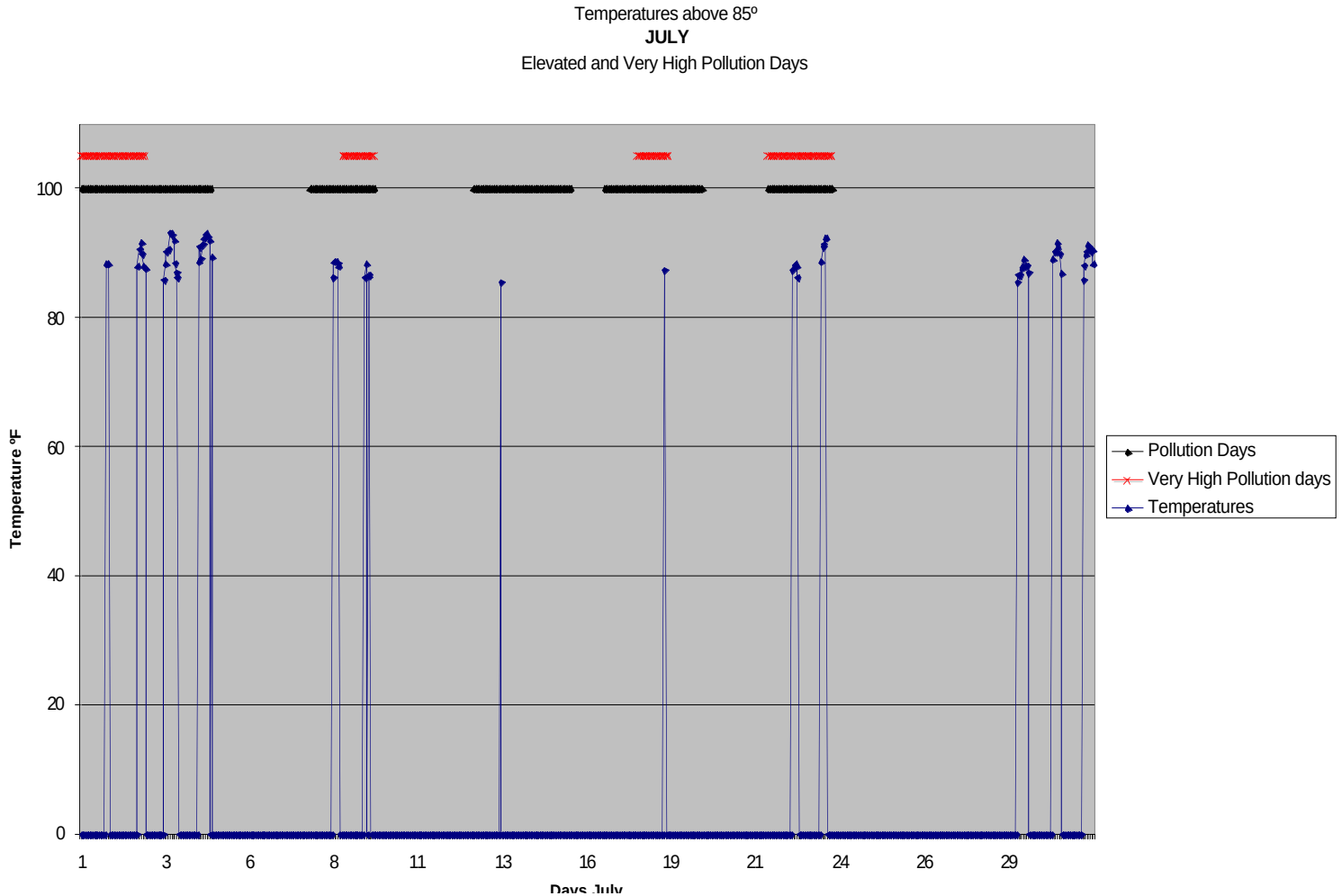
July Temperatures on Elevated Days



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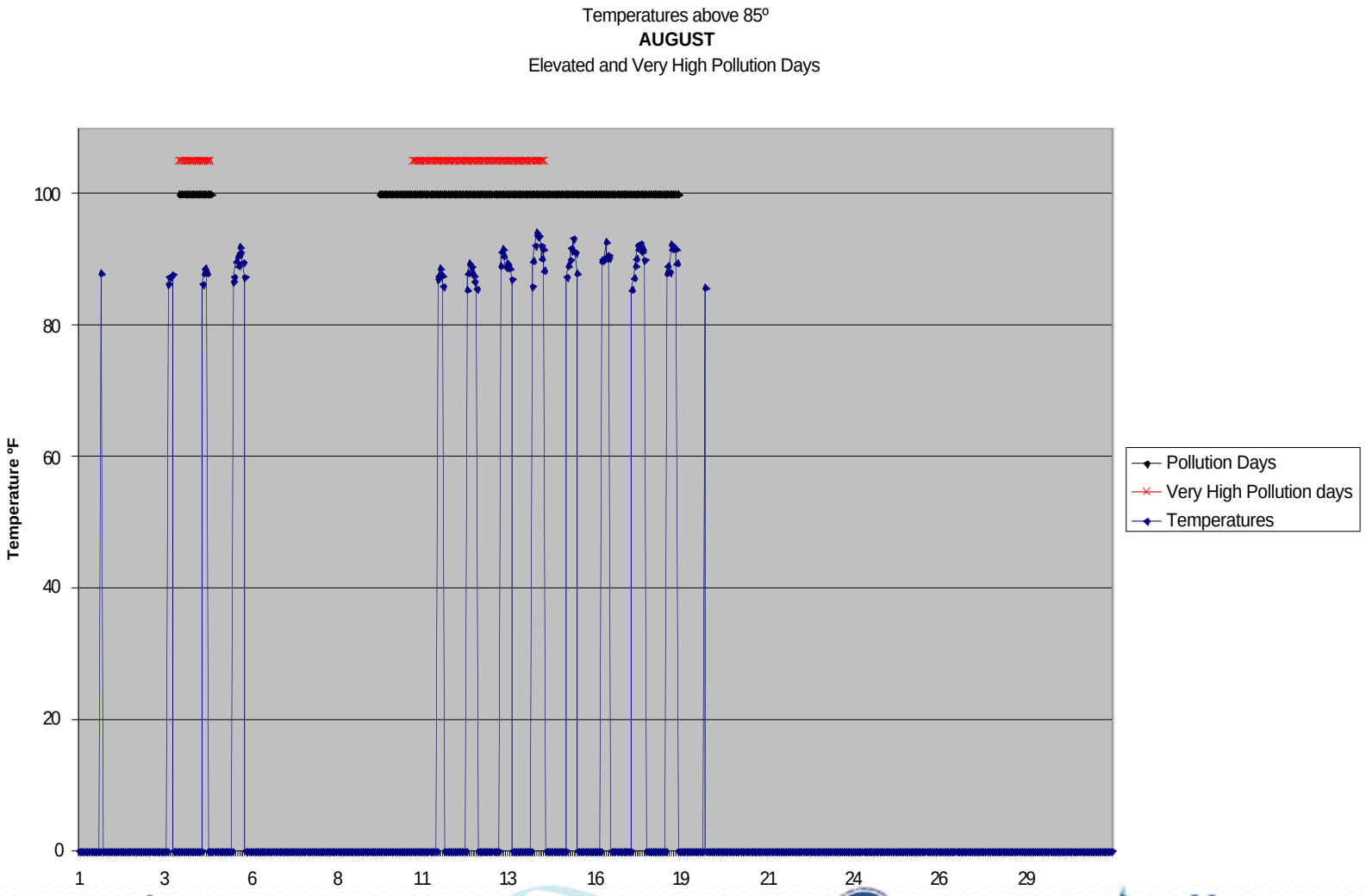
August Temperatures on Elevated Days



Summary

- Atlantic Return (AR) usually associated with pollution episodes
- SW-NW ridge to west and offshore trough
- Source regions from SSW near surface shifting to more W at higher levels
- Temperatures were slightly above normal and maximums above 85F were common on pollution days

NEAQS 2002 Climatology

Detailed results of the analysis shown here and supporting spreadsheets will be posted at the Plymouth State NEAQS Archived Data Page:

http://pscwx.plymouth.edu/NEAQS/archive.html