Atmospheric Mercury Measurements at Canadian IADN Sites

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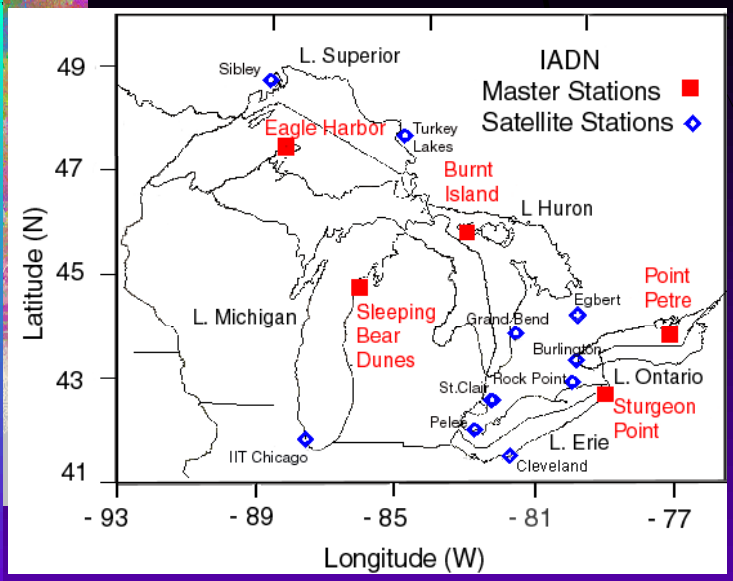
Environment Canada

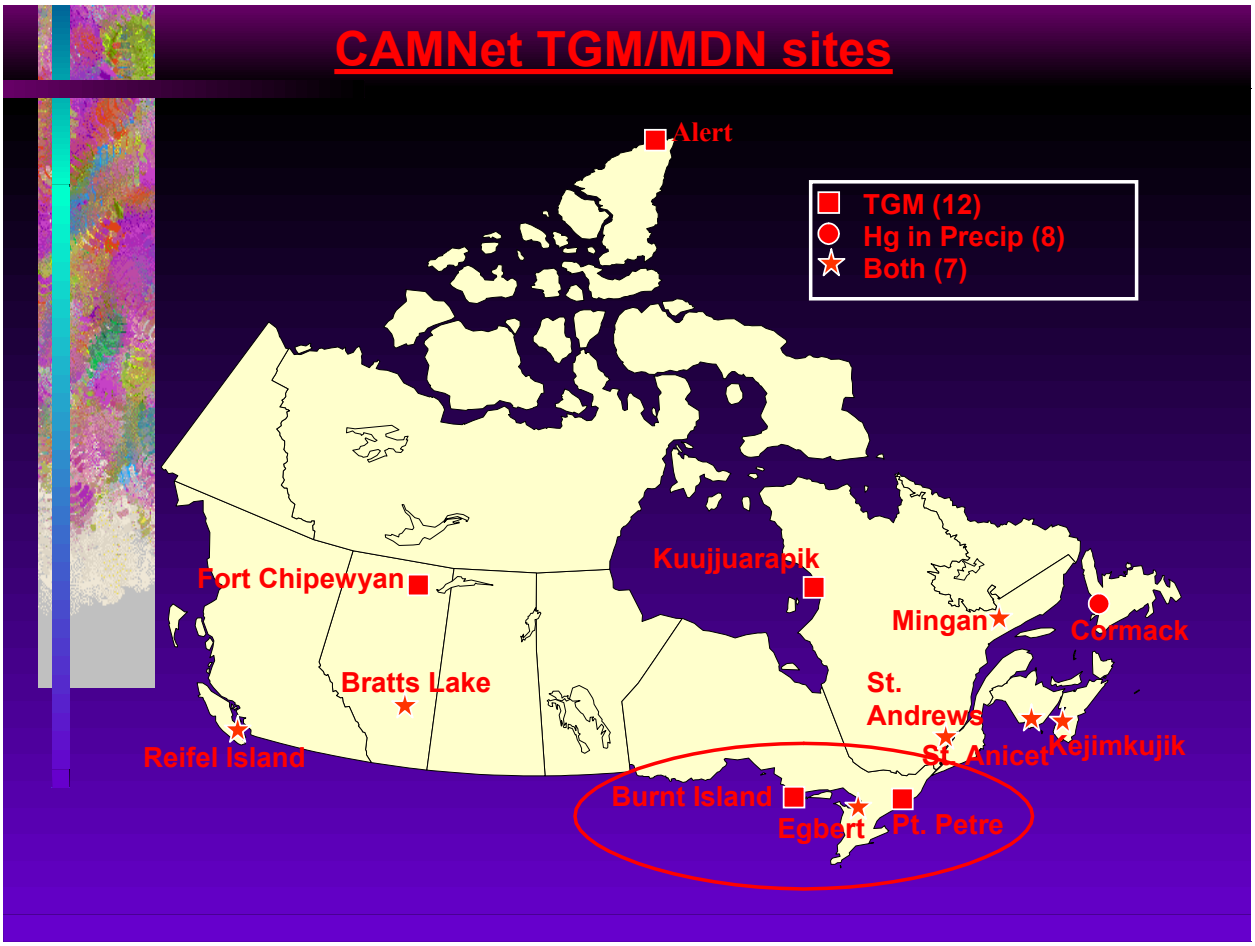
Mercury at IADN Stations



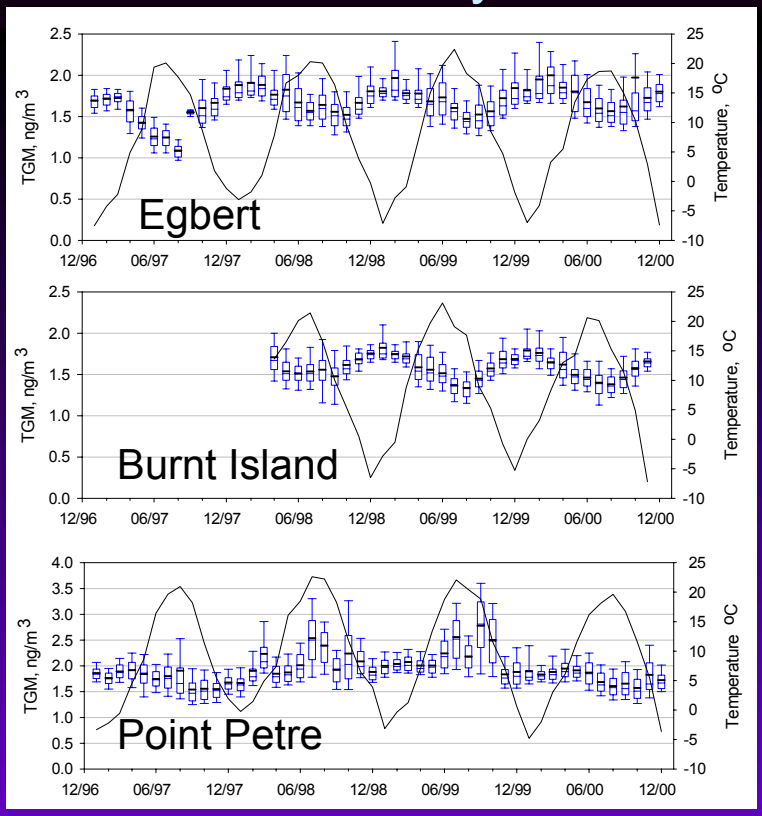
- Spatial, temporal Hg variability in air and precipitation (MDN) on a regional/national basis (CAMNet).

- To improve the current understanding of the atmospheric transport, transformation and removal processes for mercury.

CAMNet TGM/MDN sites



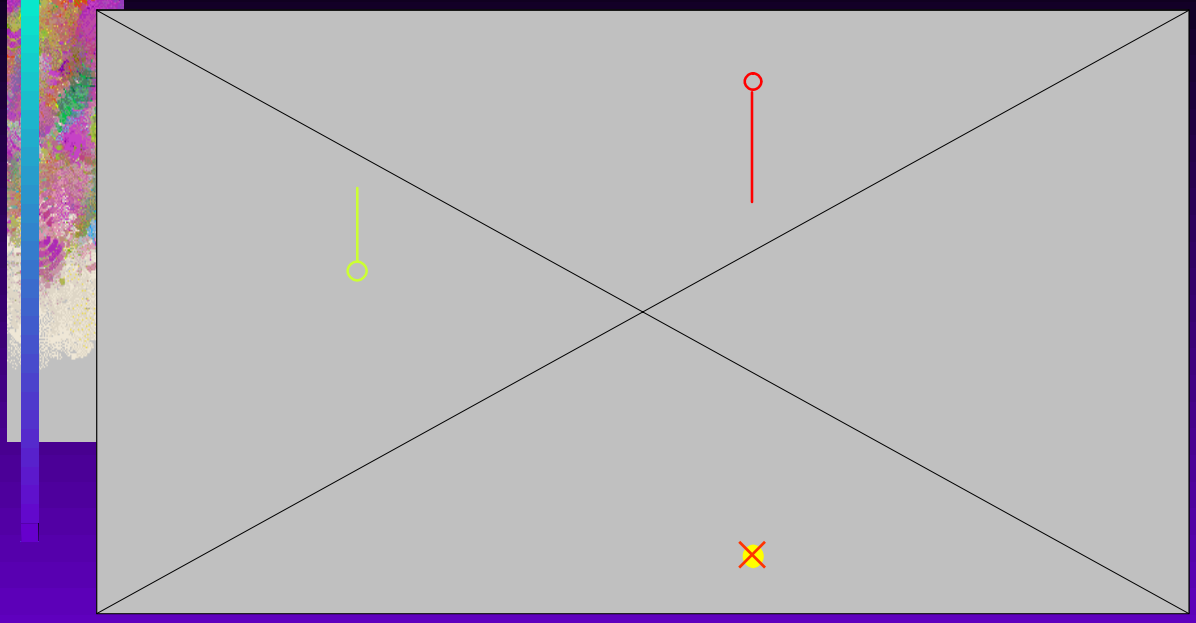
Total Gaseous Mercury Seasonal Cycle



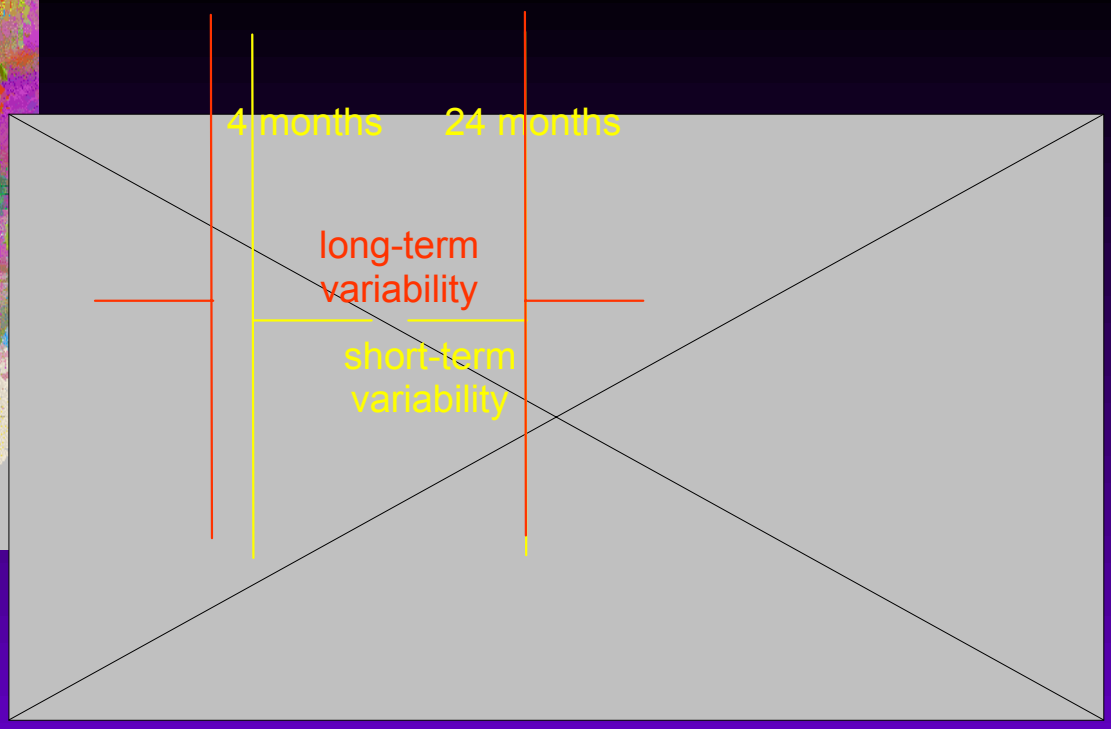
Blanchard et al., 2002, Atmos. Environ., 36, 3735-3743.

Temporal Trend Technique (DF)

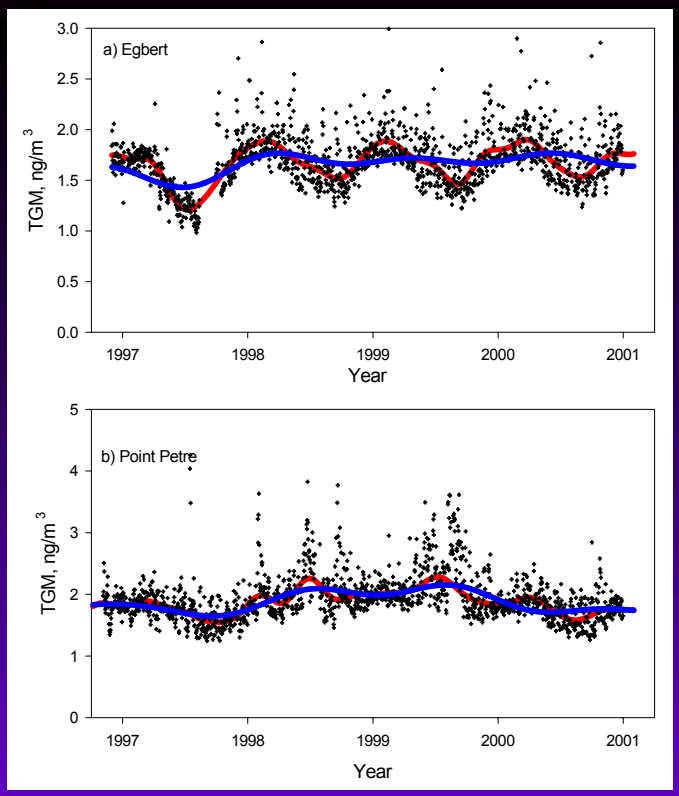
(Nakazawa et al., 1997)



Temporal Trend Technique (DF)...con't

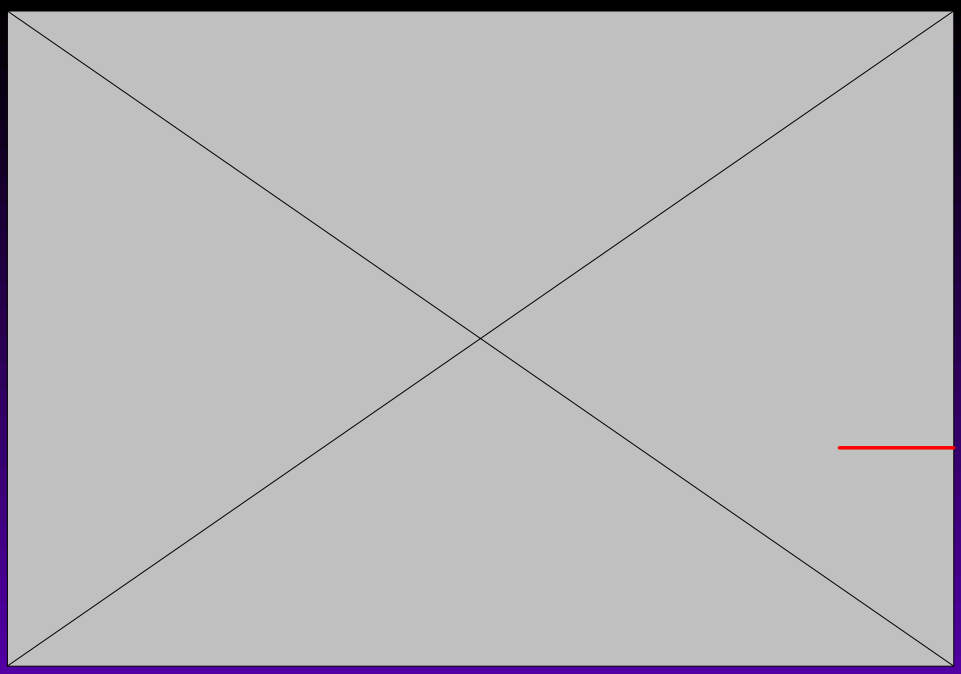


Total Gaseous Mercury Atmospheric Trends



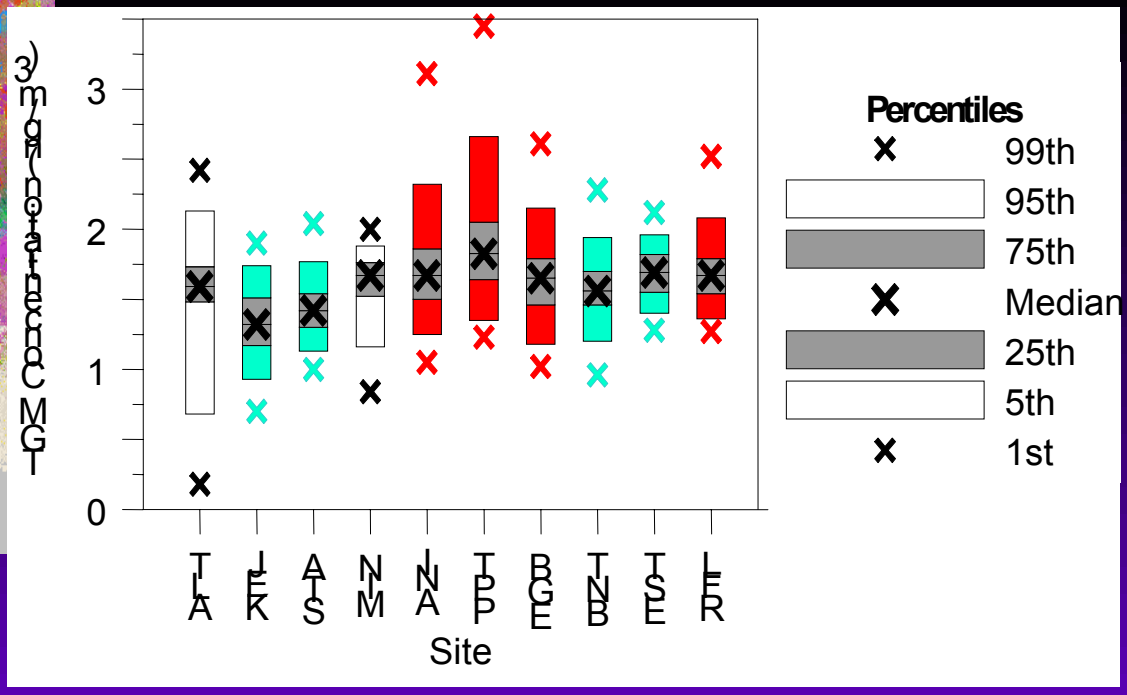
Blanchard et al., 2002, Atmos. Environ., 36, 3735-3743.

Mercury Emission Trends in Canada



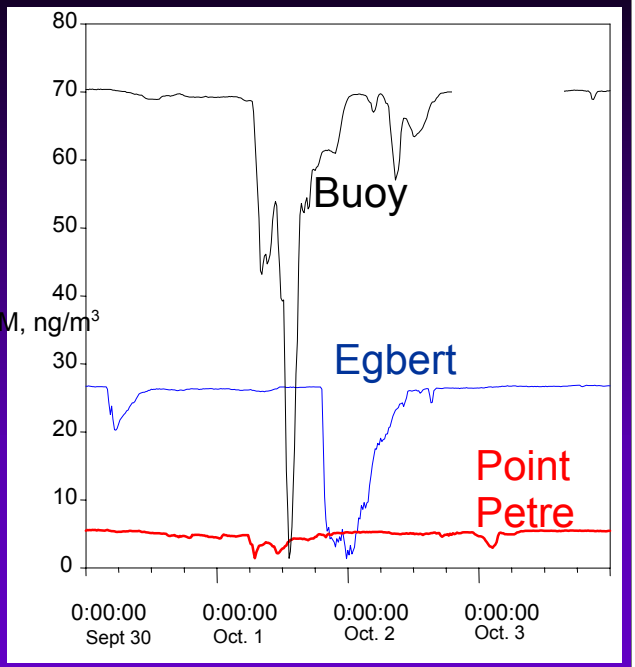
Courtesy: Pollution Data Branch, Environment Canada, Ottawa

Total Gaseous Mercury across Canada



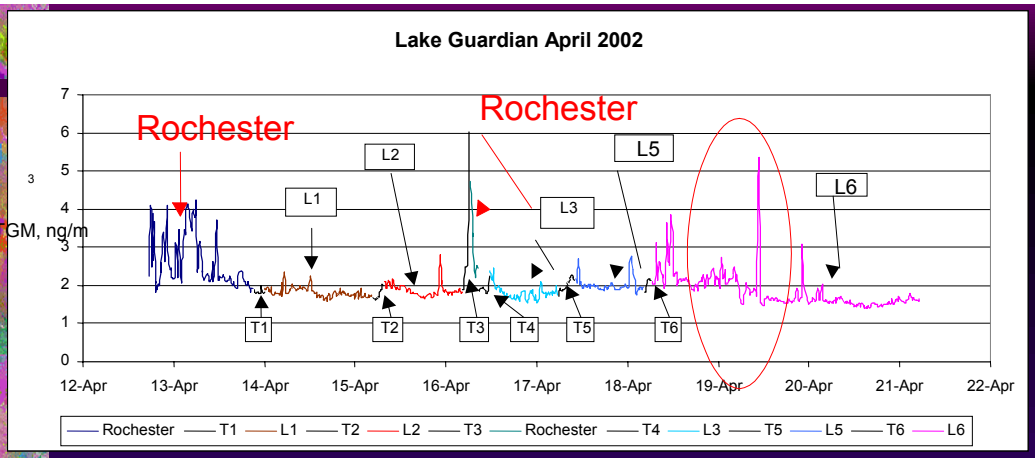
Kellerhals et al., 2003, Atmos. Environ., 37, 1003-1011

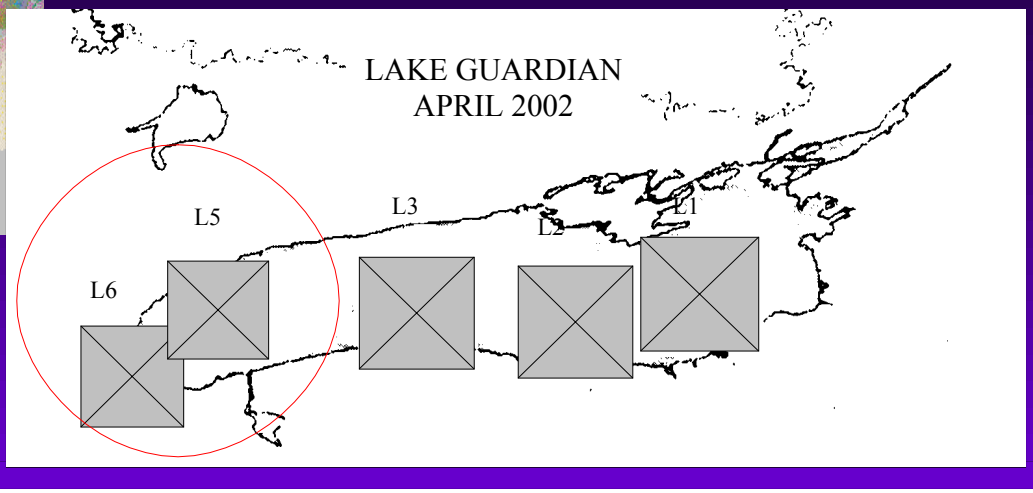
Large TGM Concentrations near Urban Centers (ECO buoy)

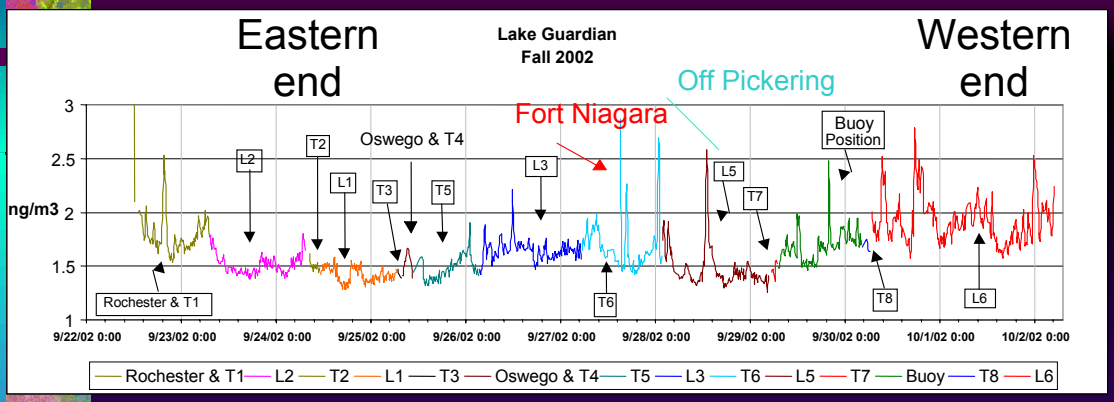


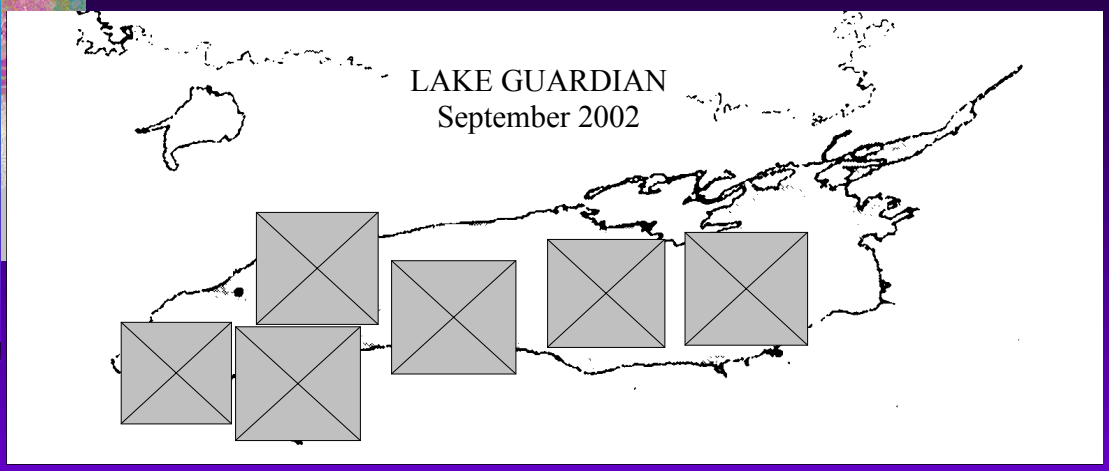
Lake Ontario Atmospheric Deposition Study (LOADS)

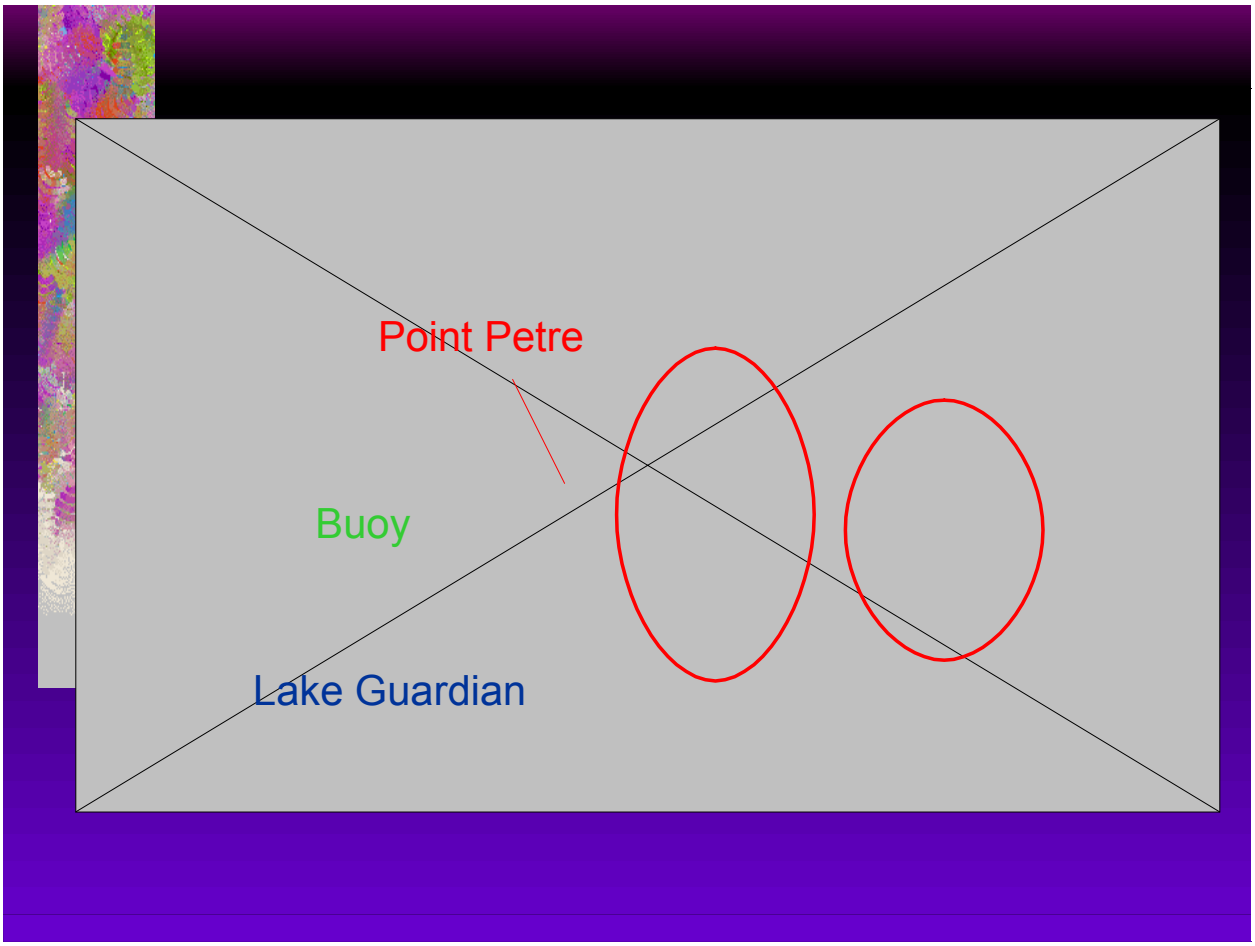
- Summer 2002, Spring and Fall cruises
- Led by EPA Region 2 and Clarkson University
- Deposition of mercury, PCBs, DDE, mirex, HCB, dioxins and furans
- Estimate Loadings to Lake Ontario
- Differences over lake-over land
- Urban influence
- Source apportionment


Lake Guardian April 2002
Rochester
Rochester
L1
L2
L3
L5
L6
T1
T2
T3
T4
T5
T6
TGM, ng/m3
0
1
2
3
4
5
6
7
12-Apr
13-Apr
14-Apr
15-Apr
16-Apr
17-Apr
18-Apr
19-Apr
20-Apr
21-Apr
22-Apr
Rochester
T1
L1
T2
L2
T3
Rochester
T4
L3
T5
L5
T6
L6


LAKE GUARDIAN
APRIL 2002
L5
L3
L2
L1
L6


Eastern end
Lake Guardian
Fall 2002
Western end
Off Pickering
Fort Niagara
Oswego & T4
Buoy Position
ng/m3
3
2.5
2
1.5
1
L2
T2
L1
T3
T5
L3
L5
T7
T6
T8
L6
Rochester & T1
9/22/02 0:00
9/23/02 0:00
9/24/02 0:00
9/25/02 0:00
9/26/02 0:00
9/27/02 0:00
9/28/02 0:00
9/29/02 0:00
9/30/02 0:00
10/1/02 0:00
10/2/02 0:00
Rochester & T1 L2 T2 L1 T3 Oswego & T4 T5 L3 T6 L5 T7 Buoy T8 L6


LAKE GUARDIAN
September 2002


Point Petre
Buoy
Lake Guardian

Mercury Speciation at Point Petre

- Started August 2002
- Allows measurements of:
  - RGM: reactive gaseous mercury (Hg^{2+})
  - TPM: Total particulate mercury (Hg_p)
  - TGM: Total gaseous mercury (Hg^0)

Point Petre

TGM

Particulate

RGM

Future Work

- Statistical Analyses of CAMNet and MDN data
- Mercury speciation: RGM/TPM at Point Petre continues
- Participate in LOADS 2003
- Loadings calculations for Lake Ontario comparison to IADN loadings estimates.

Acknowledgements

- Frank Froude and his team at the Centre for Atmospheric Research and Experiments at Egbert, Ontario.
- In particular Chris Green.