Tonawanda Community Air Quality Study

Division of Air Resources
Community Presentation

June 12, 2009

Sheridan Parkside Community Center

Tonawanda, NY

Conclusion

The results of the community air quality monitoring study and data analysis indicates there is a need for a focused effort to reduce the burden of air toxics in the Tonawanda area.

Future Air Pollution Reduction Project Goals

- Reduce odor complaints in community;
- Reduce the emissions of chemicals associated with acute irritation effects;
- Reduce cancer risk in the community.

Current Actions

- Increased compliance inspections of all air pollution sources in the area;
- April 2009 – Comprehensive inspection of Tonawanda Coke by EPA and DEC;
- Comprehensive inspections of petroleum distribution sources by DEC;
- Gathering of complaint information in community by DEC;

Current Actions

- Continuation of sampling at Grand Island Boulevard (GIBI) and Brookside Terrace Sites (BRTS);
- The addition of a continuous automated benzene, toluene, ethylbenzene and xylene (BTEX) monitor at the GIBI site – measurements every 15 minutes;
- The addition of a high volume sampler for polyaromatic hydrocarbon (PaH) compounds at the GIBI site.

Future Actions

- Continue compliance inspections of major and area sources;
- Use the inspection and monitoring results to make decisions about revising current NY State source category specific regulations;
- Use the inspection and monitoring results to make decisions about requiring a greater degree of air pollution control at specific sources using current NY State regulations.

Future Actions

- Continue to provide study information to the New York State Department of Health (NYSDOH) to investigate feasibility of a community health study;
- Continue our dialog with the community and industry representatives to achieve air pollution reductions for clean air.

Recent Air Pollution Reduction Projects

- 3M O-Cell-O
  - Air pollution equipment installation resulted in significant Carbon Disulfide emissions reduction (50%).
- Huntley Power
  - Air pollution equipment installation and switch to cleaner coal resulted in significant reductions in Sulfur Dioxide, Nitrogen Oxides, Particulates, and Mercury.

Future Air Pollution Reduction Projects

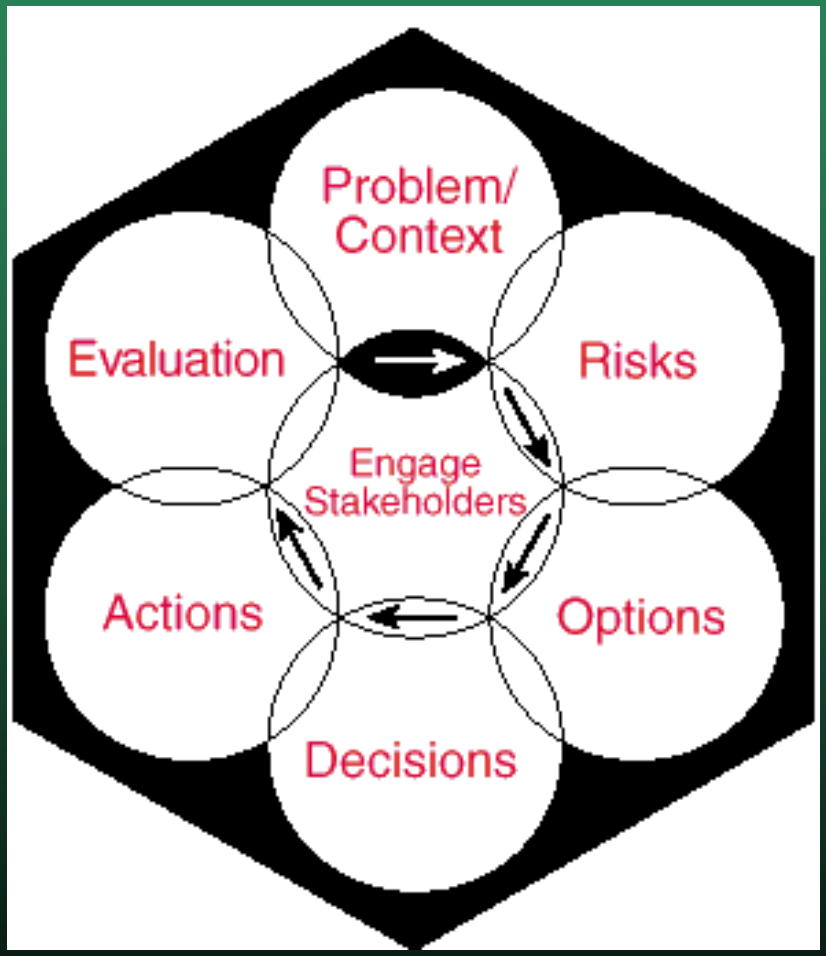
- Tonawanda Coke Corporation

-Tonawanda Coke has agreed to control emissions from the “ammonia still” by the Fall of this year;

-This project will reduce ammonia emissions by approximately 800,000 pounds per year and smaller but significant amounts of benzene, toluene, xylene, and naphthalene;

- Require increased work-practice oversight responsibility as a permit condition in renewed Title V permit.

Framework of Risk Management for Community Air Quality Decisions



Tonawanda Community Air Quality Study

Results of Air Toxics Data Analysis

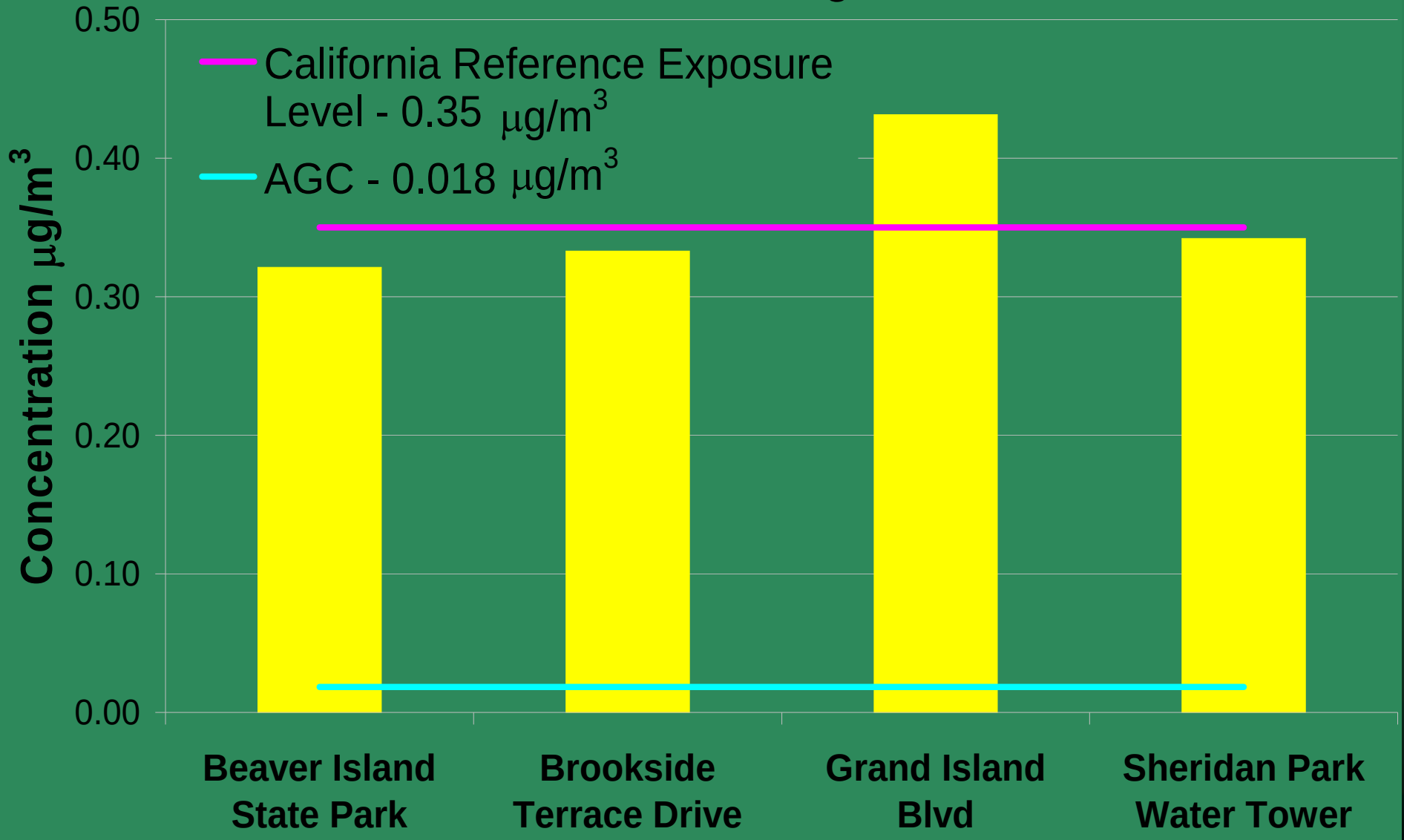

0
0.5
1
2 Miles
I190
BTRS
I290
GIBI
River Road
SPWT
Sheridan Parkside Community Center
BISP
N

Compounds greater than the Annual Guideline Concentration (AGC)

- Volatile Organic Compounds
  - Benzene
  - Acrolein
  - Carbon tetrachloride
- Carbonyls
  - Formaldehyde
  - Acetaldehyde

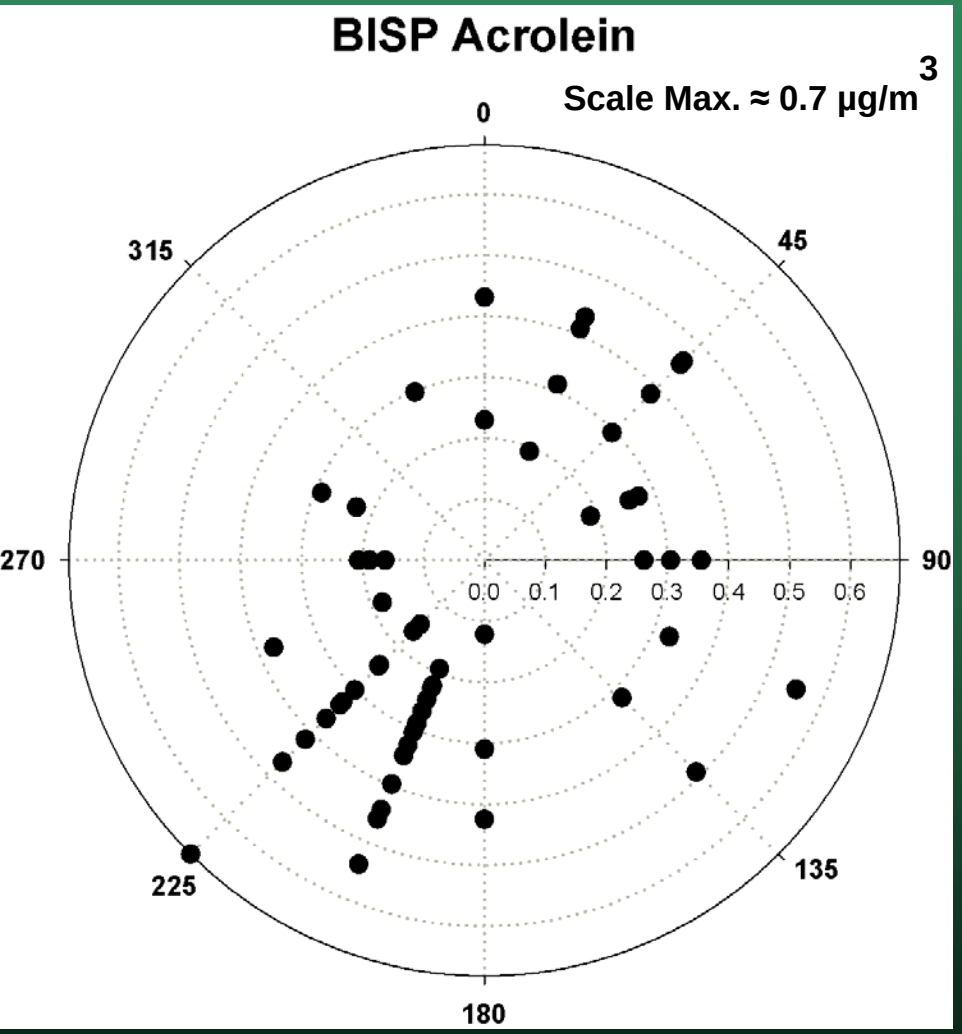
Acrolein

12 month average



Acrolein

- Manmade sources
  - Tobacco smoke
  - Chemical manufacturing (acrylic acid)
  - Combustion of petrochemical fuels and coal
  - Mobile source exhaust (cars, trucks, airplanes)
  - Formed when cooking fats are overheated
  - Breakdown by sunlight of various hydrocarbon pollutants (such as 1,3-butadiene)
  - Used as an herbicide and algaecide
- Natural sources
  - Product of fermentation and ripening processes
  - Released when organic matter such as trees and other plants, including tobacco, are burned


BISP Acrolein
Scale Max. ≈ 0.7 µg/m3
0
45
90
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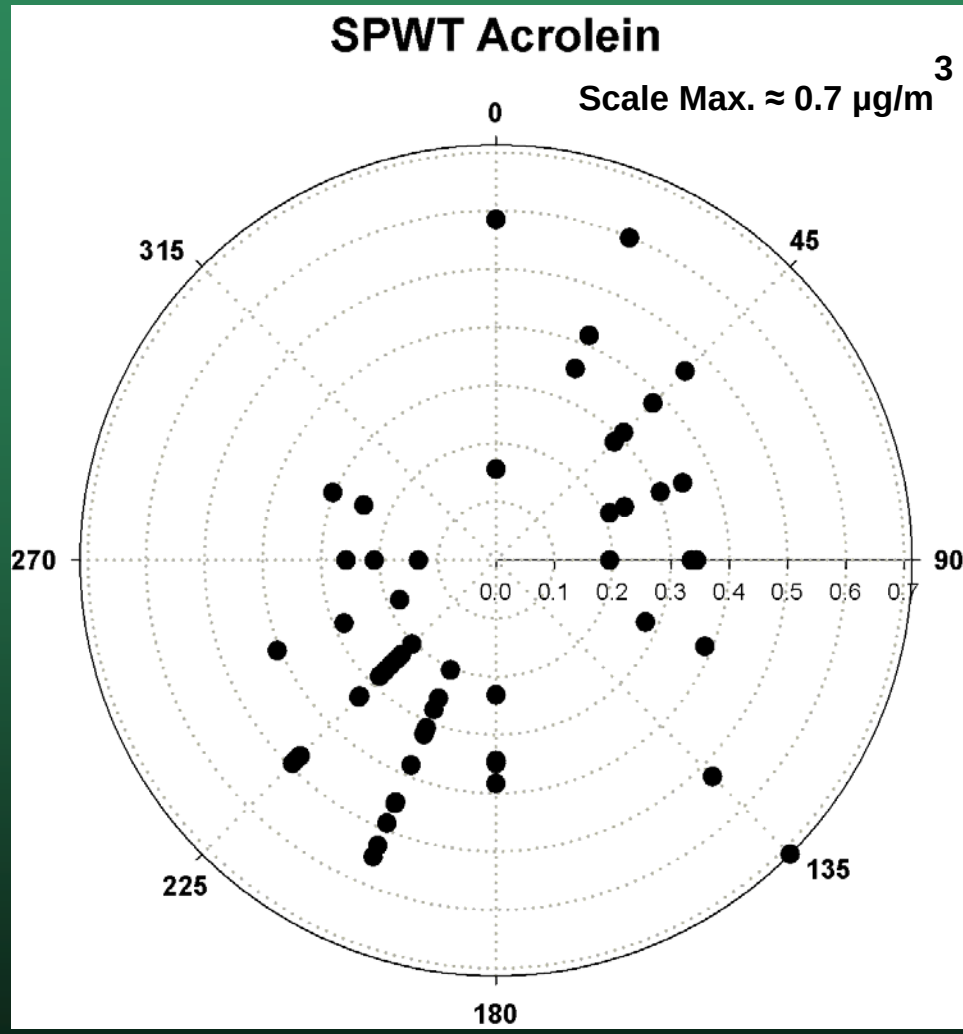
180
225
270
315
0.0
0.1
0.2
0.3
0.4
0.5
0.6


SPWT Acrolein
Scale Max. ≈ 0.7 µg/m3
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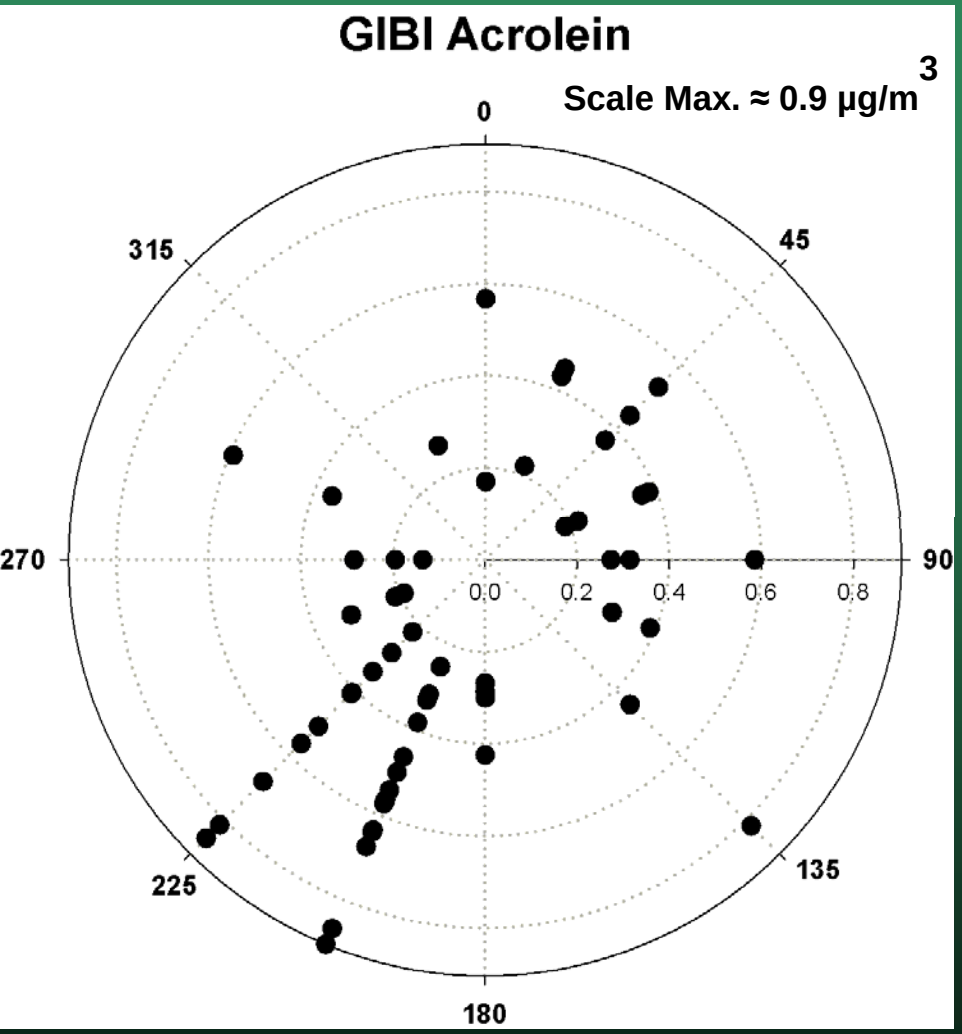
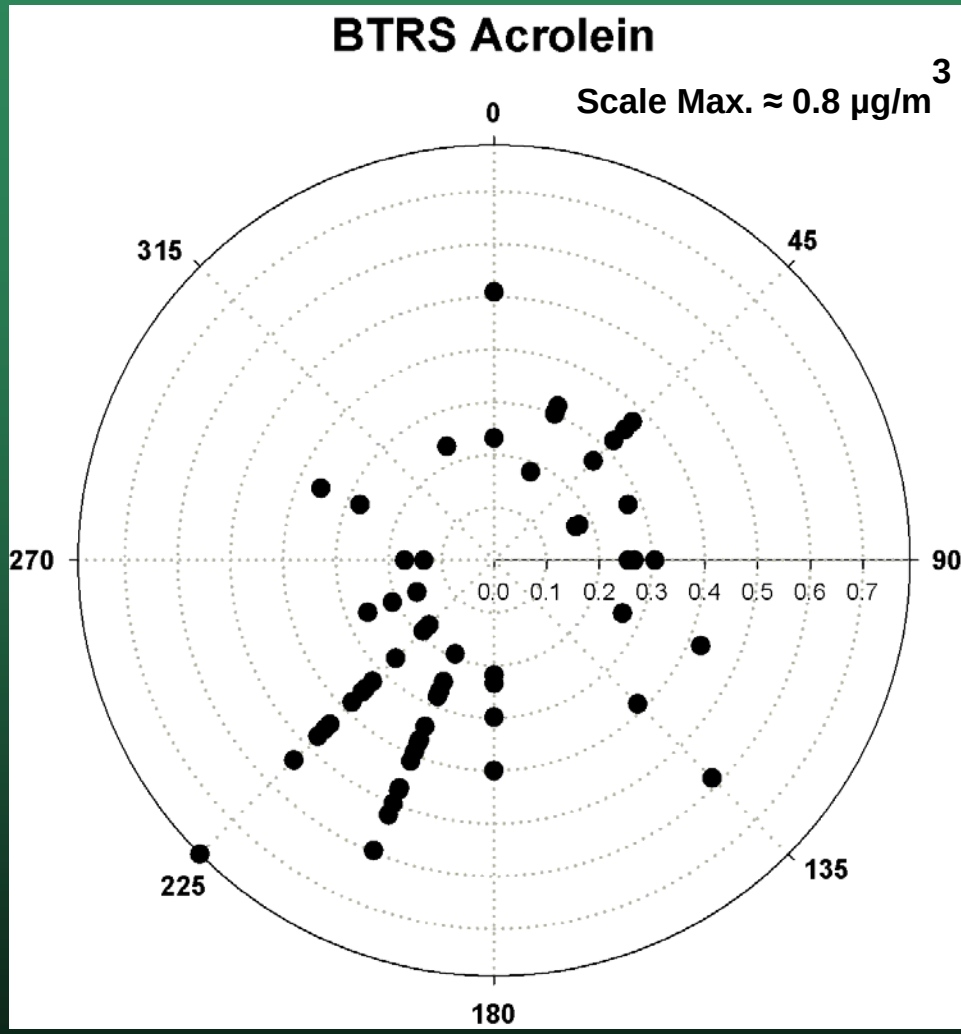
0.4
0.5
0.6
0.7


GIBI Acrolein
Scale Max. ≈ 0.9 µg/m3
0
45
90
135
180
225
270
315
0.0
0.2
0.4
0.6
0.8


BTRS Acrolein
Scale Max. ≈ 0.8 µg/m3
0
45
90
135
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315
0.0
0.1
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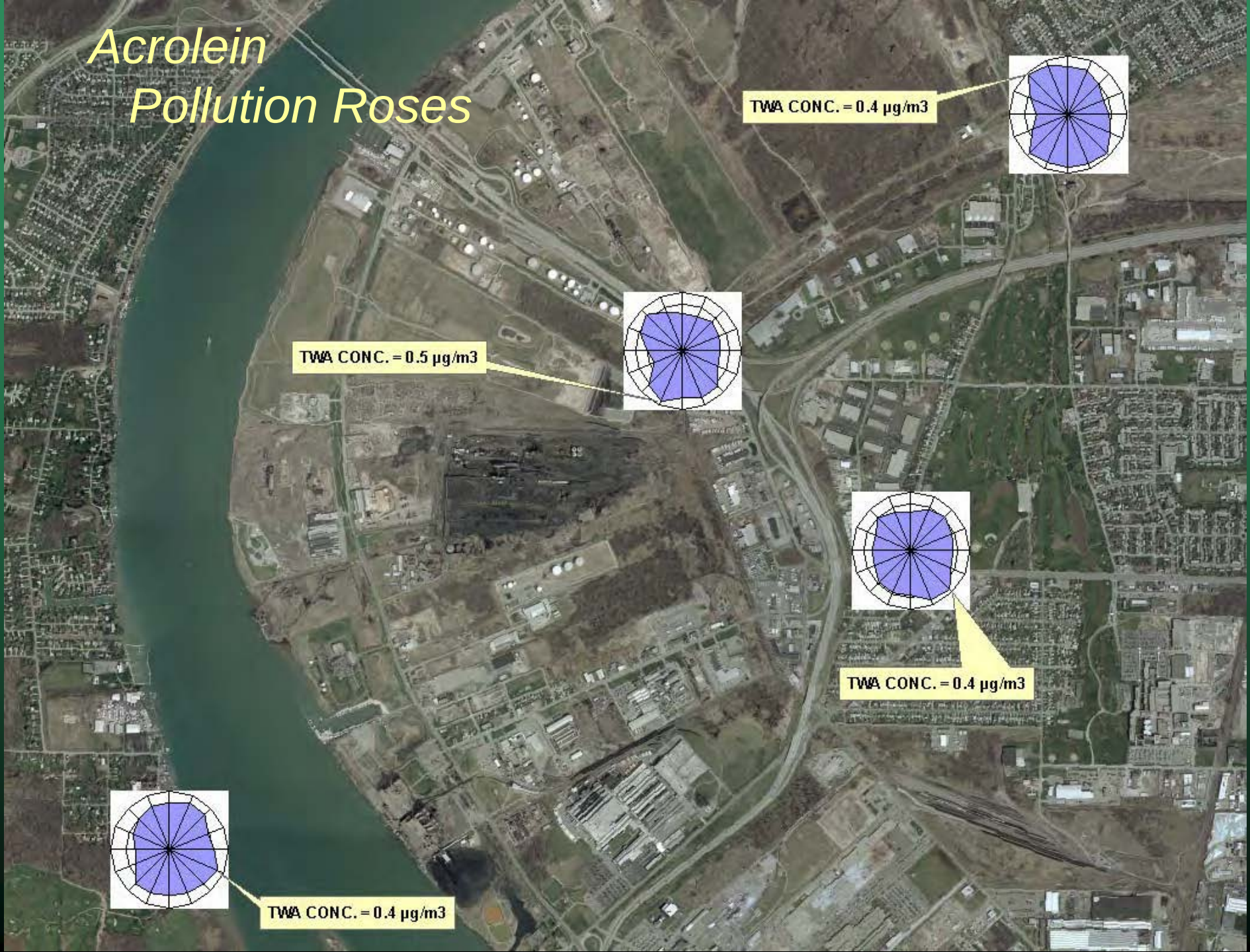
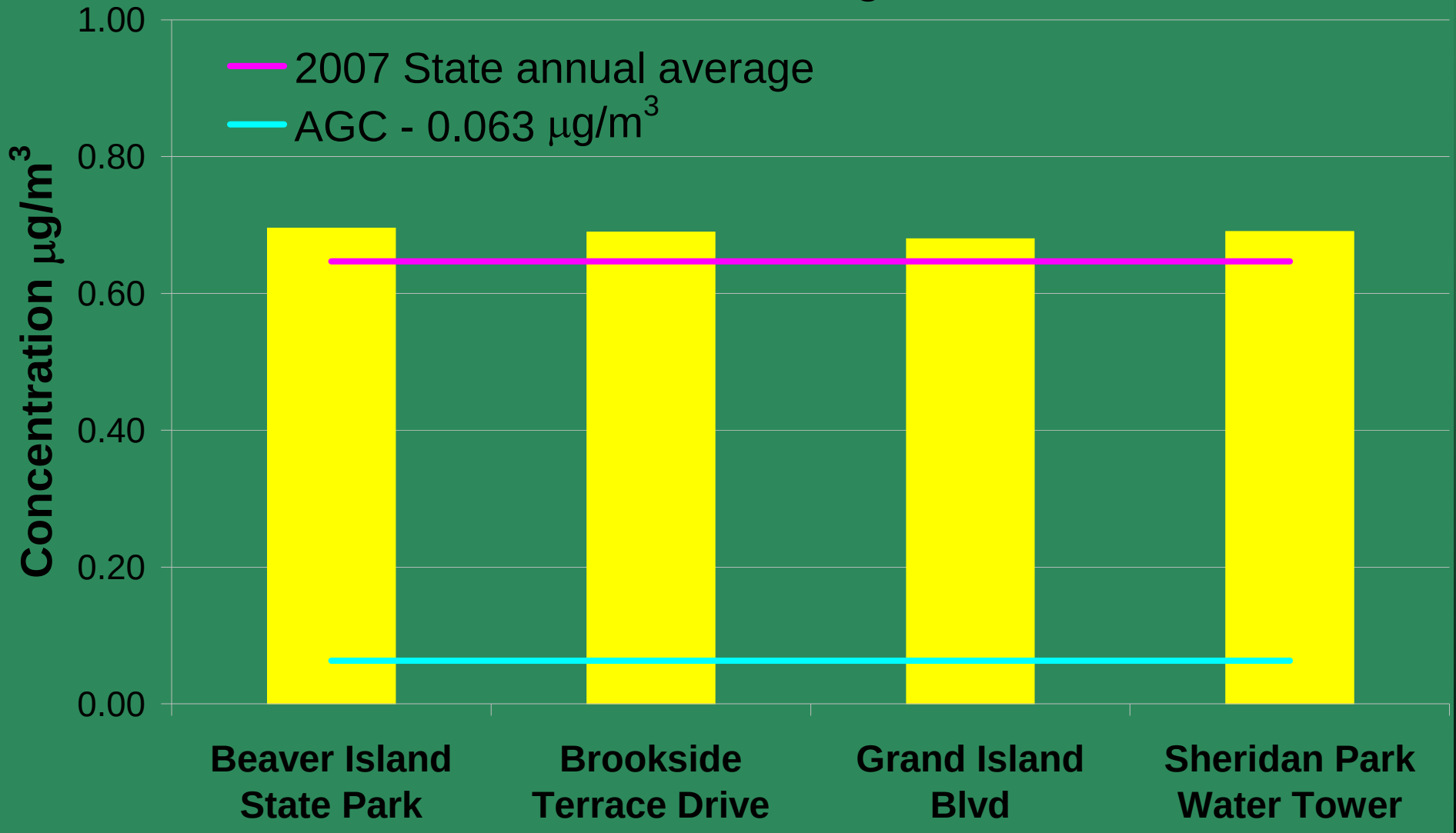
0.4
0.5
0.6
0.7

Acrolein Pollution Roses



Carbon tetrachloride

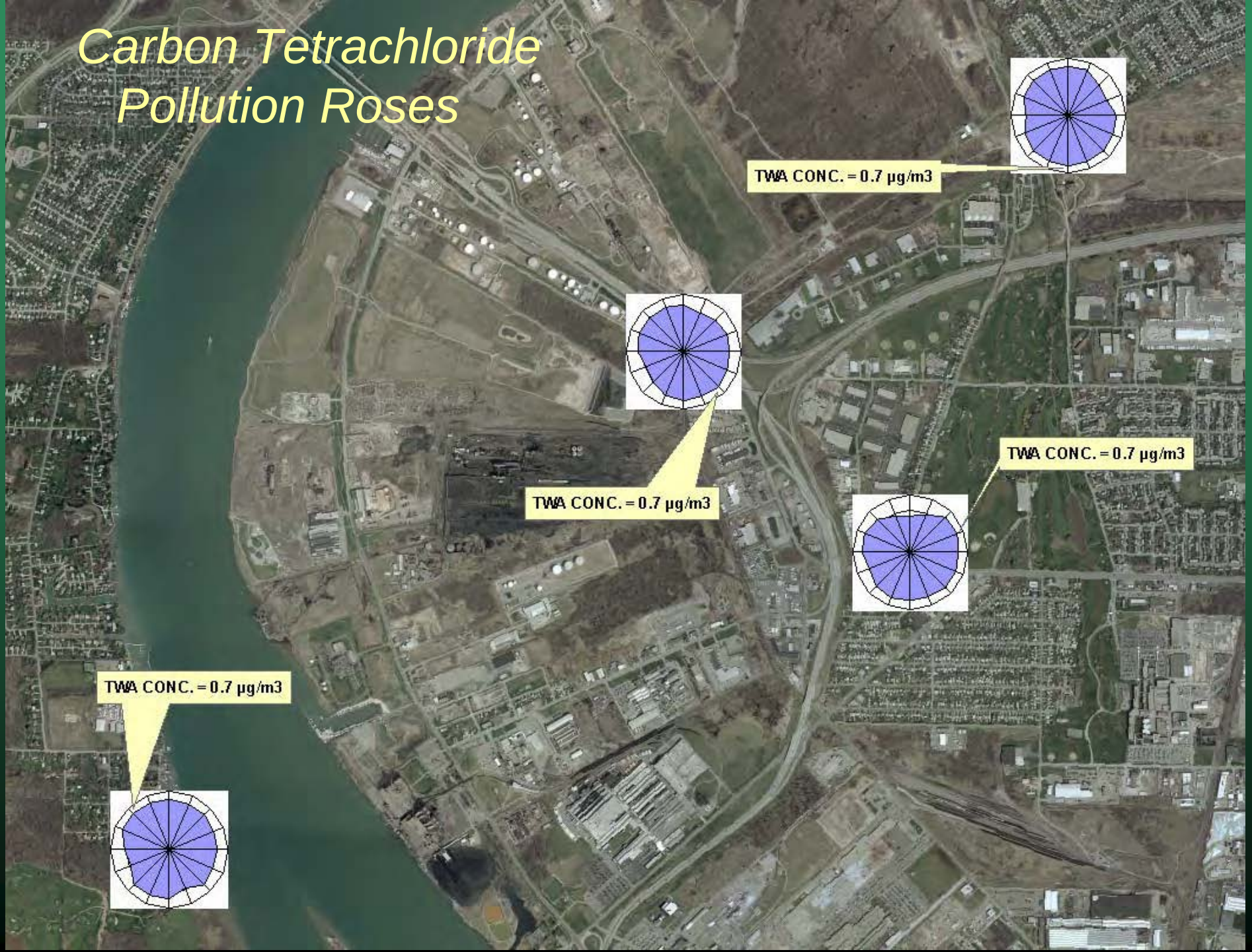
12 month average



Carbon tetrachloride

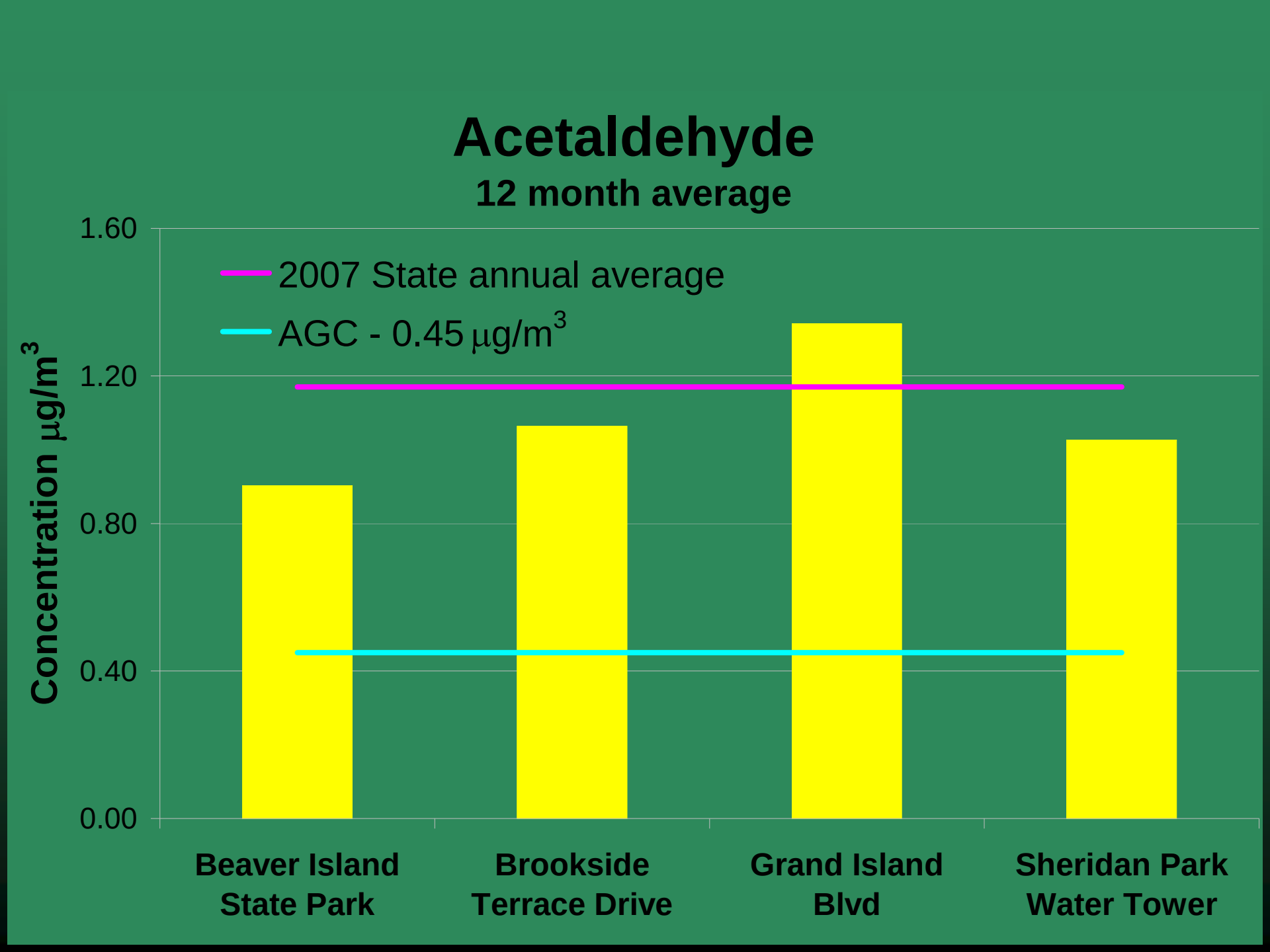
- Manmade sources
  - Manufacturing agent for refrigerants and propellants for aerosol cans
  - Solvent for oils, fats, lacquers, varnishes, and resins
  - Grain fumigant
  - Dry cleaning agent
  - Consumer and fumigant uses have been discontinued
  - Production and consumption phased out in U.S in 1999
  - New York Emissions 2001 (1,928 lbs/year), Now Zero
- Natural Sources
  - No natural sources

Carbon Tetrachloride Pollution Roses



Acetaldehyde

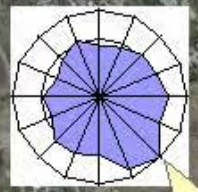
12 month average



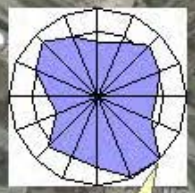
Acetaldehyde

- Manmade
  - intermediate in the synthesis of other chemicals, perfumes, polyester resins, and basic dyes.
  - solvent in the rubber, tanning, and paper industries
  - product of incomplete combustion
  - Mobile source exhaust (cars & trucks)
- Natural Sources
  - Wildfires

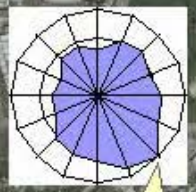
Acetaldehyde Pollution Roses



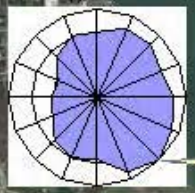
TWA CONC. = 1.5 µg/m3



TWA CONC. = 1.7 µg/m3



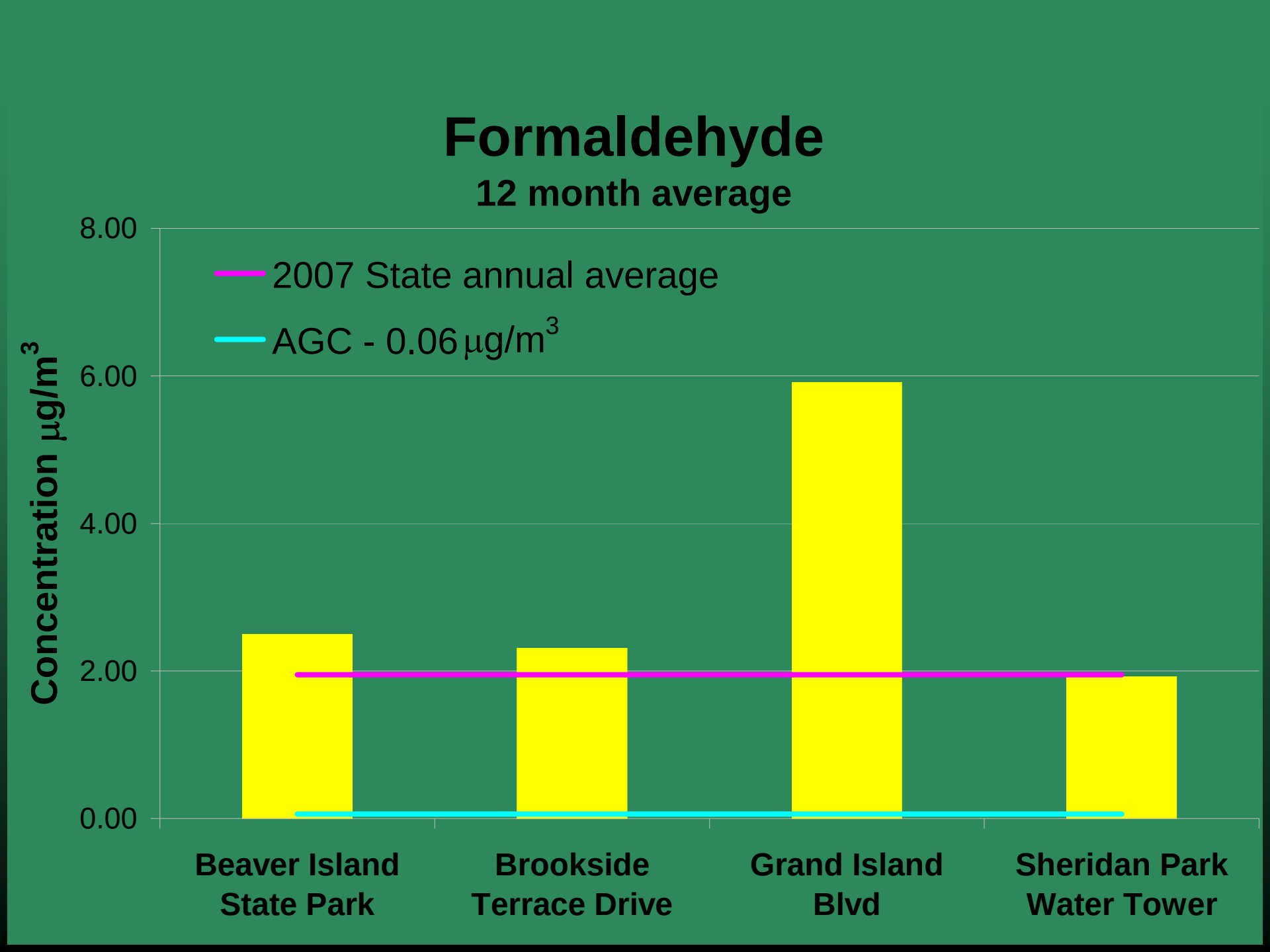
TWA CONC. = 1.4 µg/m3



TWA CONC. = 1.2 µg/m3

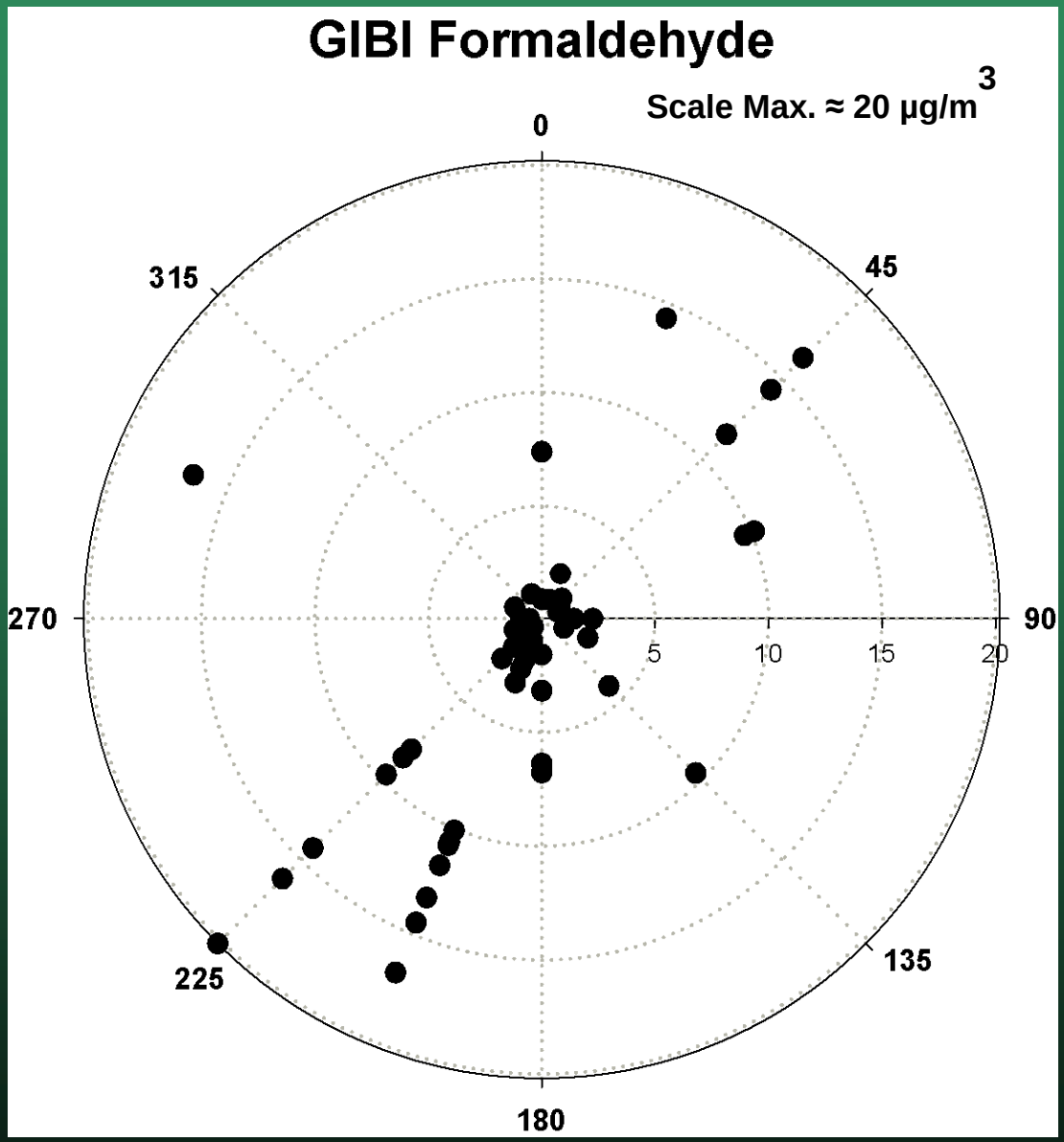
Formaldehyde

12 month average

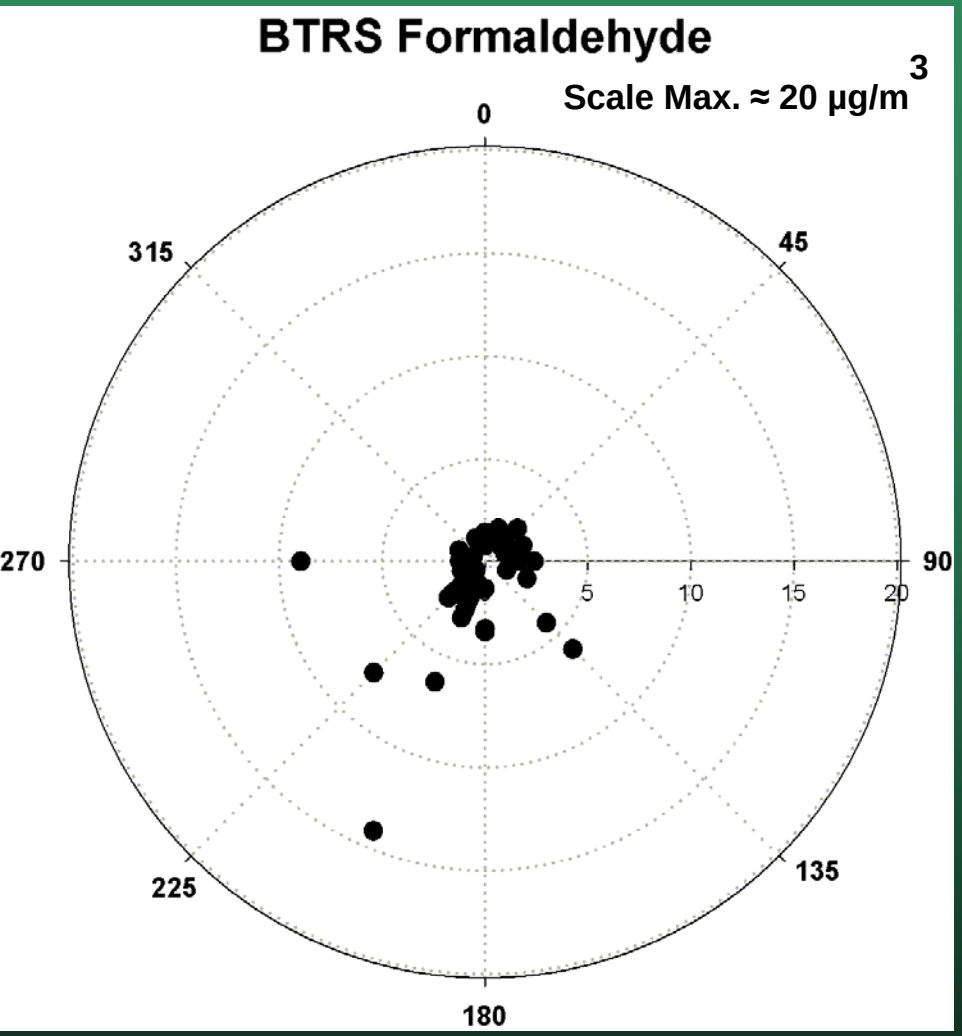


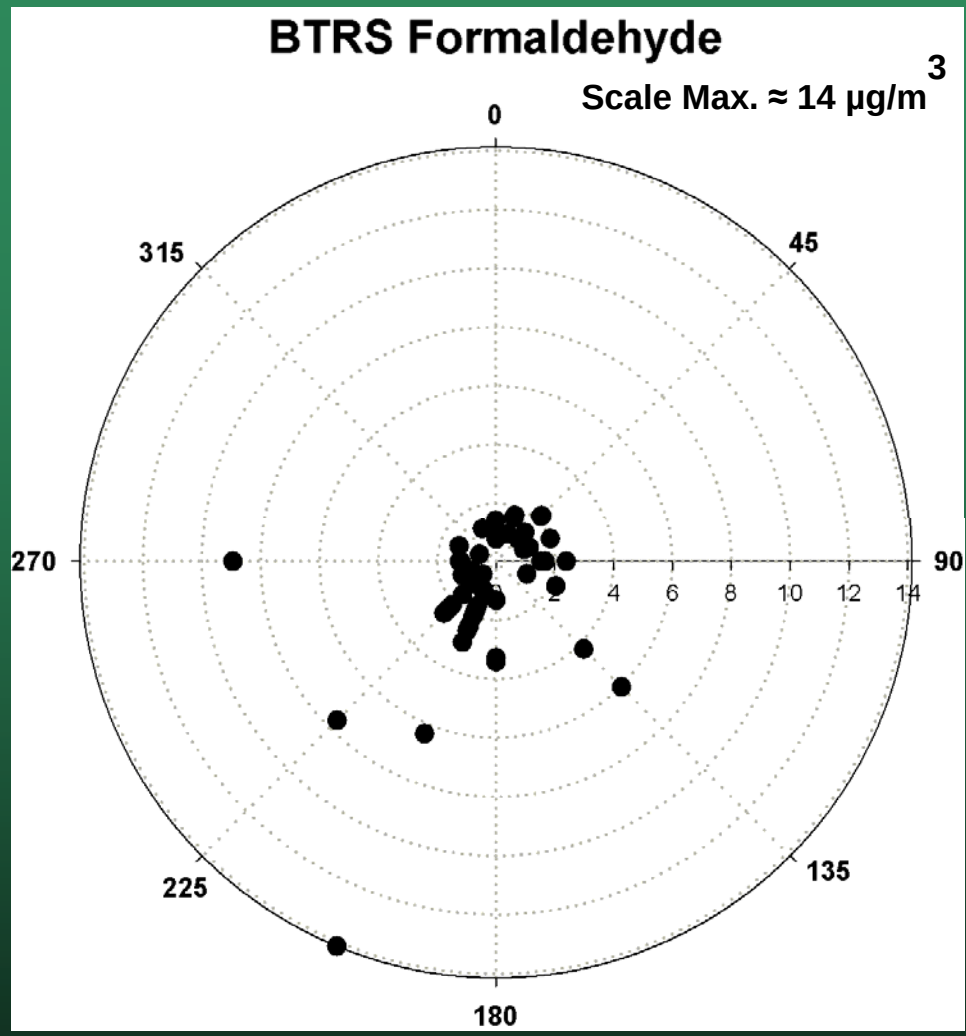
Formaldehyde

- Manmade Sources
  - Predominantly used as a chemical intermediate
  - Manufacturing of urea-formaldehyde resins, used in particleboard products
  - Combustion sources, smoking
  - Mobile source exhaust (cars & trucks)
  - Breakdown of other compounds
- Natural Sources
  - Wildfires, animal wastes, plant volatiles



NYS Department of Environmental Conservation


BTRS Formaldehyde
Scale Max. ≈ 20 µg/m3
0
45
90
135
180
225
270
315
5
10
15
20


BTRS Formaldehyde
Scale Max. ≈ 14 µg/m3
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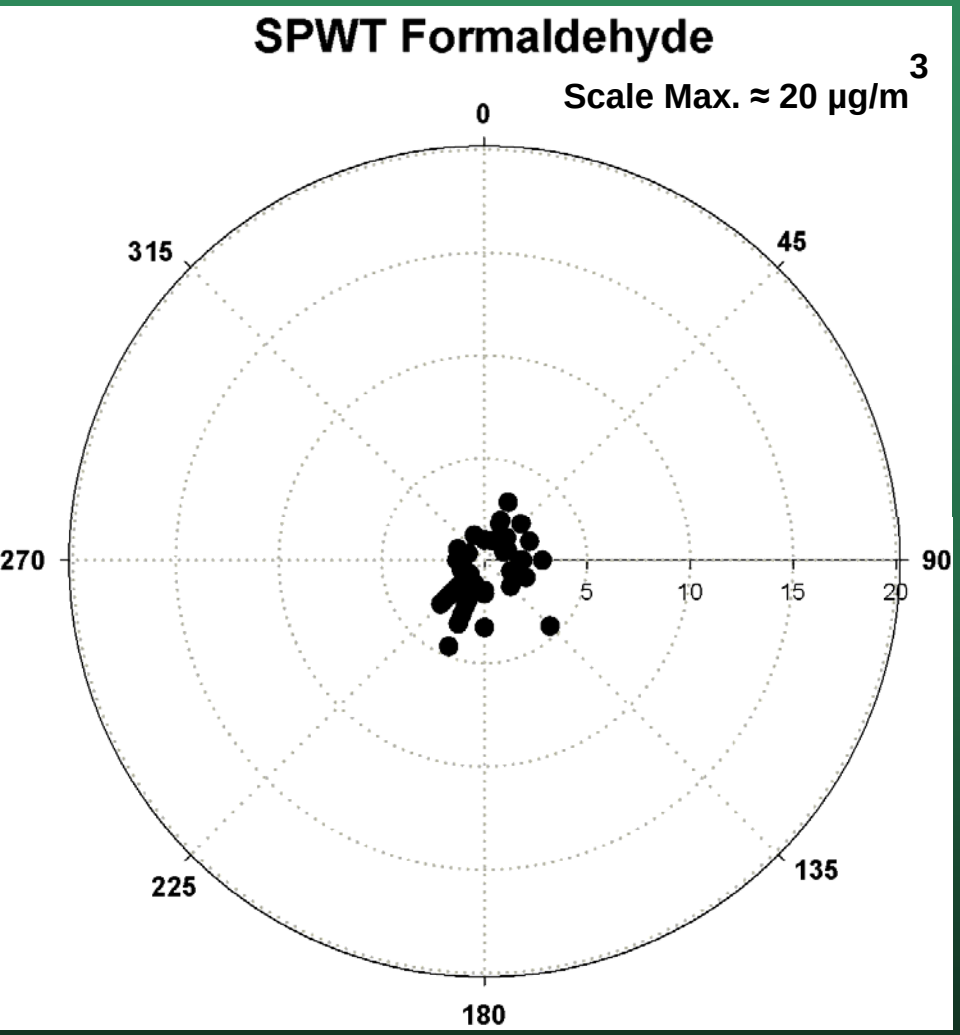
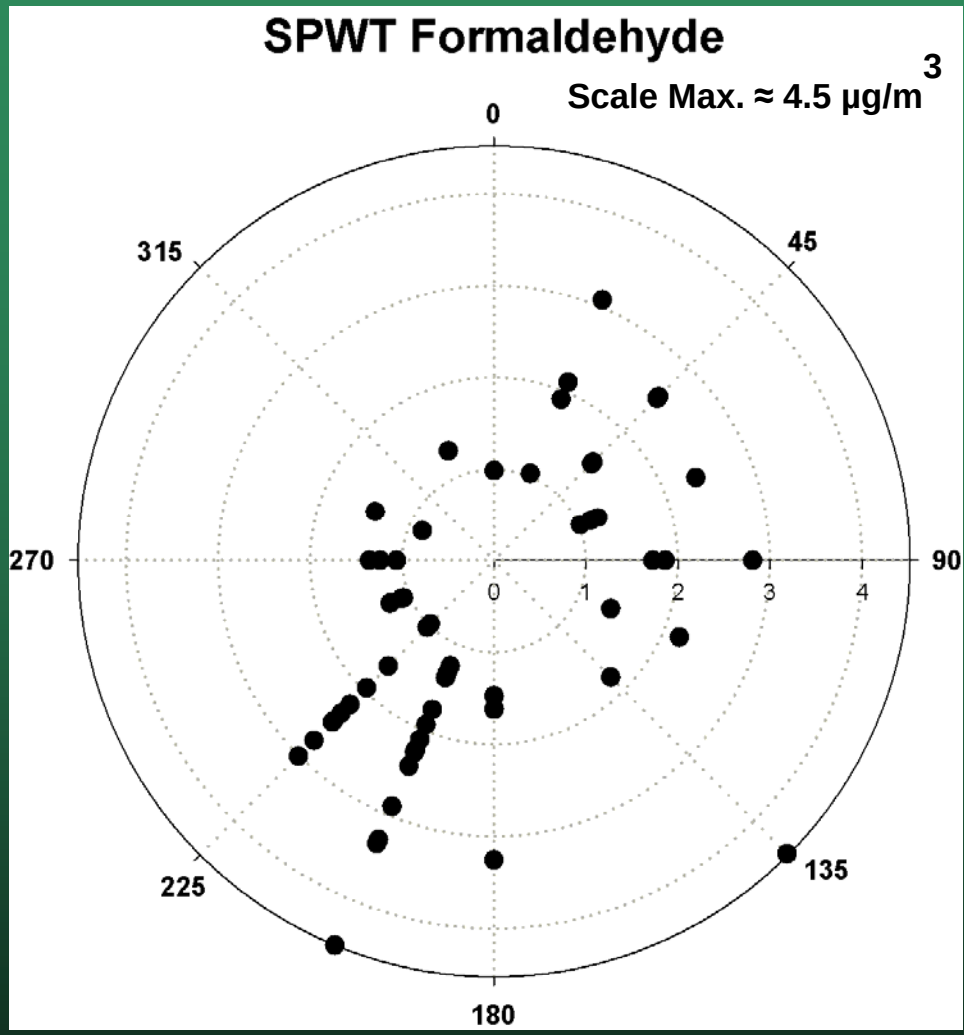
45
90
135
180
225
270
315
2
4
6
8
10
12
14


SPWT Formaldehyde
Scale Max. ≈ 20 µg/m3
0
45
90
135
180
225
270
315
5
10
15
20


SPWT Formaldehyde
Scale Max. ≈ 4.5 µg/m3
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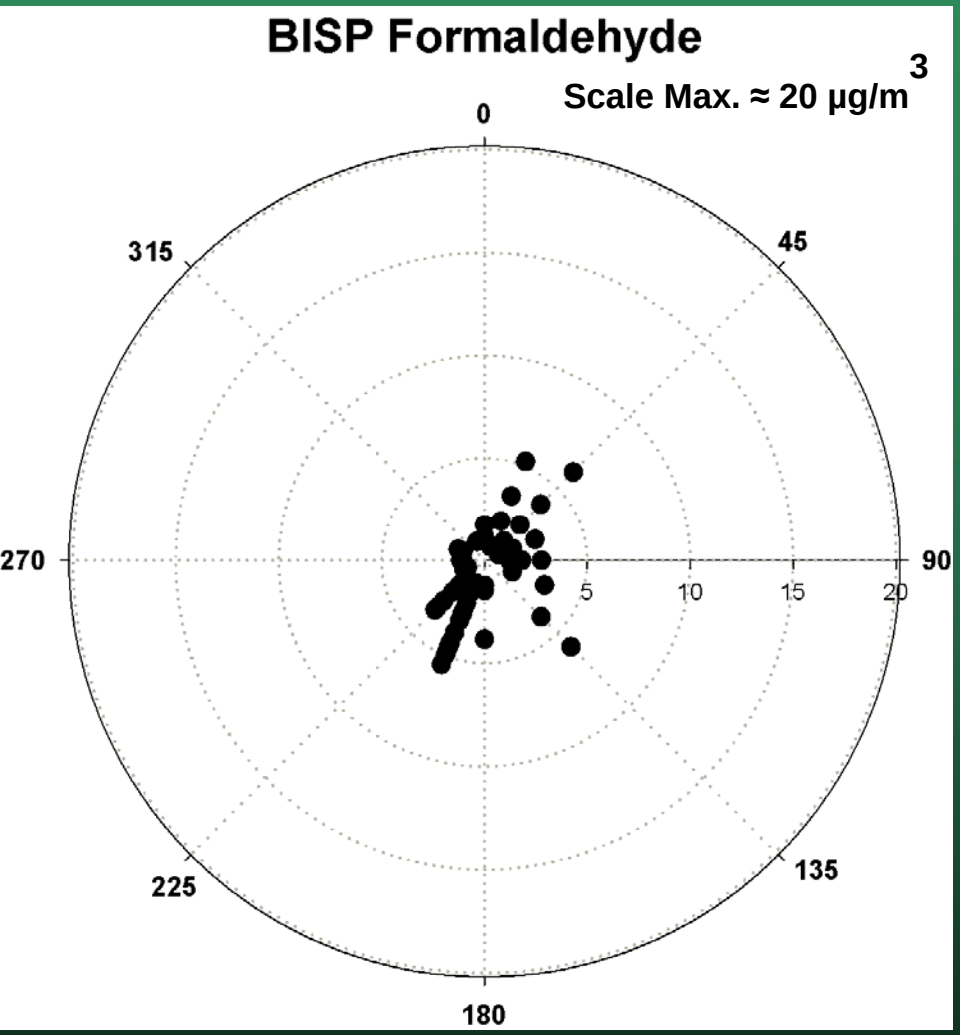
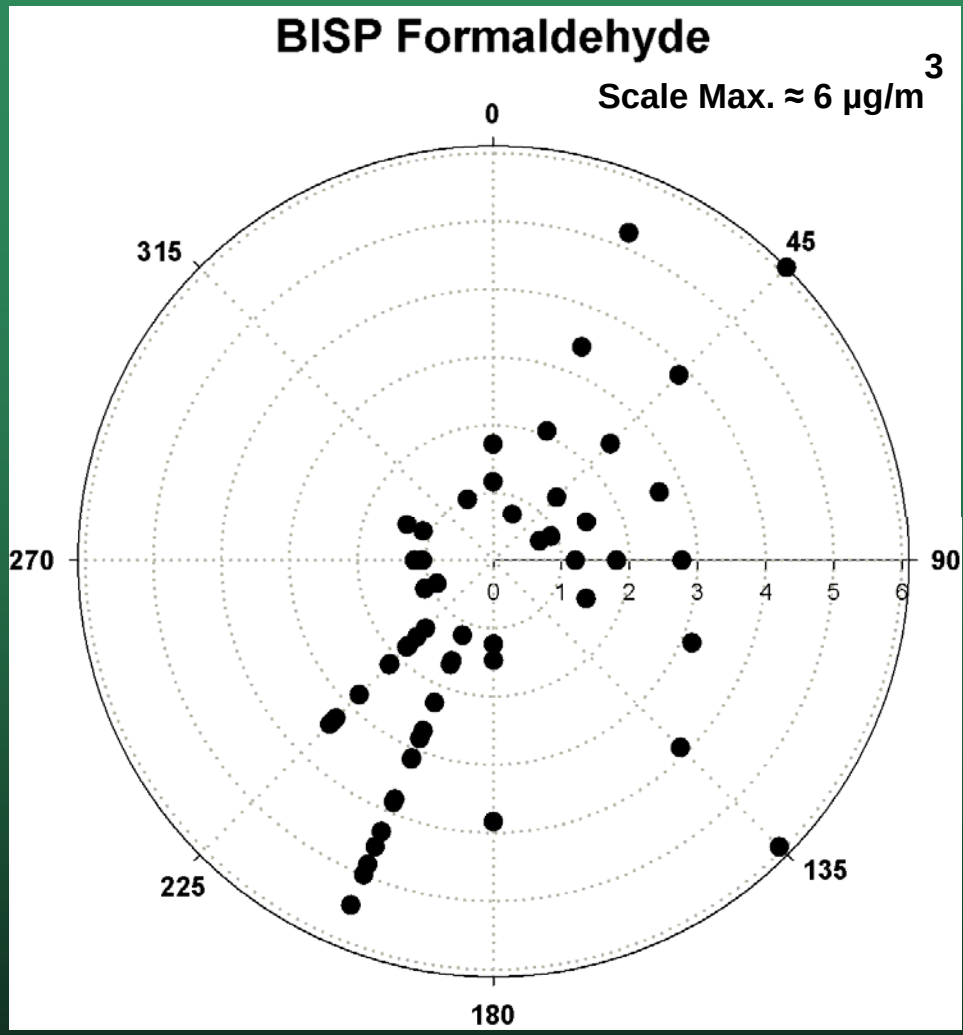
45
90
135
180
225
270
315
0
1
2
3
4


BISP Formaldehyde
Scale Max. ≈ 20 µg/m3
0
45
90
135
180
225
270
315
5
10
15
20


BISP Formaldehyde
Scale Max. ≈ 6 µg/m3
0
45
90
135
180
225
270
315
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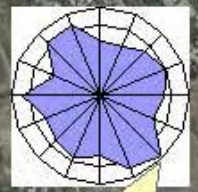
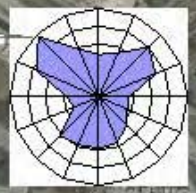
1
2
3
4
5
6

Formaldehyde Pollution Roses

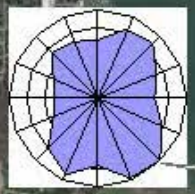


TWA CONC. = 2.9 µg/m3

TWA CONC. = 9.5 µg/m3



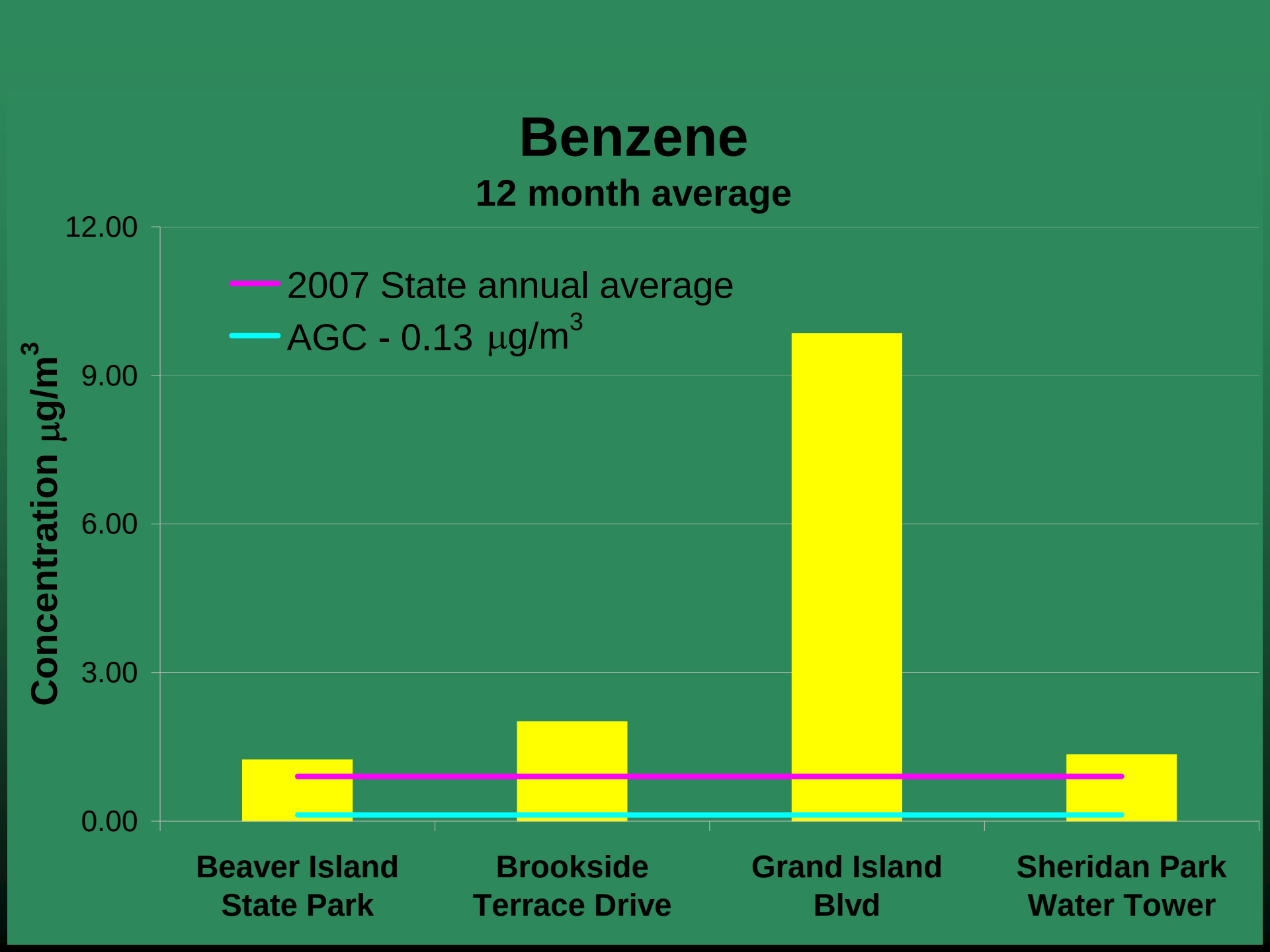
TWA CONC. = 2.5 µg/m3



TWA CONC. = 3.2 µg/m3

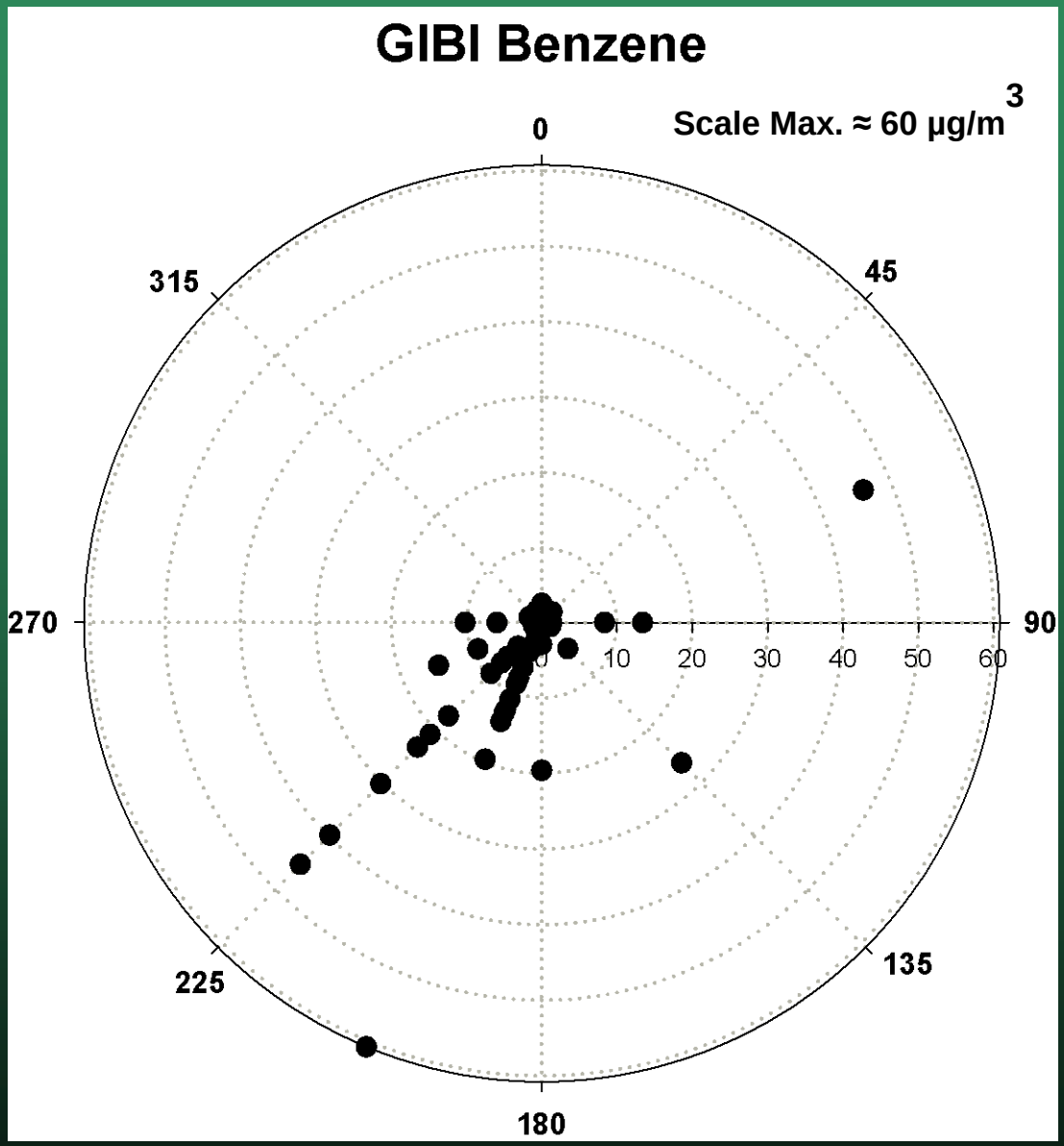
Benzene

12 month average



Benzene Sources

- Manmade sources include:
  - Tobacco smoke
  - Motor vehicle
  - Oil and natural gas production
  - Petroleum refining & distribution
  - Burning coal, oil and gas
  - Gasoline service stations
  - Coke ovens and coal chemical manufacturing
  - Rubber tire manufacturing
  - Storage or transport of benzene
- Natural sources
  - Emissions from wildfires


GIBI Benzene
Scale Max. ≈ 60 µg/m3
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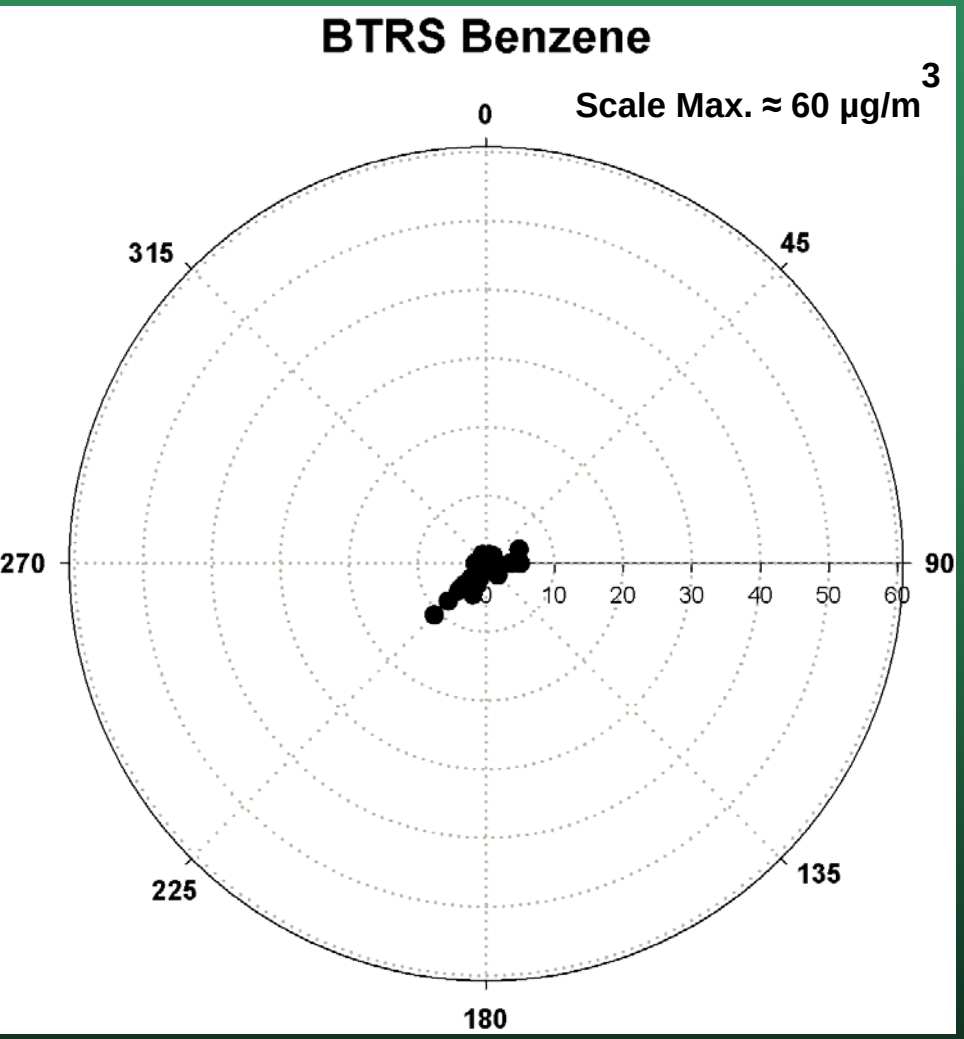
45
90
135
180
225
270
315
10
20
30
40
50
60


BTRS Benzene
Scale Max. ≈ 60 µg/m3
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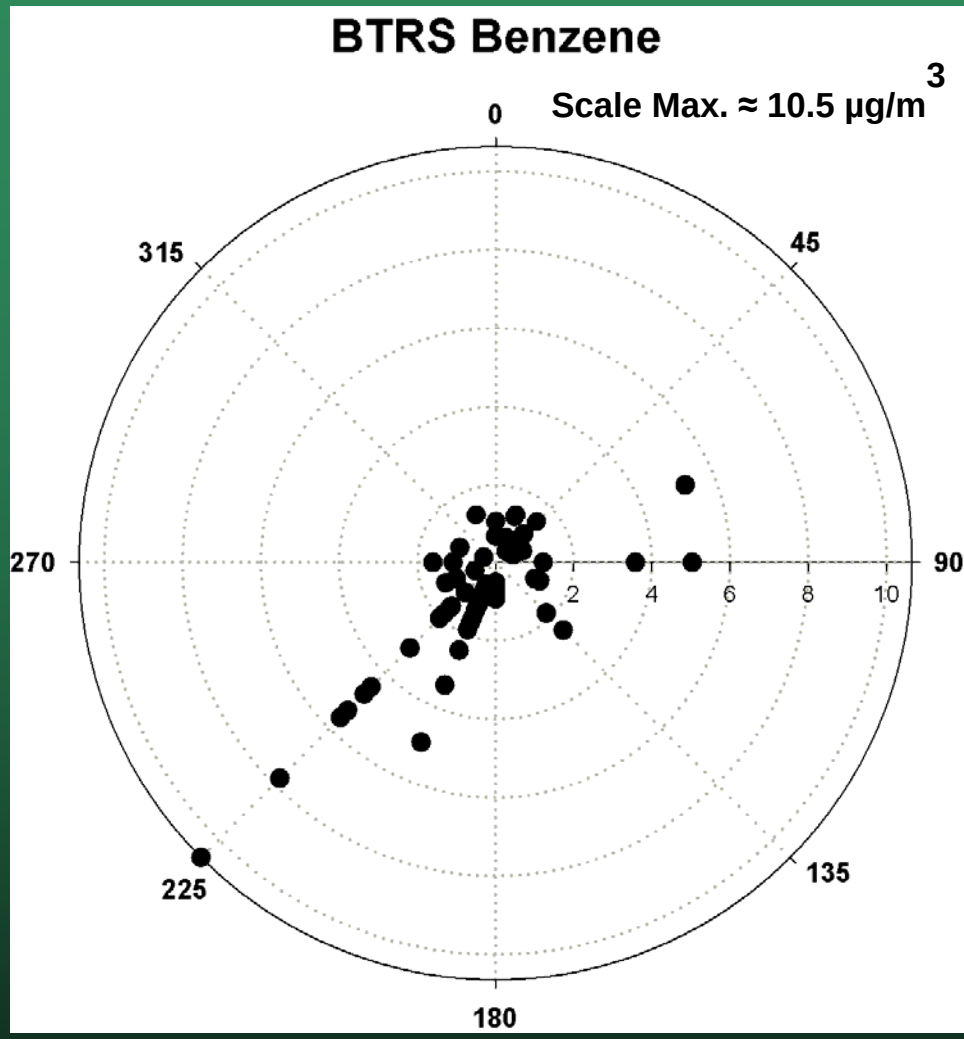
60


BTRS Benzene
Scale Max. ≈ 10.5 µg/m3
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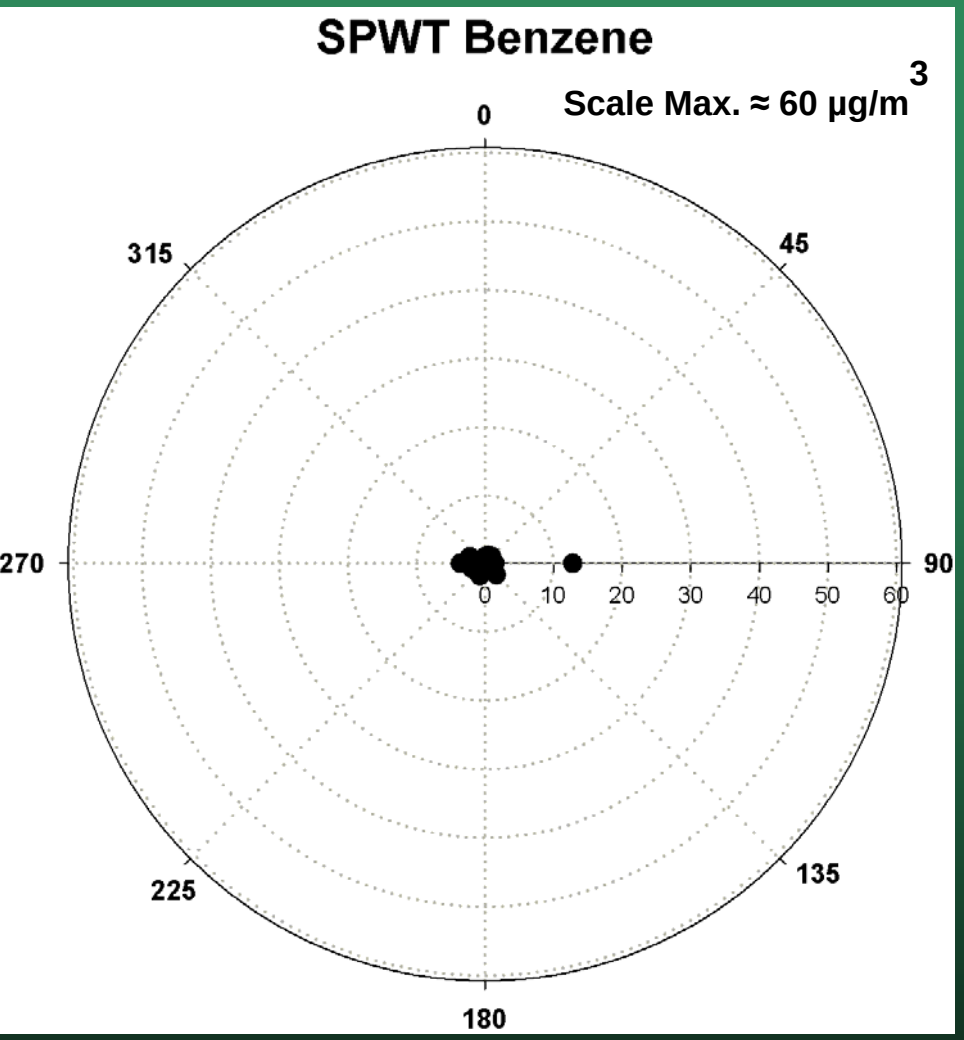
45
90
135
180
225
270
315
2
4
6
8
10


SPWT Benzene
Scale Max. ≈ 60 µg/m3
0
45
90
135
180
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0
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20
30
40
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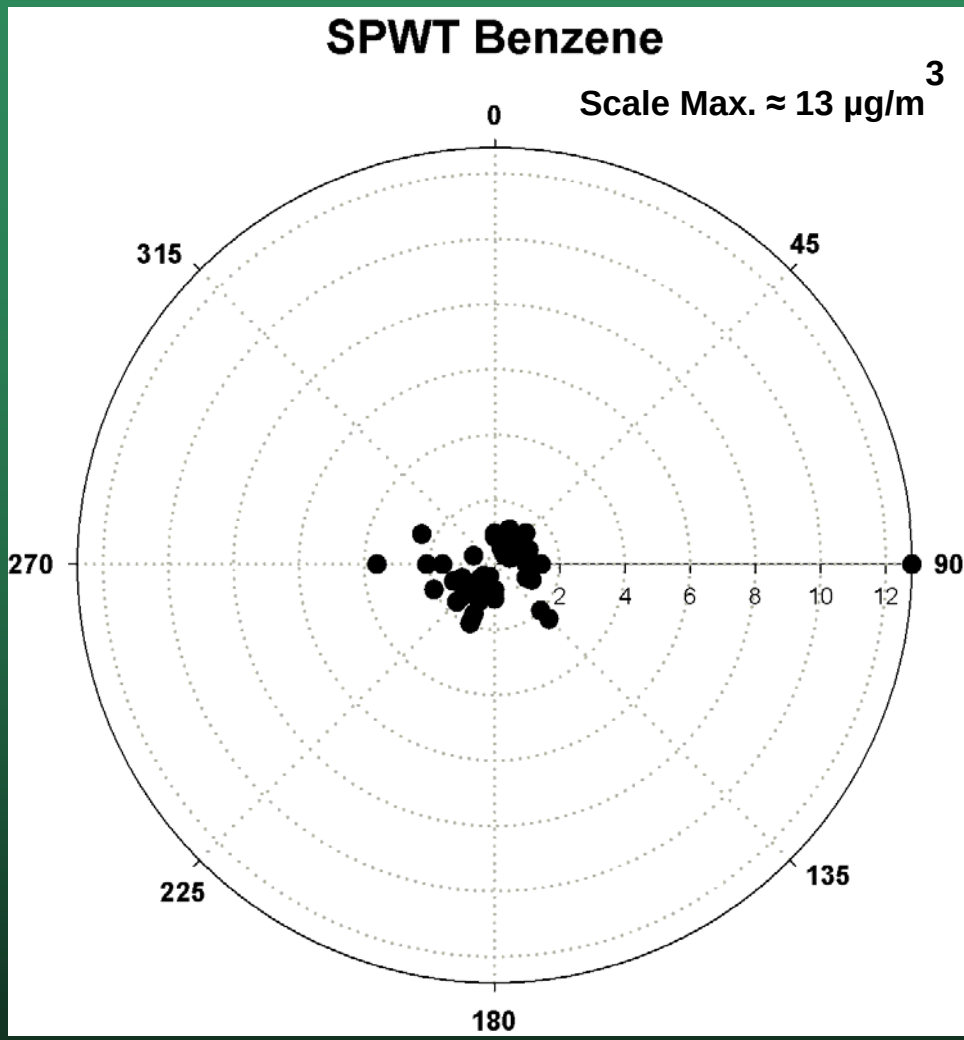
60


SPWT Benzene
Scale Max. ≈ 13 µg/m3
0
45
90
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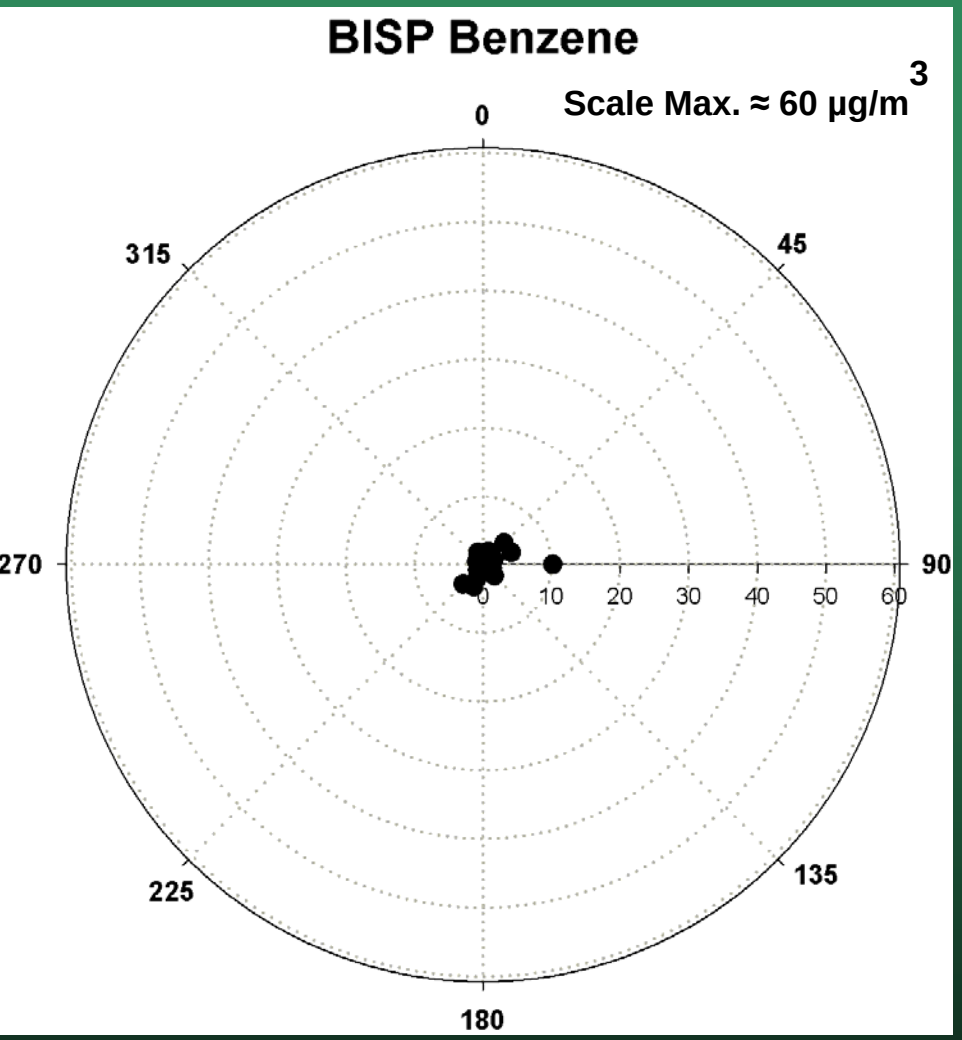
180
225
270
315
2
4
6
8
10
12


BISP Benzene
Scale Max. ≈ 60 µg/m3
0
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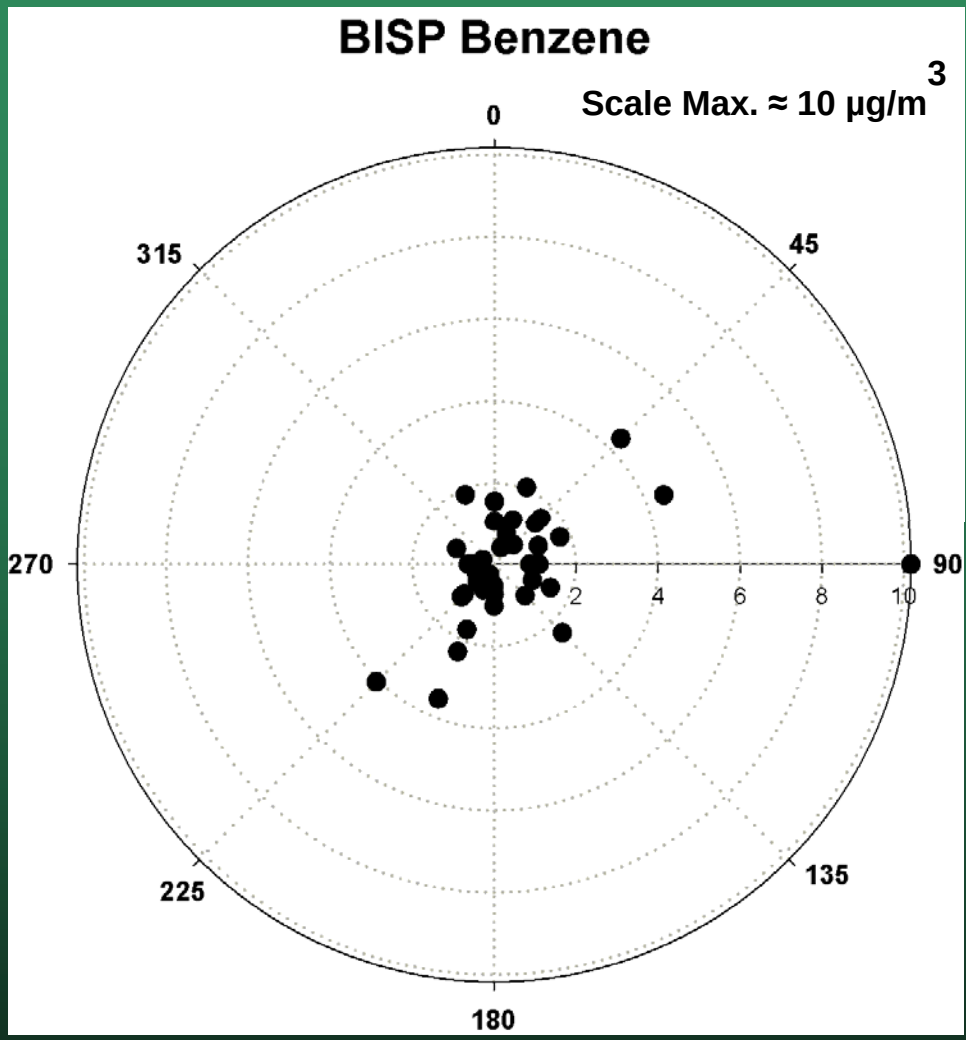
BISP Benzene
Scale Max. ≈ 10 µg/m3
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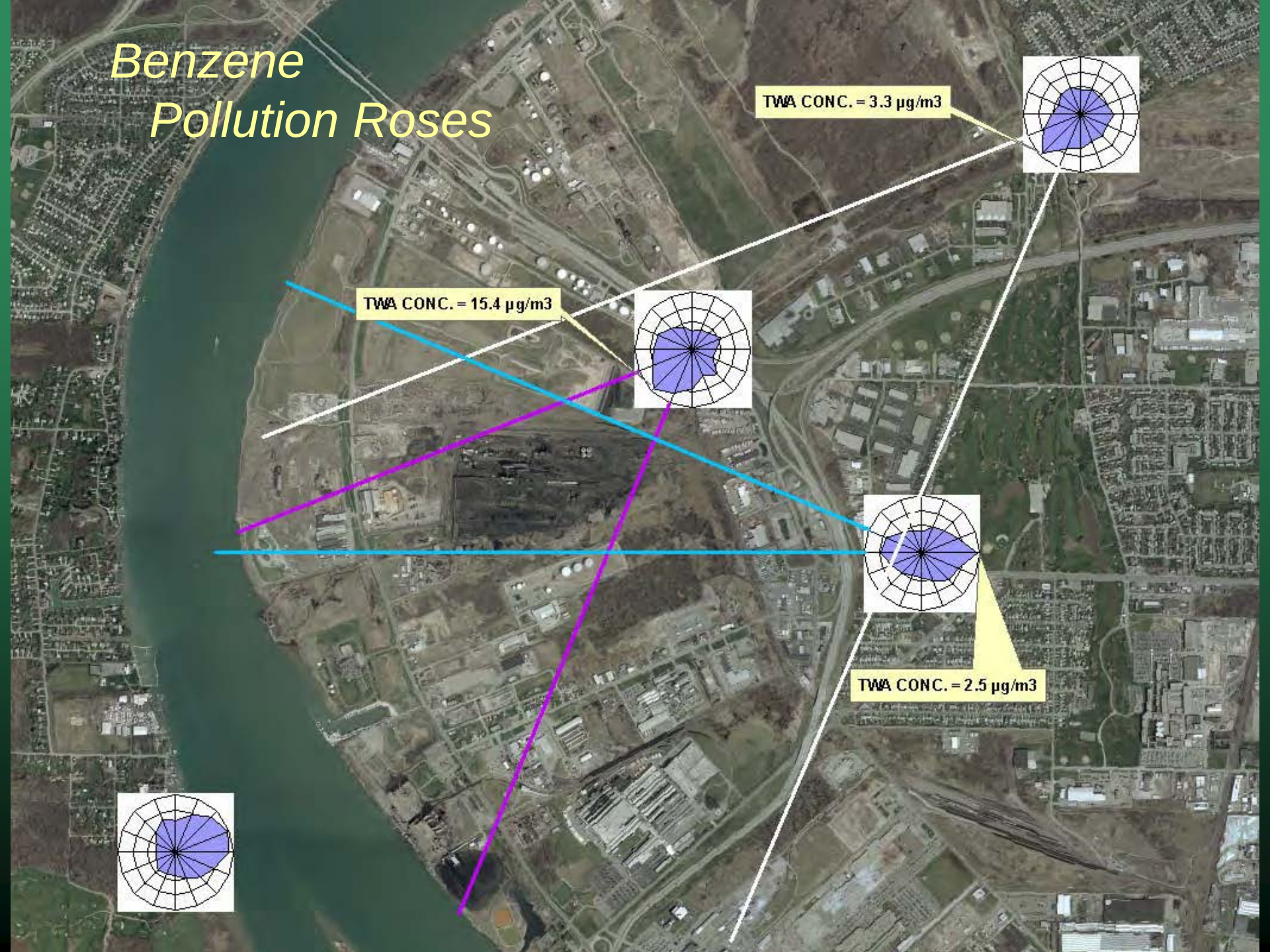
Benzene Pollution Roses

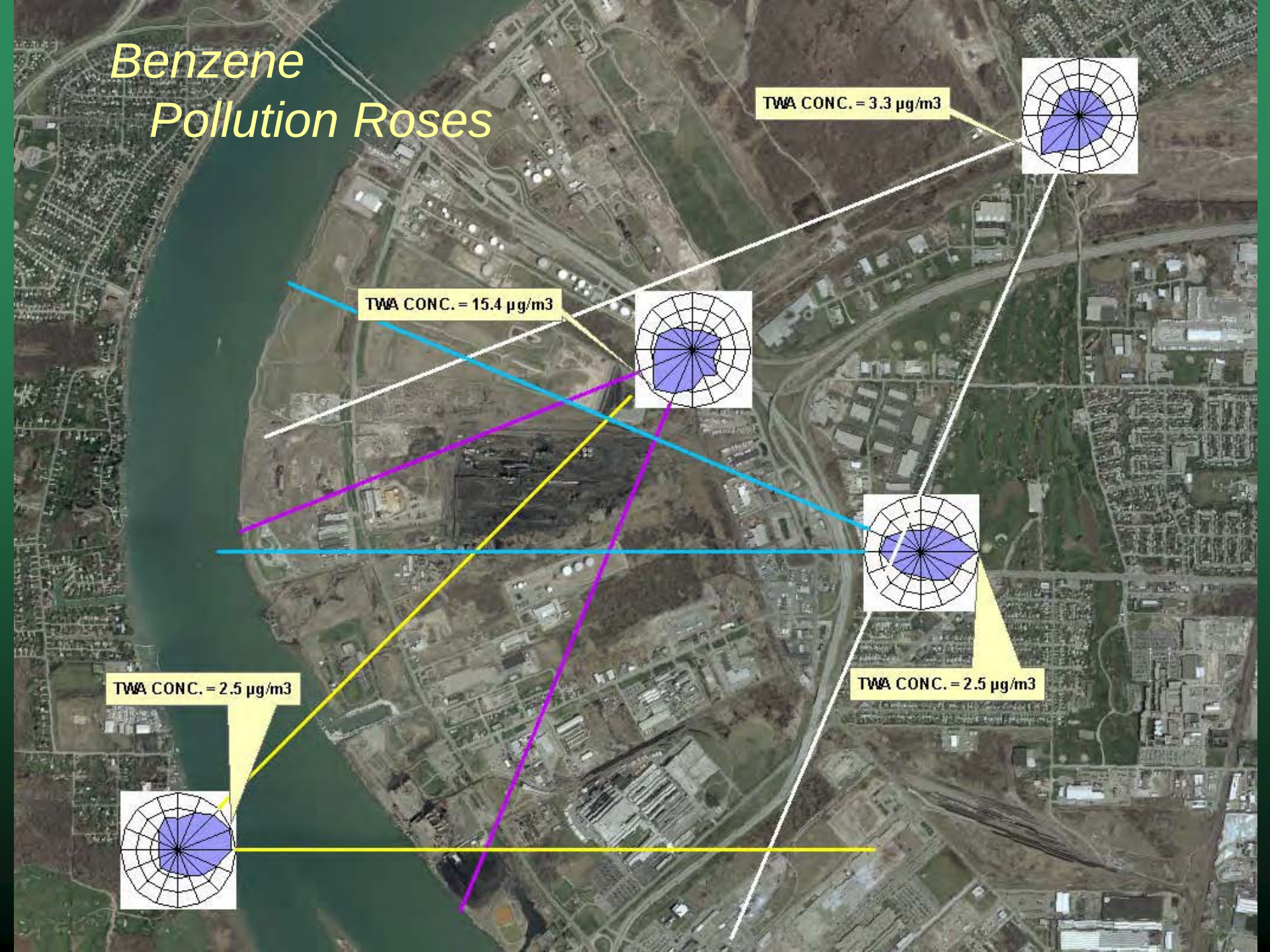
Benzene Pollution Roses

Benzene Pollution Roses

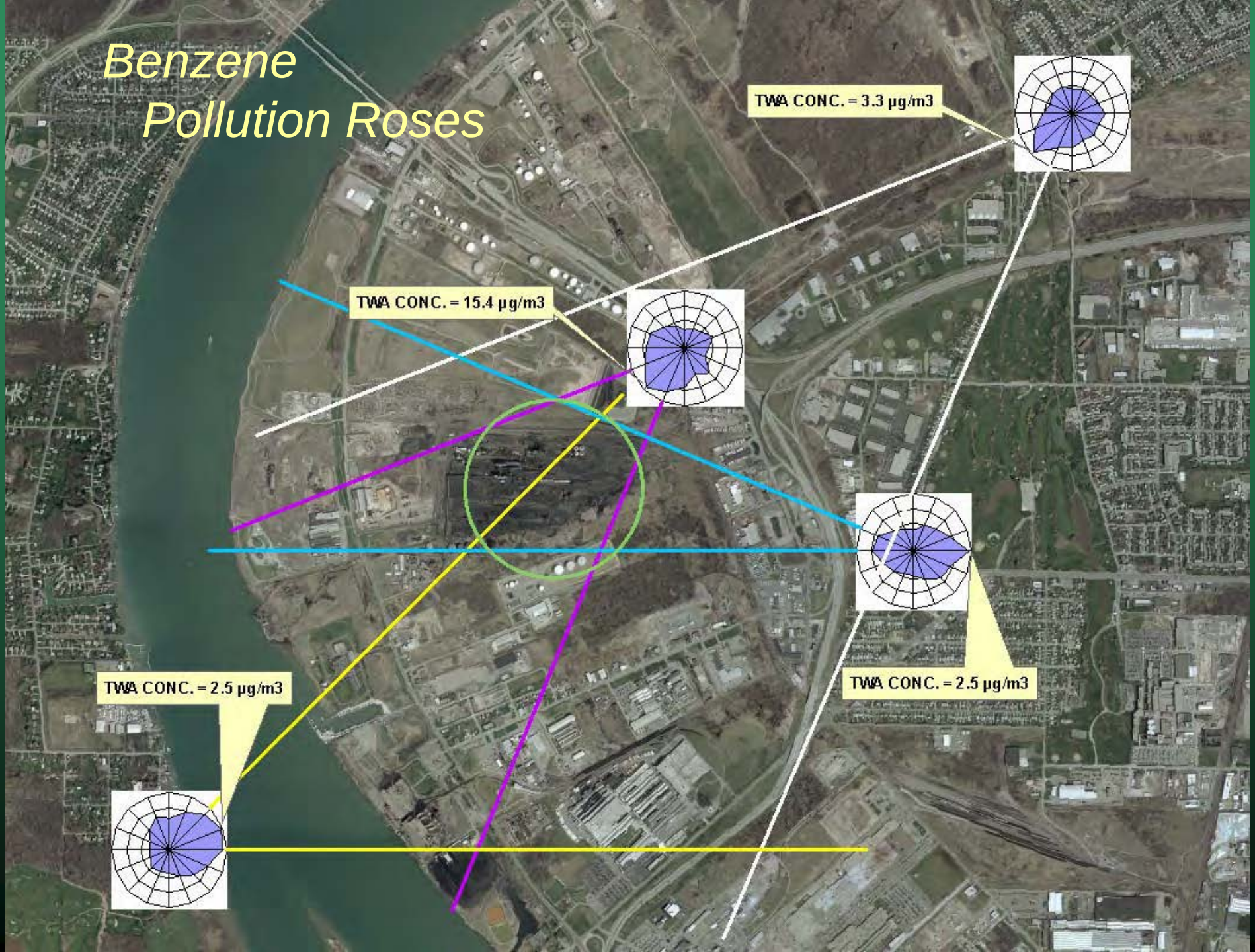
Benzene Pollution Roses



Benzene Pollution Roses



Benzene Pollution Roses



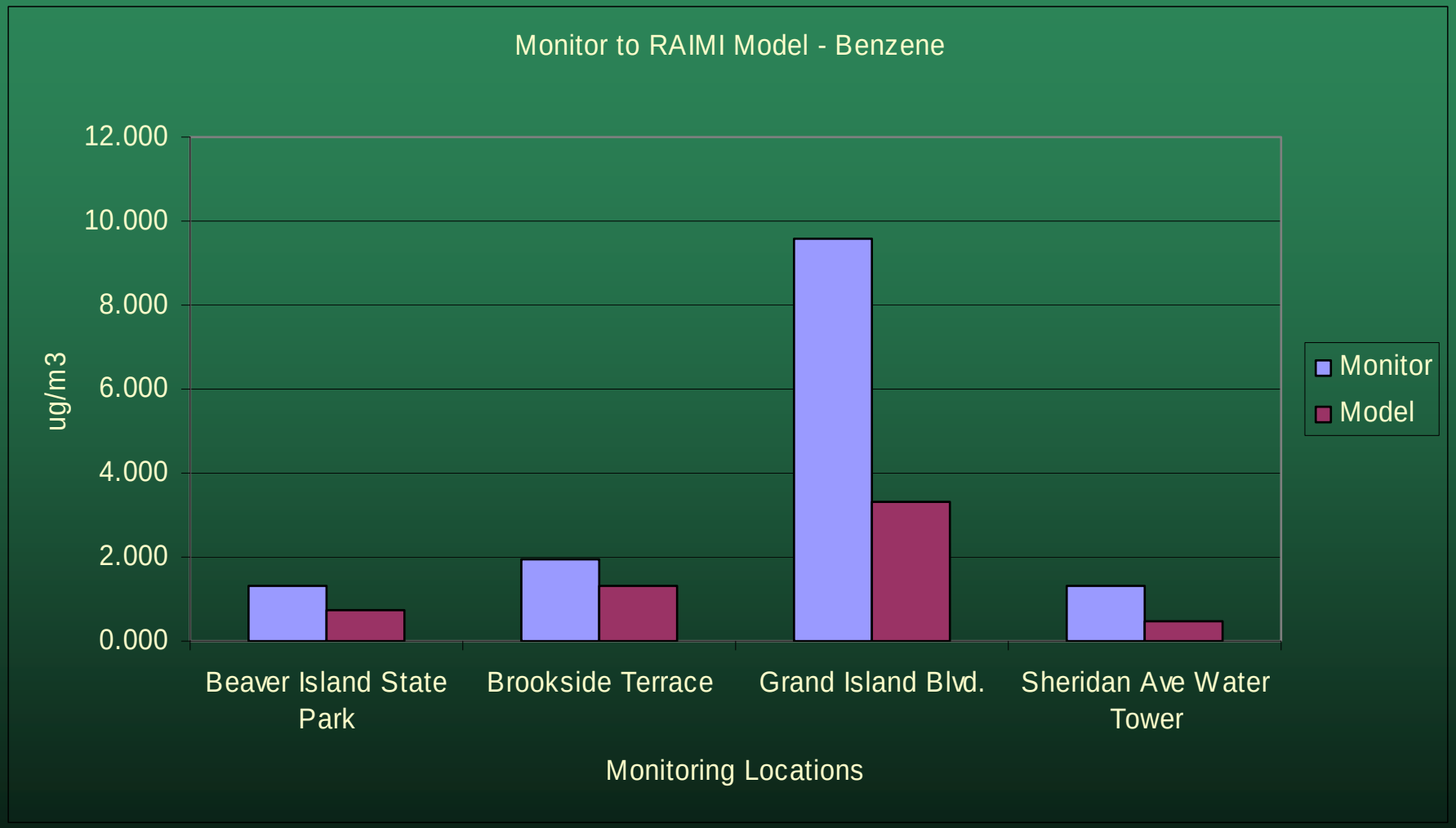
Air Dispersion Models

- A tool for predicting ambient air concentrations from facilities;
- Cost effective – can't measure everything everywhere;
- Two levels of models
  - Screening
  - Refined

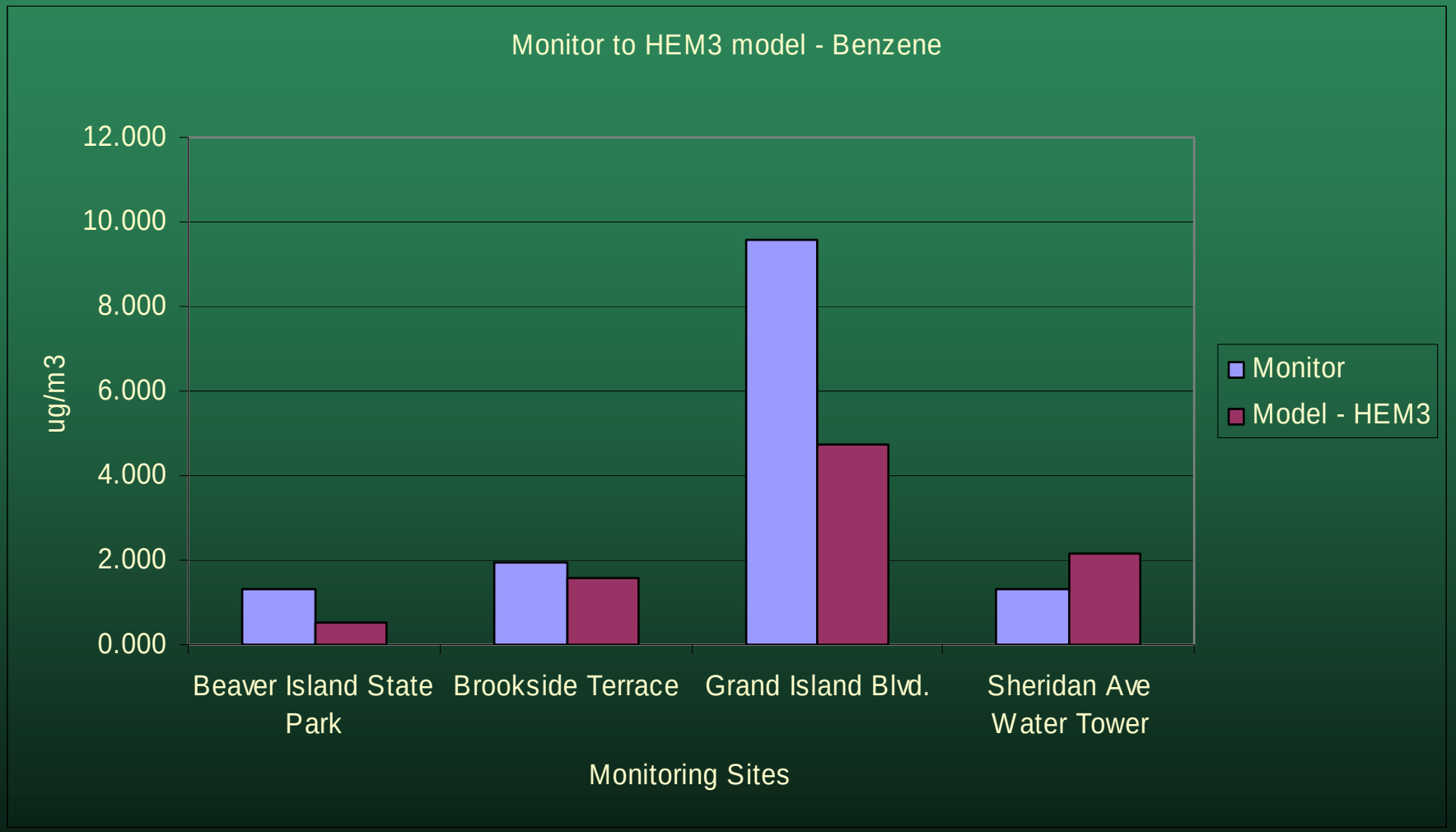
Measured to Model Comparisons

- Human Exposure Model 3 (HEM3) – AERMOD
- Regional Air Impact Modeling Initiative – ISCST3

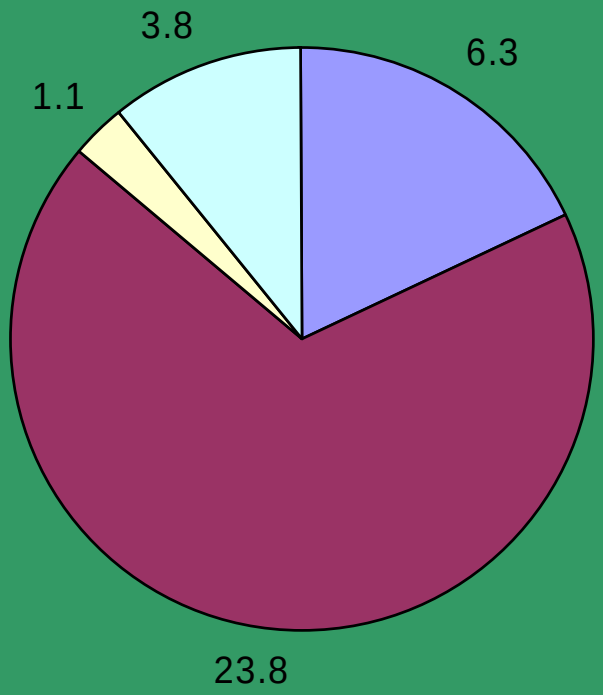
Measured to Modeled - RAIMI



Measured to Modeled – HEM3

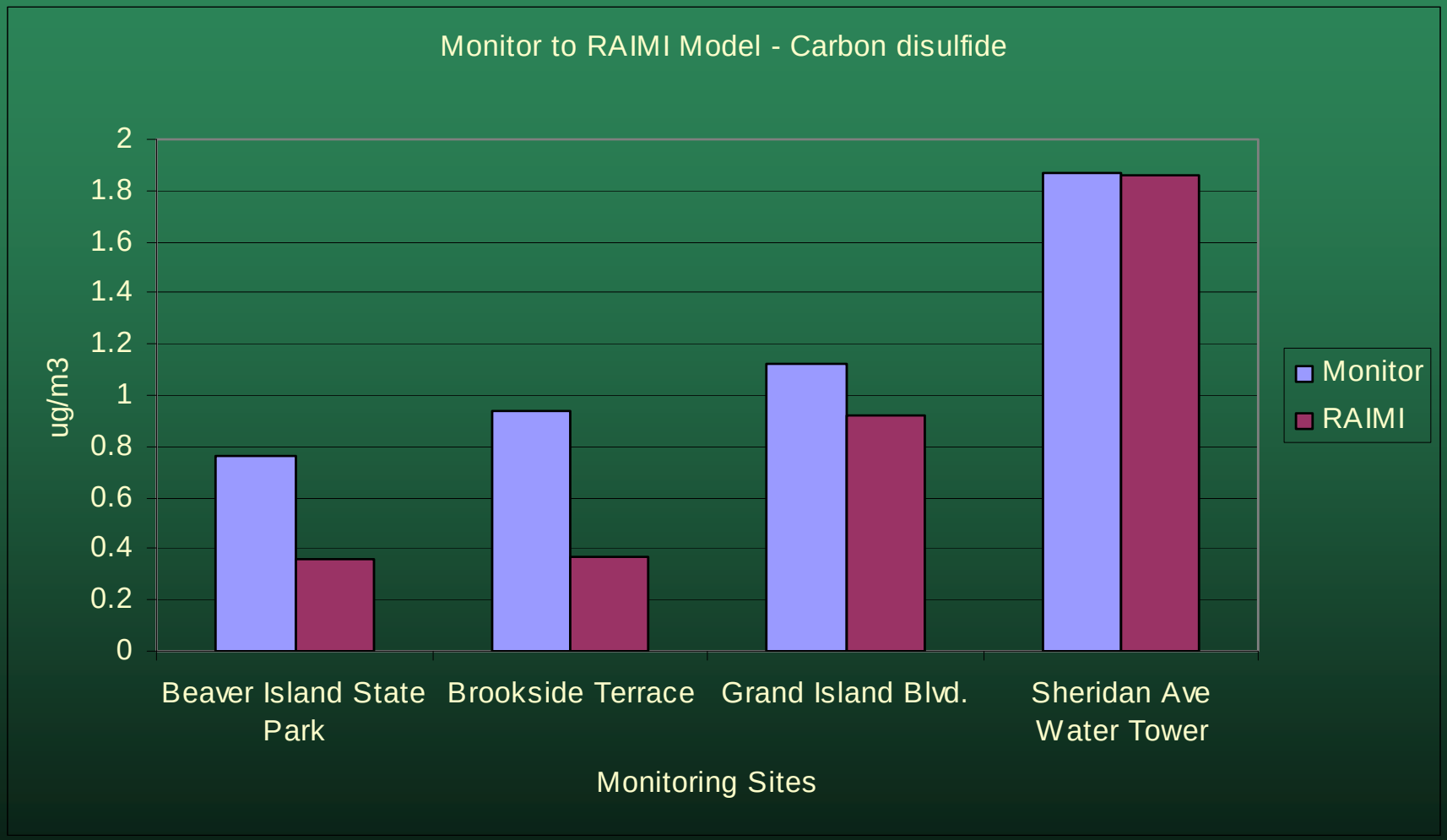


Benzene Emissions - Tons per year
Tonawanda Community Area



Mobile emissions calculated from air pollution model, Mobile6
Major includes Title V permitted point sources
Minor includes State Facility and Registered point sources
Area includes landfills, sewage treatment plants and gas stations

Measured to Modeled – RAIMI



EPA Coke Oven Residual Risk Assessment (2005)

- Assessed non-cancer and cancer risk of emissions from all operations (battery emissions, by-product plant, pushing fugitives and quenching) at Tonawanda Coke Corporation;
- Part 63 NESHAP Subpart L for Coke Oven Batteries (1993) addressed emissions from charging, and leaks from doors, lids and off-takes.

EPA Coke Oven Residual Risk Assessment (2005)

- Part 63 NESHAP Subpart CCCCC for Coke Ovens: Pushing, Quenching and Battery Stacks (2003);
- Part 61 NESHAP Subpart L for Benzene from Coke Oven By-Product Recovery Plants (1989).

EPA Coke Oven Residual Risk Assessment (2005)

- No non-cancer risk identified in community;
- Identified maximum cancer risk of 100 x 10^{-6} in community around Tonawanda Coke;
- Cancer risk drivers were benzene and benzene soluble organics (BSO) – coke oven emissions;
- Modeled Emissions - 15.3 tons of benzene, 4.98 tons of BSO;
- Identified limitation about the lack of monitoring data around any of the 4 facilities.
- End Result – adoption of lowest achievable emission rate for coke oven batteries.

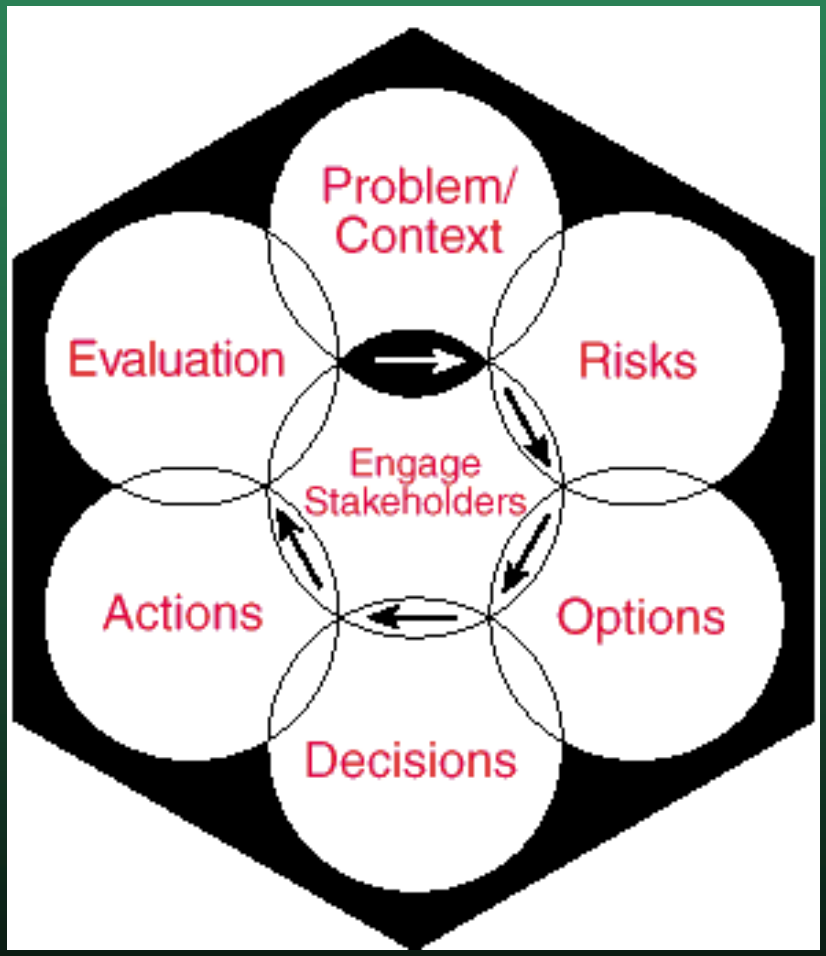
EPA Coke Oven Residual Risk Assessment (2005) Check

- **Non-cancer** inhalation risk screen for benzene (hazard quotient (HQ) = 0.2)
- GIBI monitor (HQ = 0.3)
- Other monitoring sites (HQ < 0.1)

EPA Coke Oven Residual Risk Assessment (2005) Check

- Maximum benzene cancer risk predicted from Tonawanda Coke was 50×10^{-6}
- GIBI benzene cancer risk measured 75×10^{-6}
- BTRS benzene cancer risk measured 16×10^{-6}

Framework of Risk Management for Community Air Quality Decisions



Contact

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- Questions about Tonawanda Study Report
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