

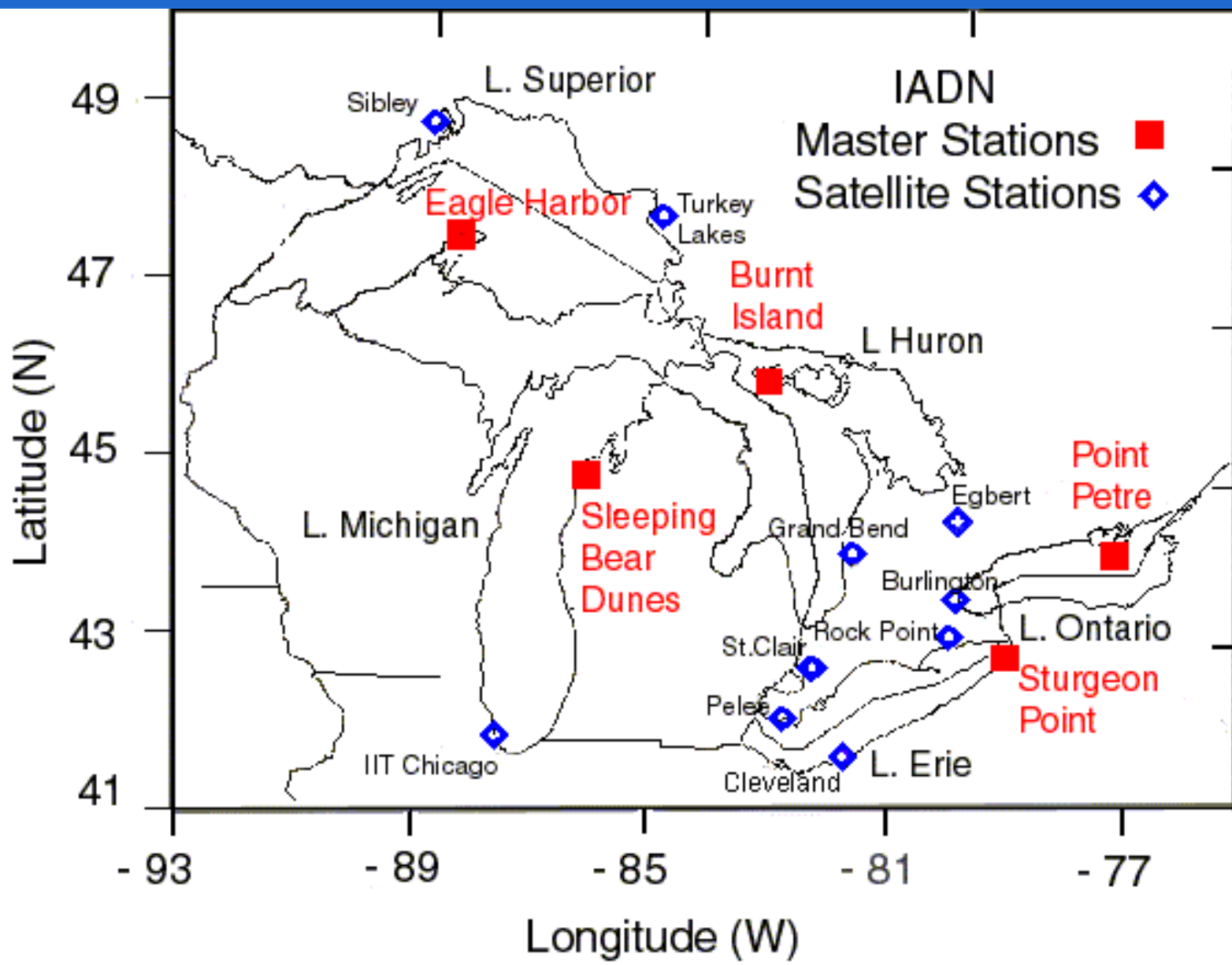
Air Monitoring Data for HCB and BaP



HCB ↓

BaP ↓ (maybe)

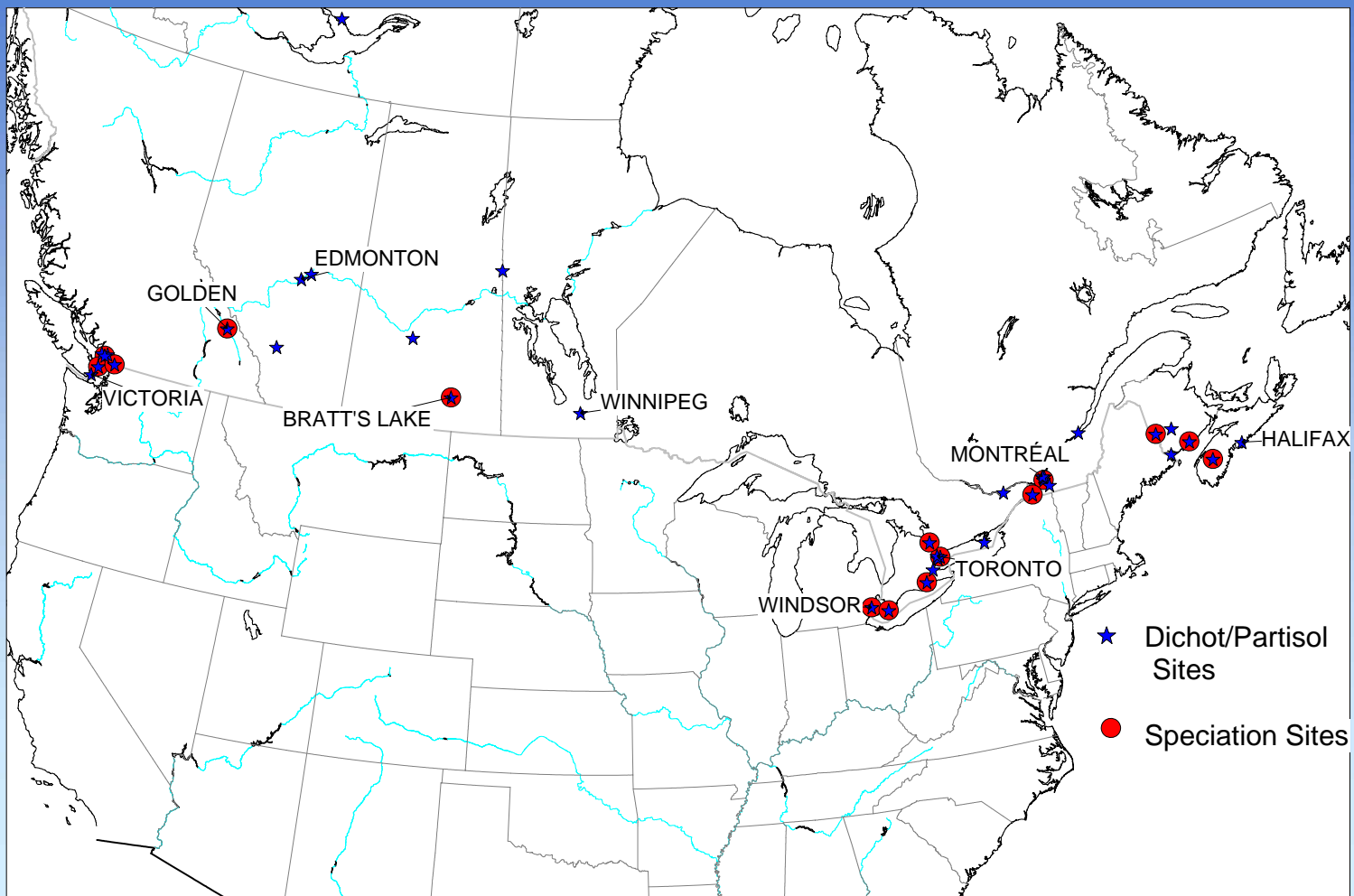
Binational Toxics Strategy Meeting
December 6, 2005
Melissa Hulting



National Air Pollution Surveillance (NAPS) Program

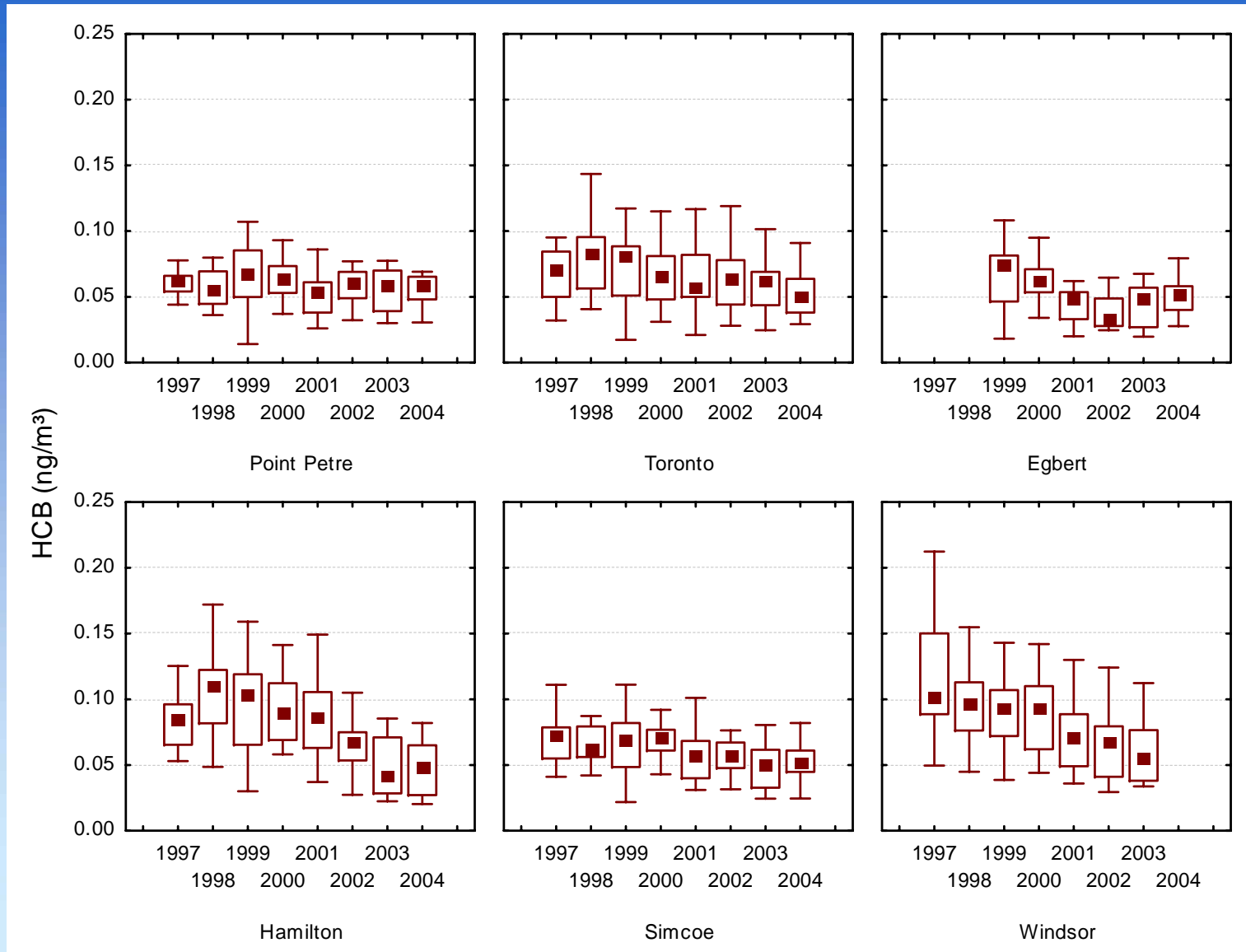
- The NAPS program is a cooperative federal-provincial-territorial network of over 800 ambient air quality monitoring instruments across Canada, mostly in urban centres.
- Substances measured:
 - PAH
 - PCDD/PCDF
 - Hexachlorobenzene (HCB)
 - Pentachlorophenol (PCP)
 - Octachlorostyrene (OCS)
 - Nitro-PAH - C13 to C22, 24 species including dinitropyrenes
 - Dioxin like PCBs
 - Metals - Hg, Cd, Pb
 - VOC - 1,4-dichlorobenzene
- <http://www.etc-cte.ec.gc.ca/NAPS/>

NAPS locations

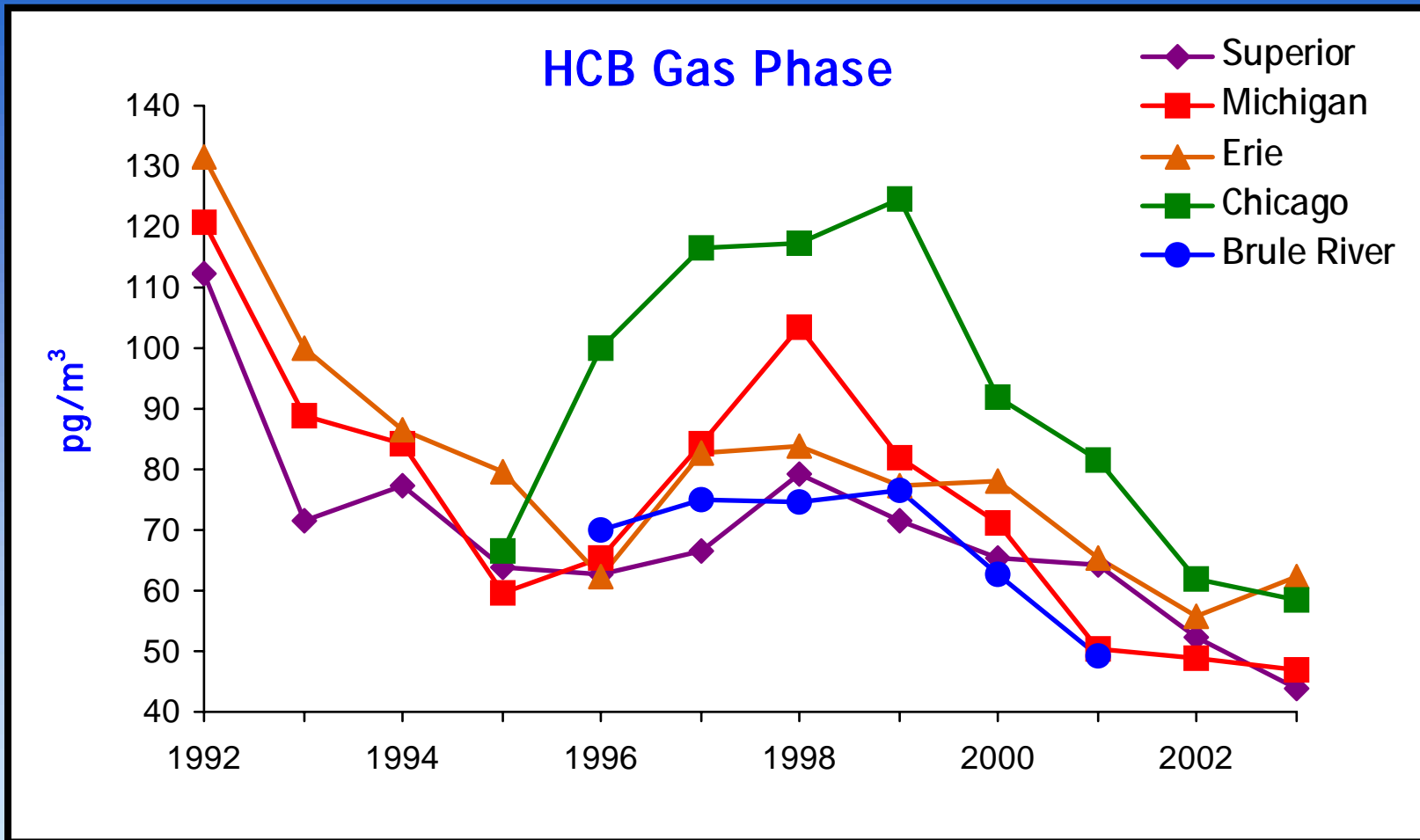


HCB

Slow decrease in HCB



Annual Variation in Hexachlorobenzene Concentrations (ng/m³) at Ontario Sites (1997-2004)



Ma et al. 2004a. How Do Climate Fluctuations Affect Persistent Organic Pollutant Distribution in North America? Evidence from a Decade of Air Monitoring. *Enviro. Sci. Technol.* 38 (9): 2538 –2543.

Half-Lives for gas-phase HCB are decreasing.....

Data through....	2001	2002	2003
Eagle Harbor (Superior)	29	23.7	18
S.B. Dunes (Michigan)	15	15.7	12
Sturgeon Pt. (Erie)	18	17.1	15
IIT (Chicago)		19.4	8.3

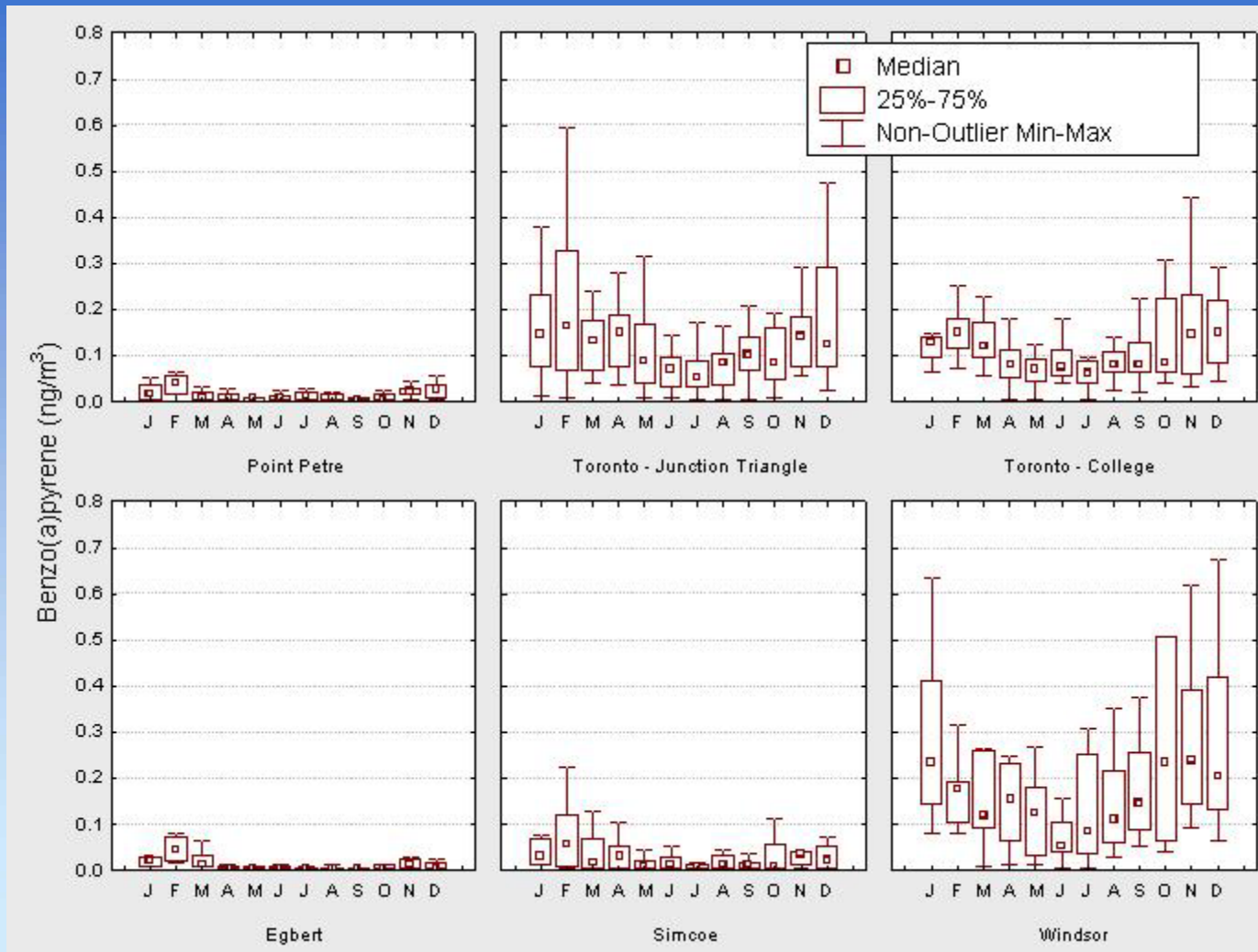
Buehler et al. 2004

Sun et al. in press

Most likely, increases in HCB in the late 1990s/early 2000s lengthened half-lives calculated previously.

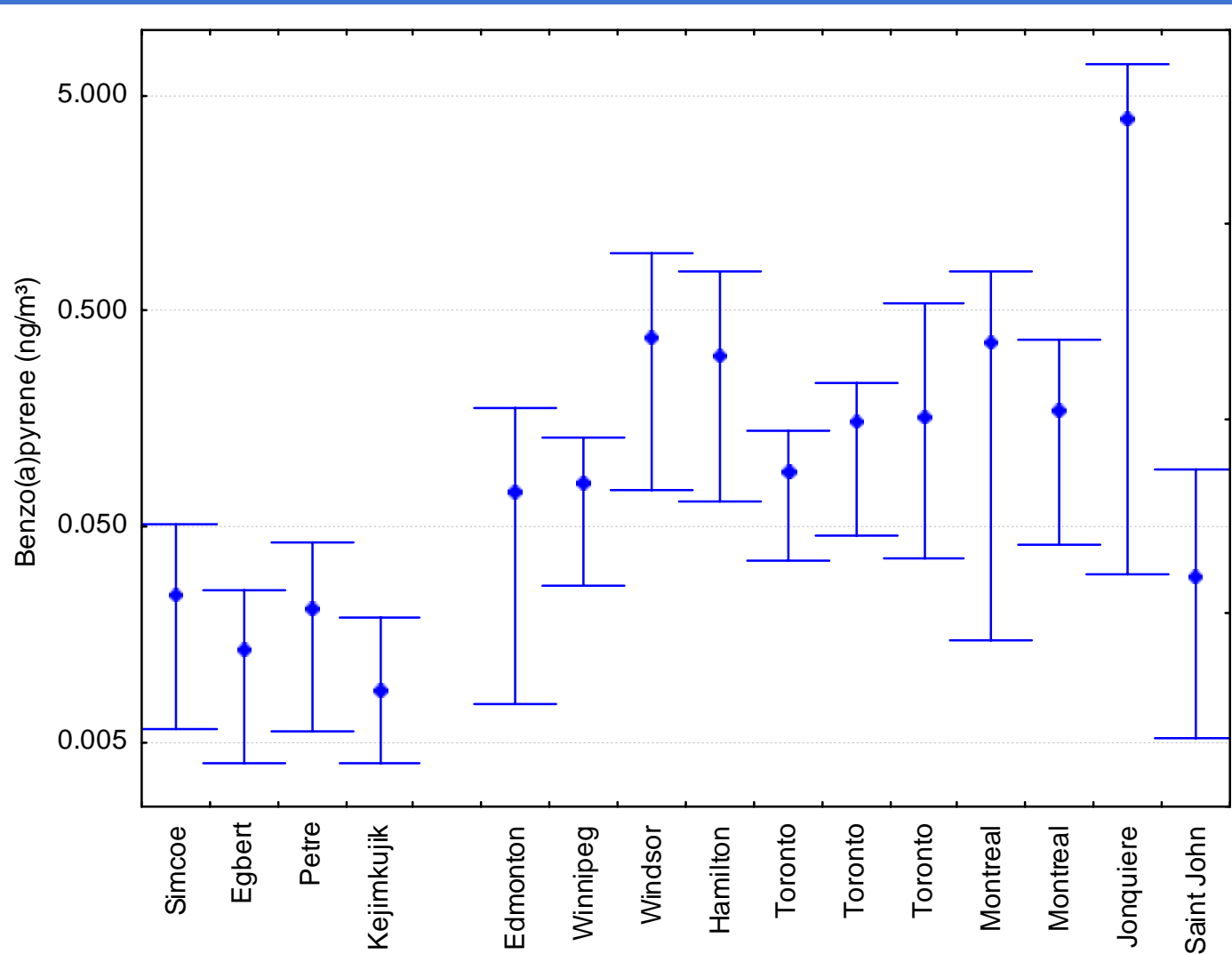
Benzo(a)pyrene

BaP higher in winter

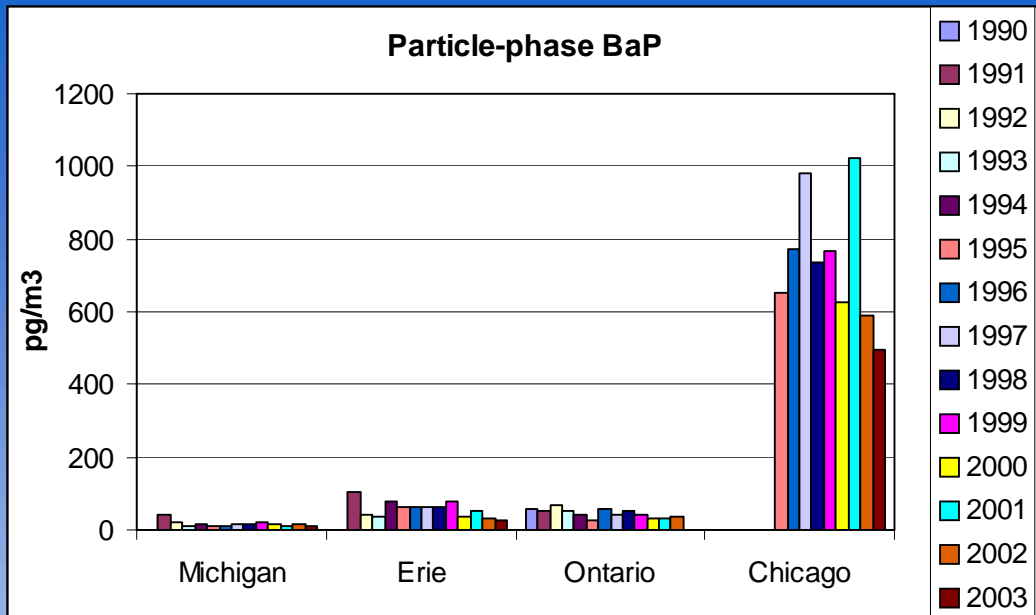


Seasonal Variation of B(a)P (ng/m^3) at Ontario NAPS Sites (1996-2003)

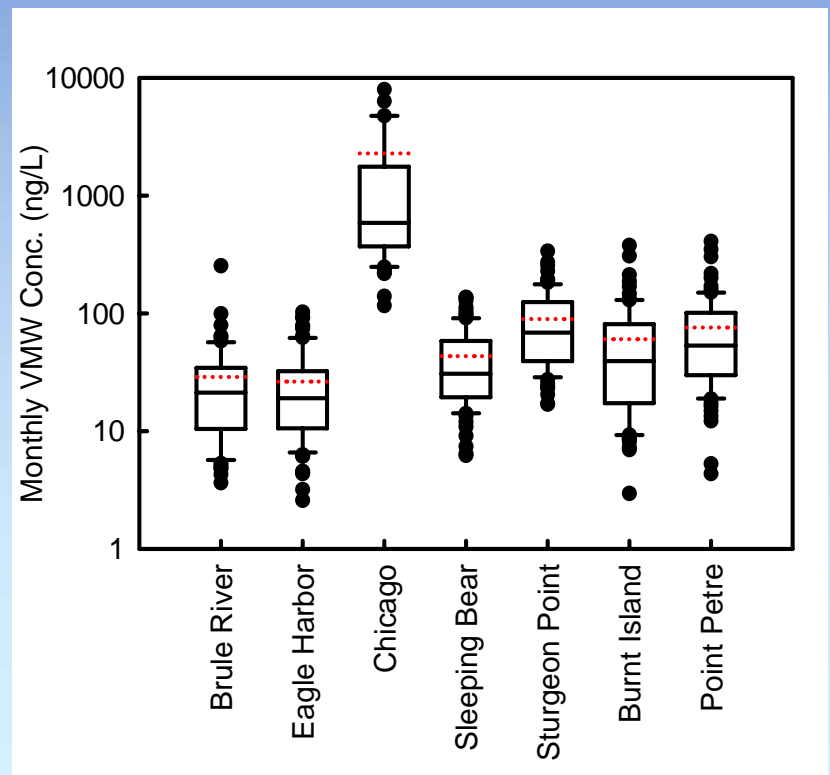
Rural BaP concentrations are about 10x lower than urban



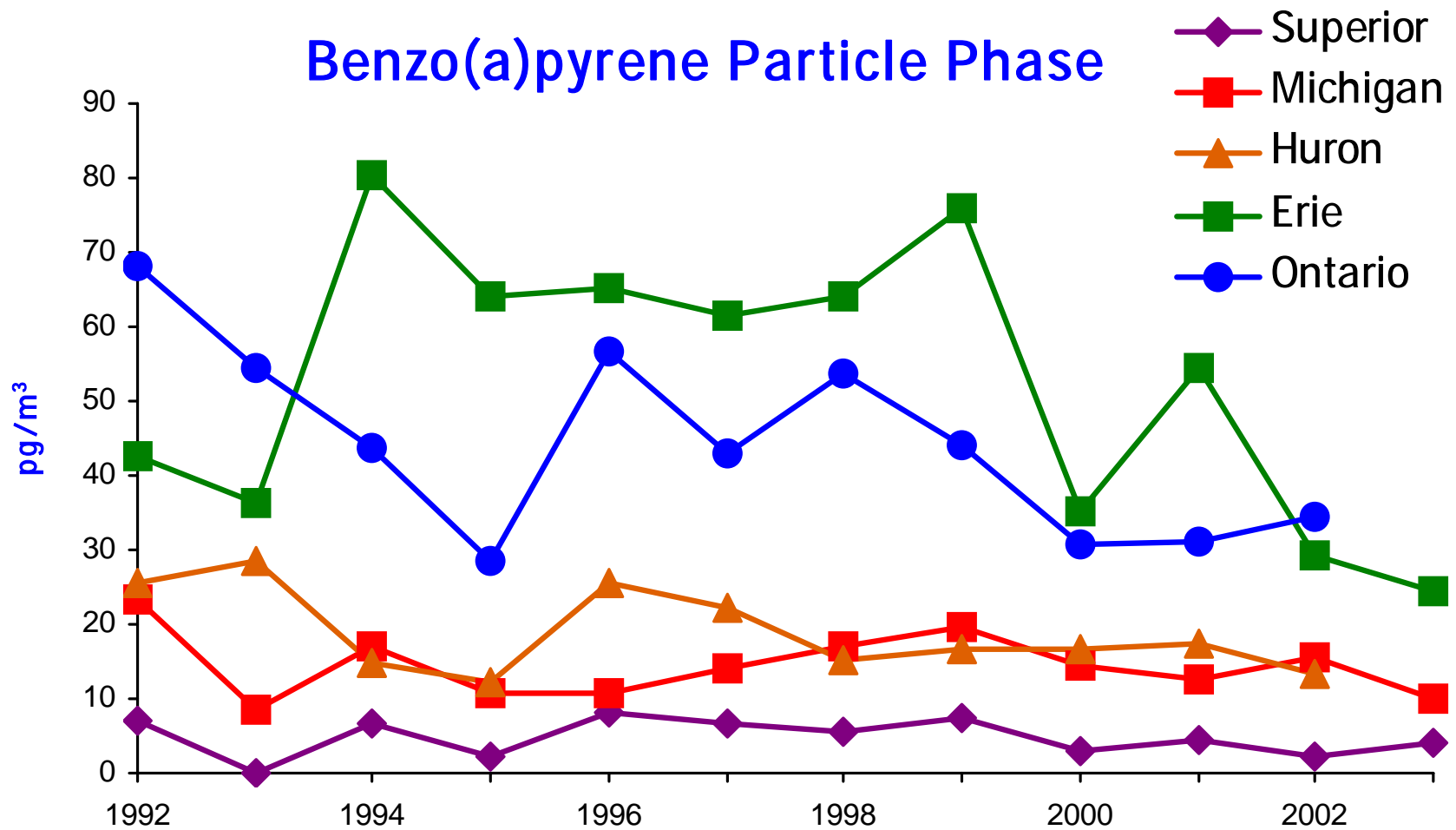
Benzo(a)pyrene Concentrations (ng/m³) 2003-2004
(Mean, 10th and 90th percentiles)



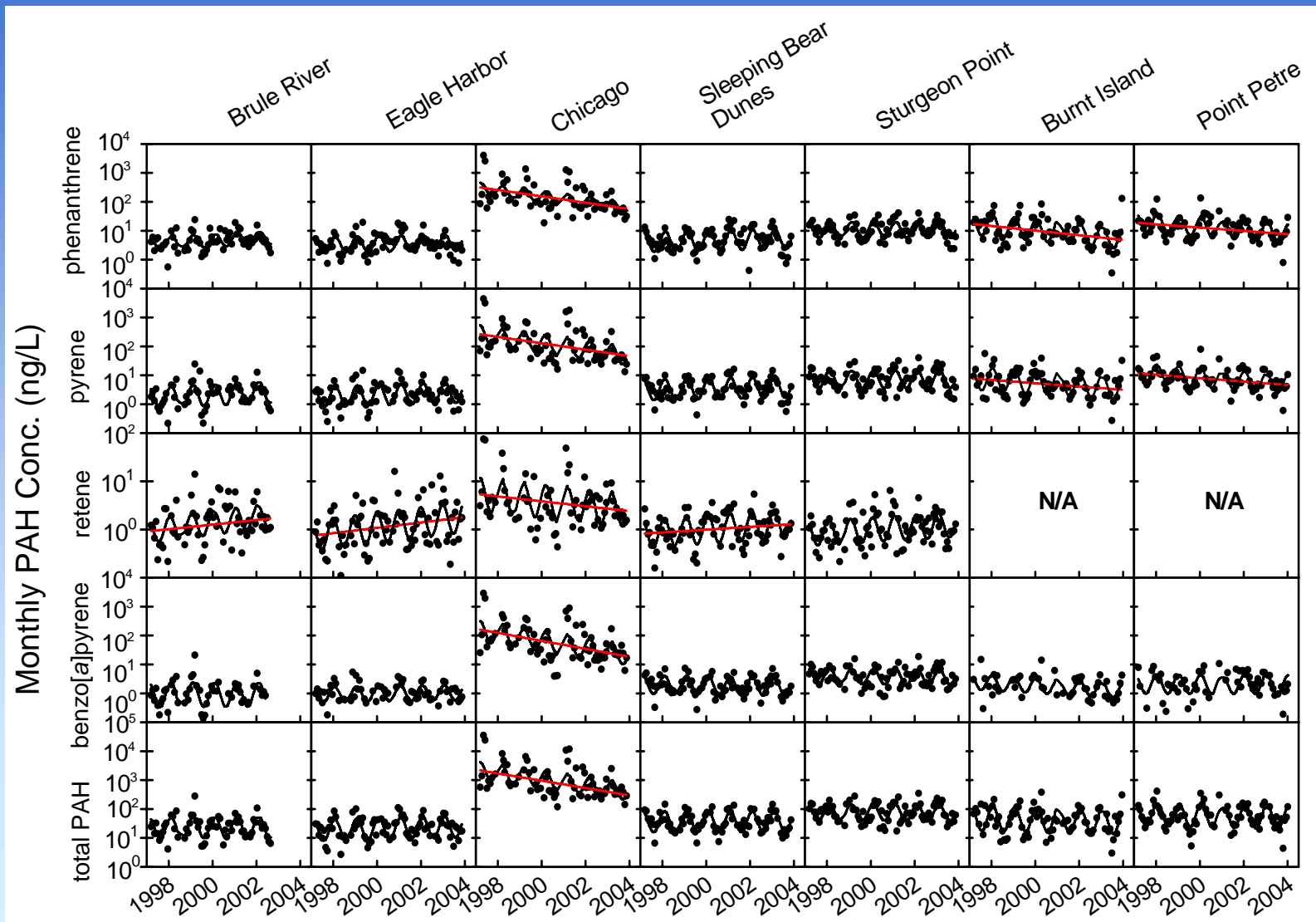
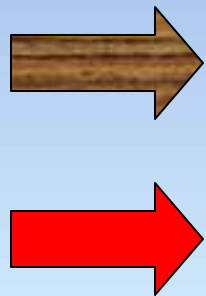
ΣPAHs in Precipitation



Benzo(a)pyrene Particle Phase



PAHs in precipitation are generally decreasing at Chicago



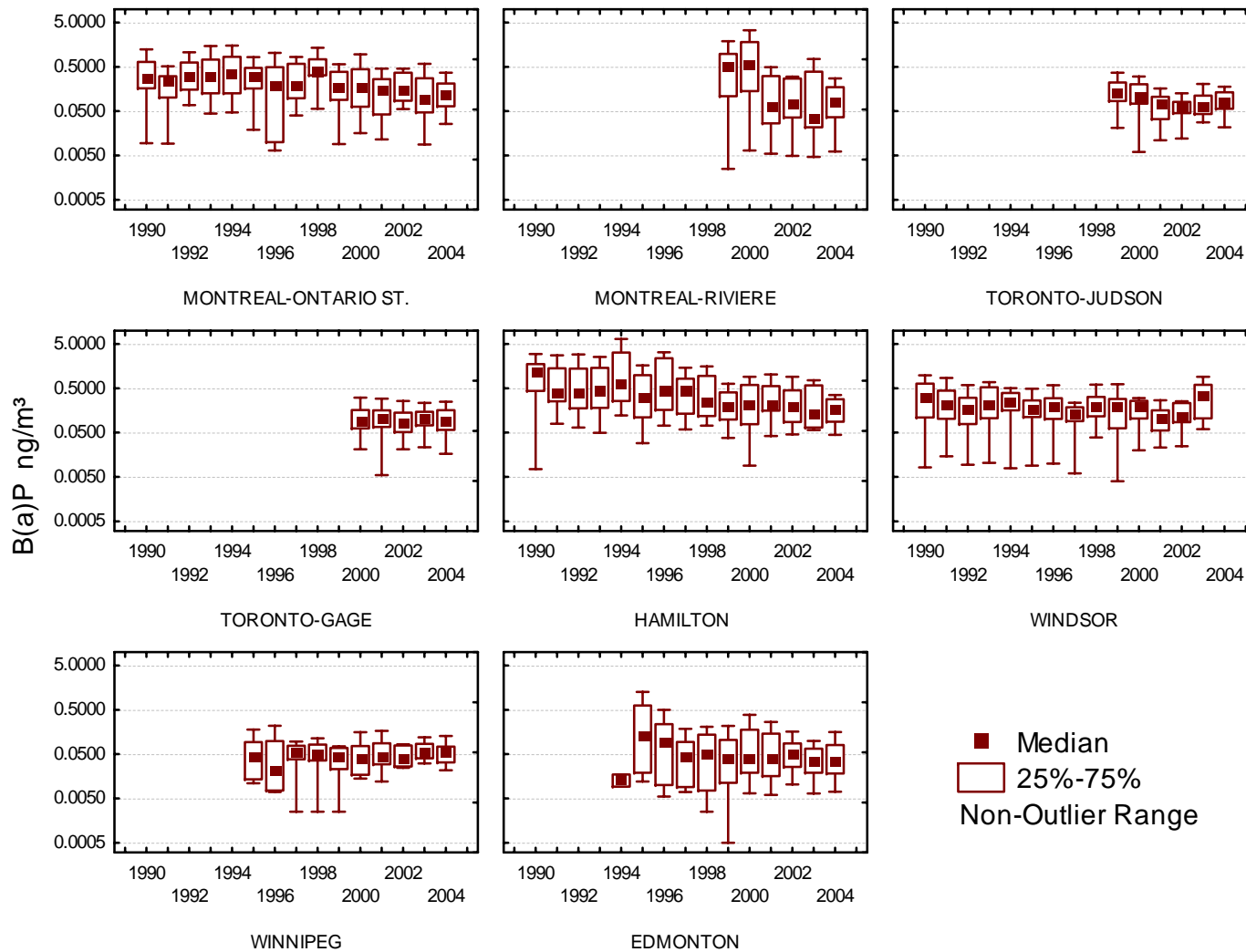
Some evidence of decreasing BaP concentrations on particles.....
 but are levels increasing at Sleeping Bear Dunes?

Site	Precipitation	Particles
Eagle Harbor (Superior)	ns	ns
S.B. Dunes (Michigan)	ns	-11 (ms)
Burnt Island (Huron)	ns	11 (ms)
Sturgeon Pt. (Erie)	ns	4.8
Pt. Petre (Ontario)	ns	11 (ms)
IIT-Chicago	2.4	9.6 (ms)

But decreases in low MW PAHs at Cdn sites Sun and Hites in press

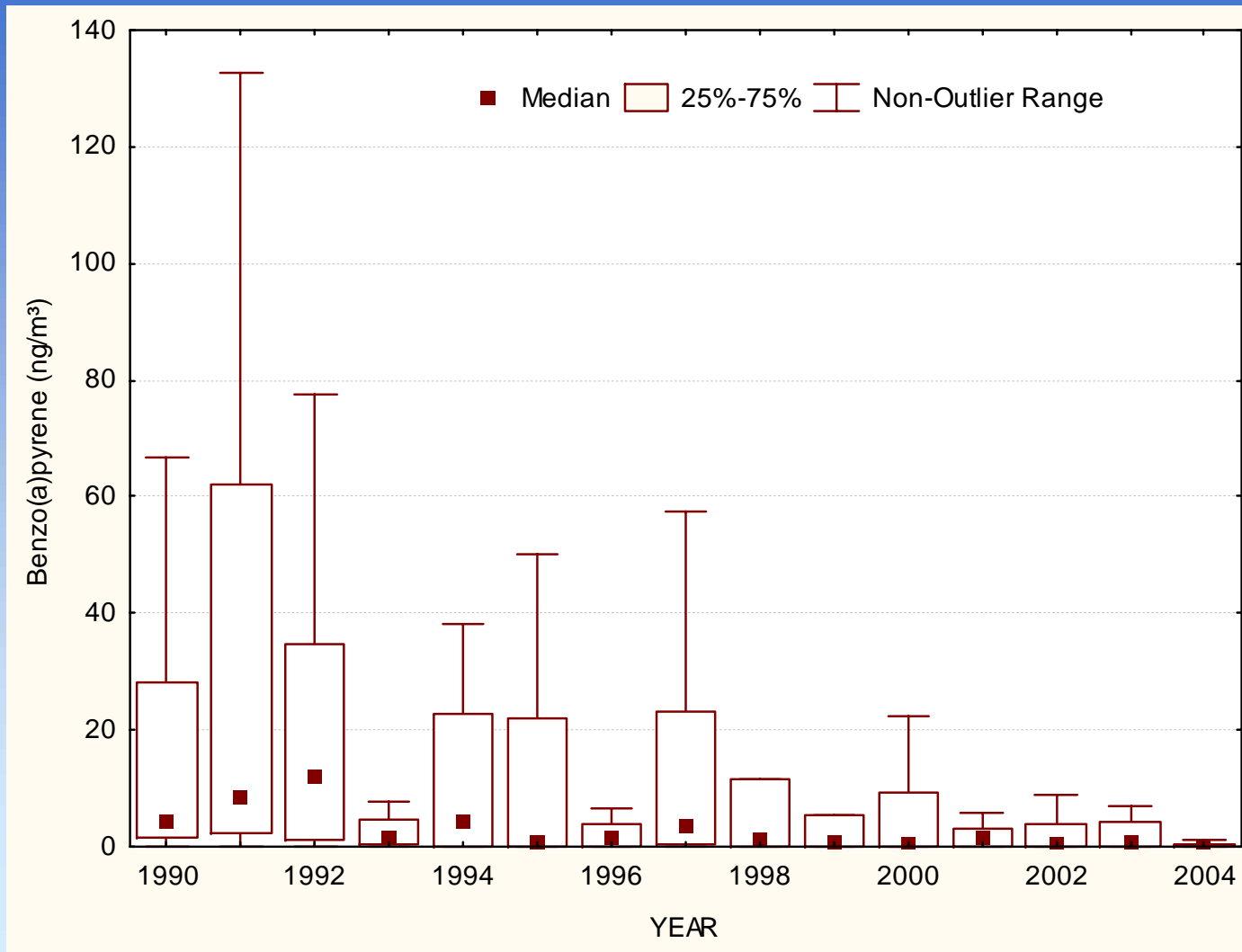
BaP half-lives for data through 2003

NAPS sites-Small or no decrease



Trend in Benzo(a)pyrene Concentrations (ng/m³) (1990-2004)

Possible decrease in *mean* in major source areas?



Benzo(a)pyrene Concentrations (ng/m³) at Jonquière

Conclusions: HCB

- Levels are decreasing slowly again after increases in the late 90s
- Little spatial variation in concentrations

Conclusions: BaP/PAHs

- Rural sites:
 - In general, no trend over time for BaP and other PAHs in precipitation, except:
 - Decreases in low MW PAHs in precip seen only at Canadian IADN sites
 - Some evidence of decreases in the particle phase, except possible increase at Sleeping Bear Dunes (L Michigan)
- Chicago
 - PAHs in precipitation at Chicago are decreasing with a half-life of 2-5 years (2.4 years for BaP)
 - Half-life for BaP on particles is 9.6 years (marginally significant)
- Source reductions may be having an impact in urban/source areas
- Retene increasing at Brule River, Eagle Harbor and Sleeping Bear Dunes (due to wood burning?)

Acknowledgments

- Tom Dann of Environment Canada for NAPS data
- Ron Hites and Ping “Sunny” Sun of Indiana University for IADN trends

IADN resources

- Main website: Station and other info, data request

<http://www.msc.ec.gc.ca/iadn/>

- U.S. IADN Resource Page (New loadings report, technical summaries, SOPs)

<http://www.epa.gov/glnpo/monitoring/air/iadn/iadn.html>

- U.S. IADN GPRA Indicator Page

<http://www.epa.gov/glnpo/glindicators/air/airb.html>

- SOLEC indicator #117 reports

- Melissa Hulting (U.S. EPA), Pierrette Blanchard (EC)