TEKRAN® Instruments Corporation
a TSI company

Where Measurement Begins

Ultra Sensitive Measurement
< 0.1 ng/m^3 (5 min samples)

Tekran® Ambient Air Hg

Tekran Instruments Corporation
330 Nantucket Boulevard
Toronto, ON M1P 2P4
Phone: 416-449-3084
Toll Free: 888-583-5726
lab-air-info@tekran.com

330 Nantucket Boulevard
Toronto, ON M1P 2P4
Phone: 416-449-3084
Toll Free: 888-583-5726
lab-air-info@tekran.com

TEKRAN®
Instruments Corporation
WHERE MEASUREMENT BEGINS™

Tekran® 2537X Automated Hg Analyzer

Tekran 2537X Leads the Way in Air Monitoring

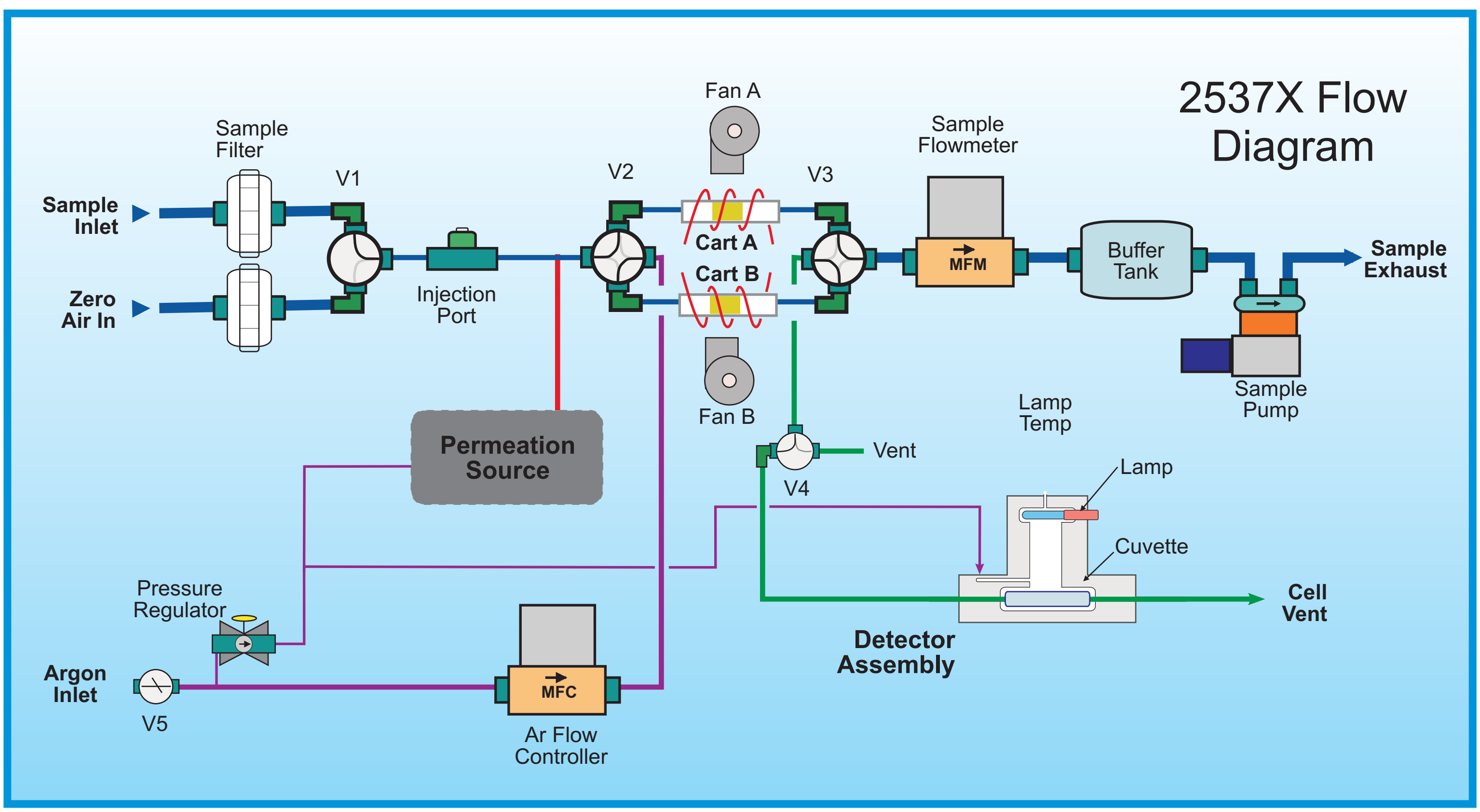
The Tekran Model 2537X performs continuous measurement of total gaseous mercury with unmatched accuracy, precision, and reliability. The atomic fluorescence based system is easy to setup, use and maintain. The Model 2537X is the analyzer of choice, since it has been the primary apparatus used to advance the science of ultra-trace atmospheric mercury.

Rugged, Compact & Versatile

The Model 2537 is self-contained, compact, rugged and versatile. It's the only automated analyzer capable of precise and accurate mercury determination in ambient air at levels less than 1 ng/m^3, with 5-minute resolution and no data gaps. With its unique feature, the Tekran Model 2537X has opened up a vast range of measurement applications that were once impractical or simply not possible.

Simple to Maintain

When you're measuring in a remote location, reliability is of prime importance. Downtime and service calls are not an option, to Tekran products are designed to be easily serviceable by the field technician. The Tekran 2537X also adds network interface and control. For simple maintenance tasks such as lamp re-optimization, the remote interface allows the user to login the to the instrument and assume full control of the instrument. Lamp optimization are now very simple and do not require a site visit.



330 Nantucket Boulevard
Toronto, ON M1P 2P4
Phone: 416-449-3084
Toll Free: 888-583-5726
lab-air-info@tekran.com

TEKRAN®
Instruments Corporation
WHERE MEASUREMENT BEGINS™

New Generation - Tekran® Model 2537X

Electronics Platform

- Network enabled
- Touch screen interface
- Local data storage and front panel USB port
- Remote access (troubleshooting, control and configuration)
- Improved data and instrument parameter logging
- Additional functionality via optional s/w plugins
  (std. additions, remote valve control, and much more)

Detector

- New lamp stabilizer and detector electronics
- Easy cuvette removal via convenient fitting interface
- Improved stability and sensitivity
- Digital PMT control and display

Permeation Source

- Lower dead volume permeation chamber
- Digital permeation source set point and display
- Improved accessibility

Cartridge / Valve Assembly

- New low dead volume valve assembly
- Constant power heater control
- Faster cartridge cool down with individual high-velocity fans

Physical Layout

- Reduced height from 5U (8.75”) to 4U (7”)
- Improved component accessibility for routine maintenance

100% Compatible with prior 2537 units and hardware

330 Nantucket Boulevard
Toronto, ON M1P 2P4
Phone: 416-449-3084
Toll Free: 888-583-5726
lab-air-info@tekran.com

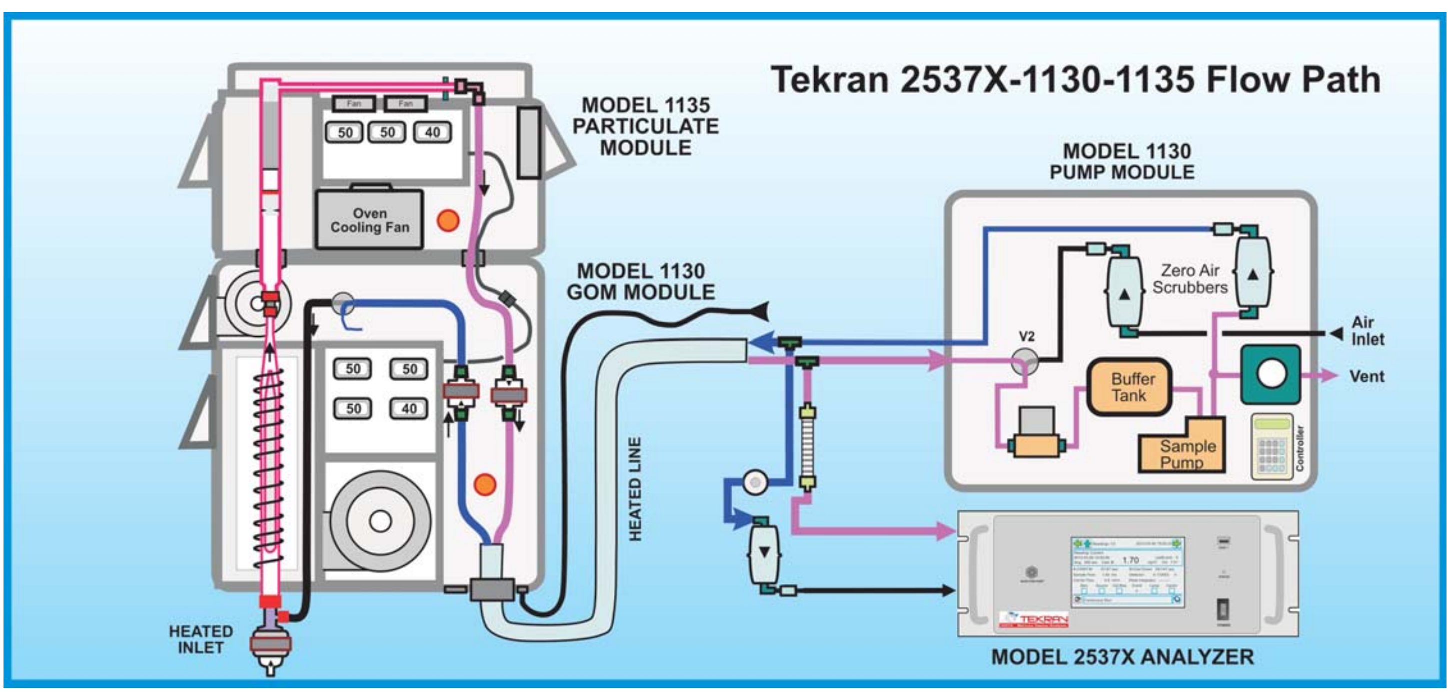
TEKRAN® Instruments Corporation
WHERE MEASUREMENT BEGINS™

Tekran® Model 1130-1135 Mercury Speciation Units

Tekran 1130-1135 System Overview

The Tekran® Model 1130 & 1135 Mercury Speciation Units work in unison with the Model 2537X Mercury Vapor Analyzer to simultaneously monitor gaseous elemental mercury (GEM), gaseous oxidized mercury (GOM), and particulate bound mercury (PBM) species in ambient air. Although the majority of atmospheric mercury is present as GEM, differentiation is important due to the greater local impact of the GOM and PBM species. Speciation is of particular interest close to industrial sources such as waste incinerators since the majority of their mercury emissions may be in GOM form, such as mercuric chloride ($HgCl_2$).

The Tekran® Model 1130 & 1135 Mercury Speciation units allow fully automated, unattended operation so all three mercury species can be measured continuously. The Tekran speciation system has been used in Polar Regions to delineate the conversion of GEM to PBM and GOM after polar sunrise. One of the greatest problems with conventional particulate mercury measurement methods is that GOM will co-collect on the filter medium along with the PBM. The Tekran speciation system solves this problem by using the accepted method to separate "sticky" gaseous compounds from ultra-fine aerosols, namely a large particle impactor, annular denuder and filter in series. The ability to collect relatively short samples, then heat the denuder and filter to release mercury in the elemental form for analysis, while regenerating the collection surfaces, is the critical and patented design that provides the best tool to measure part per quadrillion levels of mercury species in air.



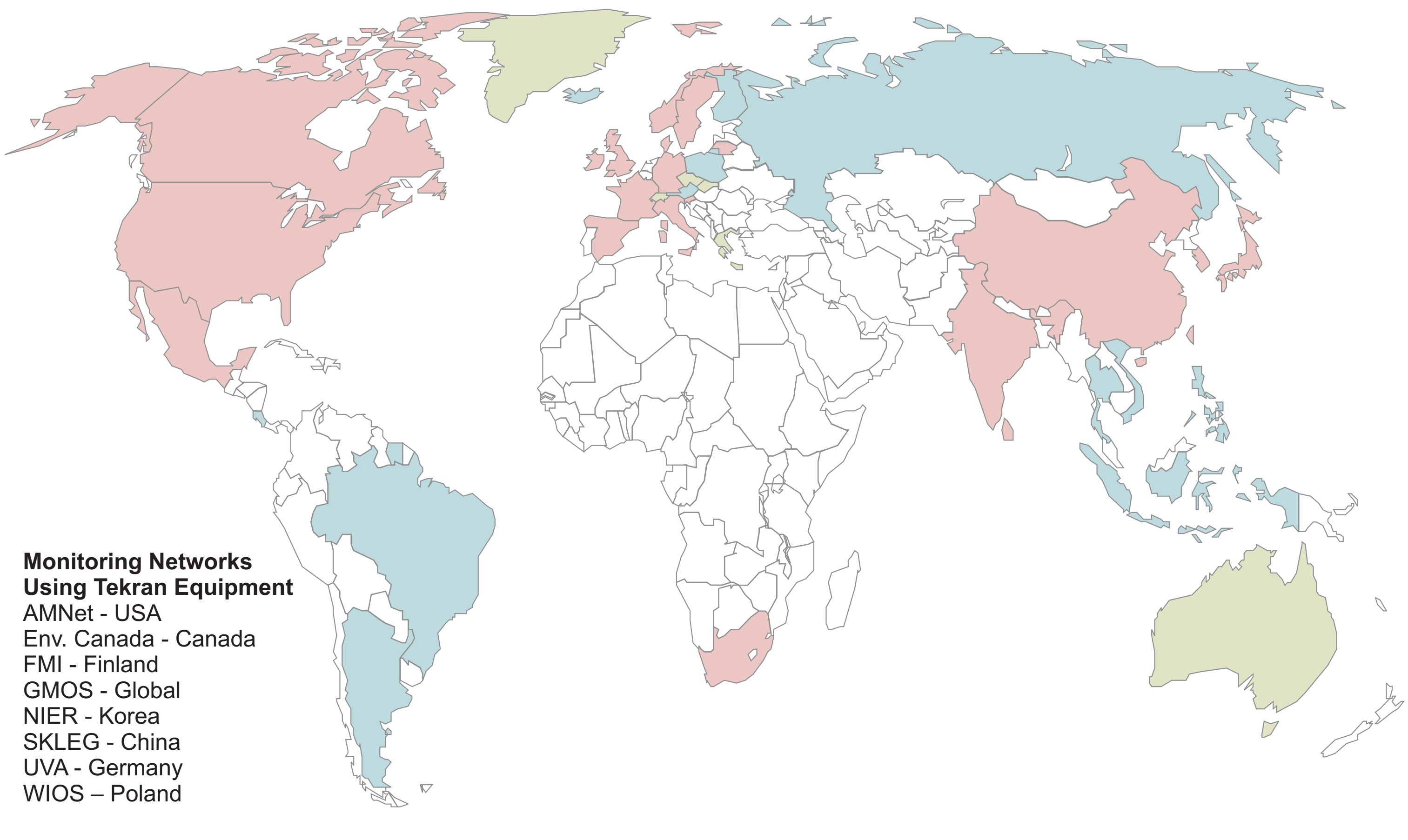
330 Nantucket Boulevard
Toronto, ON M1P 2P4
Phone: 416-449-3084
Toll Free: 888-583-5726
lab-air-info@tekran.com

TEKRAN®
Instruments Corporation
WHERE MEASUREMENT BEGINS™

Tekran® Air Mercury Sampling Sites by Country

(Past & Present)

Monitoring Sites | Research Sites | Both Monitoring & Research



Monitoring Networks Using Tekran Equipment
AMNet - USA
Env. Canada - Canada
FMI - Finland
GMOS - Global
NIER - Korea
SKLEG - China
UVA - Germany
WIOS – Poland

The Worldwide Trusted Instrumentation for Mercury Monitoring

Tekran was founded in 1991 to develop an automated mercury analyzer that was incredibly sensitive, reliable, and accurate. Ever since that time we have continued to improve our instrumentation and extend it to unique research and monitoring applications. Tekran instrumentation has been used in every continent across the globe, including Antarctica. Every major country, continental and global based air mercury monitoring network uses the Tekran Model 2537 and depends on Tekran's known reputation for excellent technical support.

Tekran air monitoring equipment is designed to be rugged and handle a variety of installation environments. The GMOS network deploys Tekran instrumentation in ground-based monitoring stations, shipboard measurements over the Pacific and Atlantic Oceans and European Seas, as well as aircraft-based measurements in the UTLS. Tekran Instrumentation is deployed in coastal climates, arid deserts, temperate forests, and tropical jungles. The GMOS set the record for the highest elevation Tekran 2537 installation at the Italian Site Ev-K2-CNRS in the Himalayan Mountains at 5050 meters asl. Tekran thrives on working with customers to conquer their unique monitoring challenges.

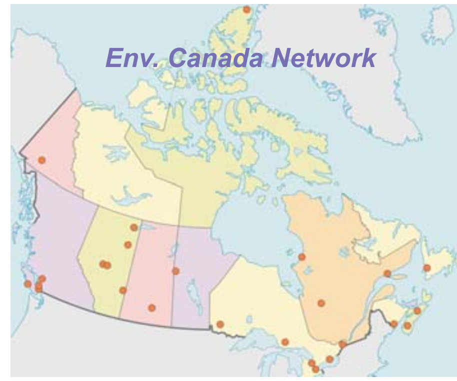
330 Nantucket Boulevard
Toronto, ON M1P 2P4
Phone: 416-449-3084
Toll Free: 888-583-5726
lab-air-info@tekran.com

TEKRAN®
Instruments Corporation
WHERE MEASUREMENT BEGINS™

Air Mercury Networks Using Tekran Monitors

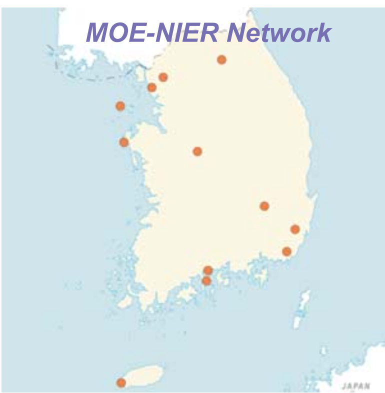
China

Several organizations operate air mercury monitoring sites in China to establish baseline concentrations and characterize fate and effects. There are a wide range of site locations; coastal, urban, remote and high elevation Tekran equipment installations.



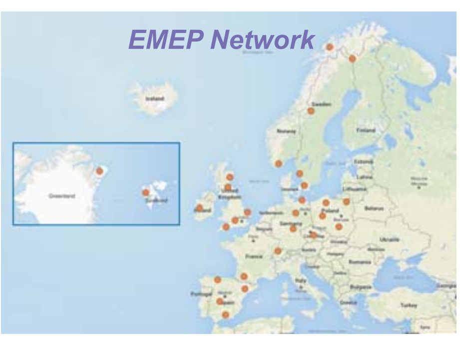
Canada

The goal of the Canadian Network is better understanding of atmospheric transport, transformation, and removal processes of elemental mercury released into the environment. The data is used for scientific modeling to help better understand transboundary Hg transport.



Korea

The MOE-NIER network will help Korea elucidate the relative impact of local sources and cross-boundary transported mercury input to the ecosystem. The Tekran Monitors generate data to help develop a comprehensive plan for the improvement of the atmospheric environment.



Europe

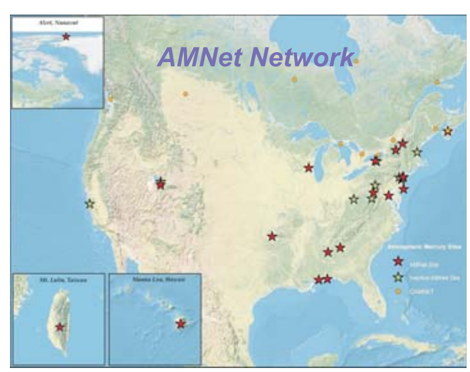
EMEP is scientifically based and policy driven under CLRTAP for international cooperation to solve trans-boundary air pollution issues. It establishes a framework for cooperative action to reduce air pollution impacts and aids in negotiating air control measures through legally binding protocols.

Global

The Global Mercury Observation System (GMOS) aims to establish a worldwide observation system for the measurement of atmospheric mercury in ambient air and precipitation samples.

USA/Canada/Asia

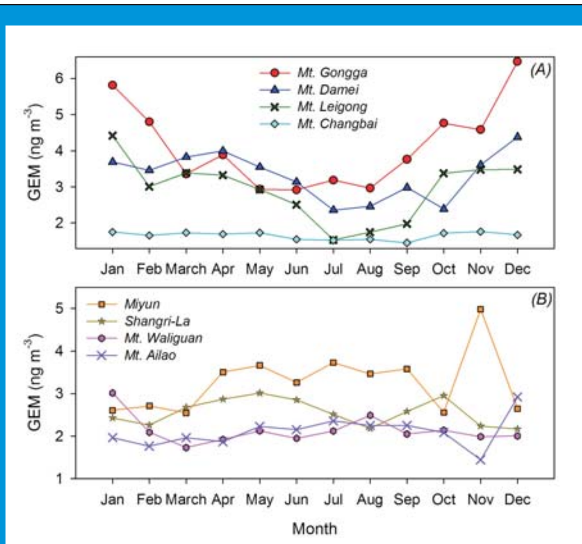
The Atmospheric Mercury Network (AMNet) established this network of monitoring stations for the purpose of measuring atmospheric mercury fractions which contribute to dry and total mercury deposition. Data is collected with standardized methods, with quality assured data archived in an online data base.



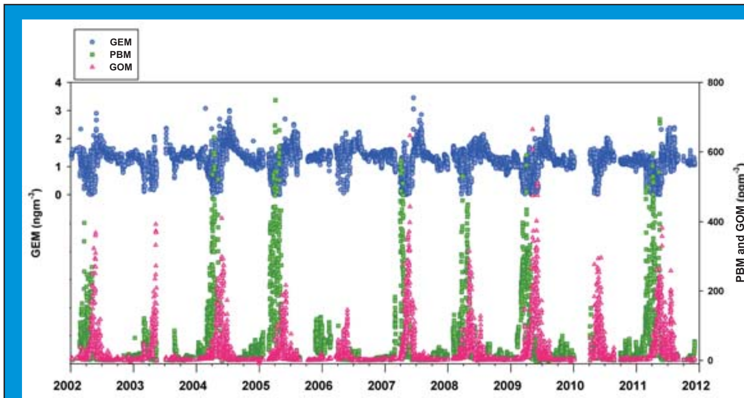
330 Nantucket Boulevard
Toronto, ON M1P 2P4
Phone: 416-449-3084
Toll Free: 888-583-5726
lab-air-info@tekran.com

TEKRAN®
Instruments Corporation
WHERE MEASUREMENT BEGINS™

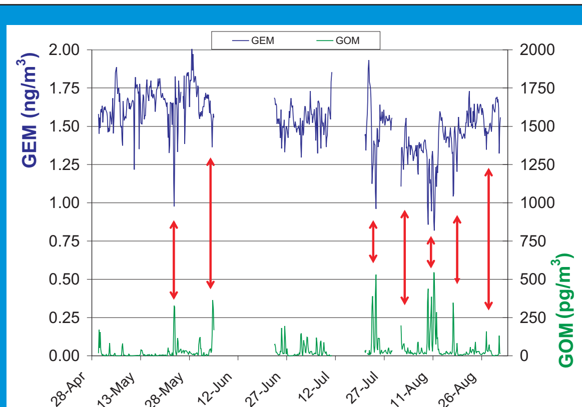
Tekran® 2537-1130-1135 Data Spotlight



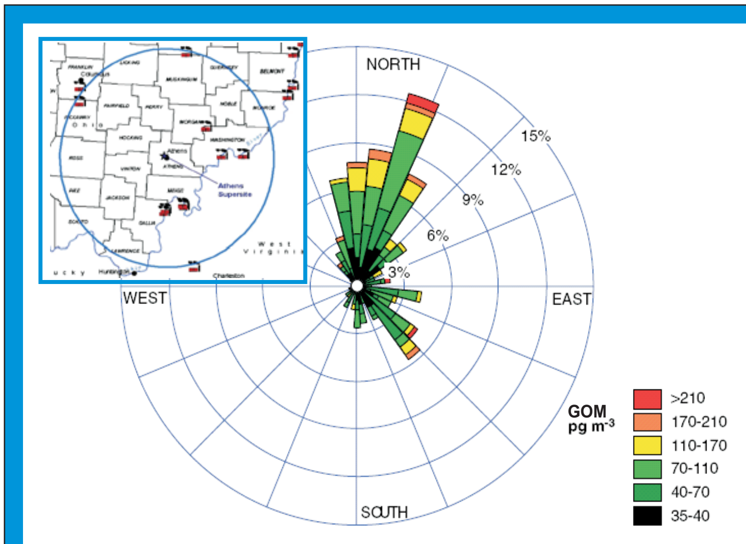
A comprehensive review of atmospheric Hg in China. GEM and PBM measured at the remote sites in China are more dynamic and elevated compared to the background values in the Northern Hemisphere.
Source: Fu, et. al., *Observations of atmospheric mercury in China: a critical review*, Atmos. Chem. Phys., 2015.



Data collected from 2002 to 2012. During the winter-spring period of atmospheric mercury depletion events (AMDEs), GEM is nearly 0.0 ng/m^3, while PBM and GOM rise significantly. This pattern changes in April when the levels of PBM decrease and GOM increases.
Source: Steffen, et. al, *Atmospheric mercury speciation and mercury in snow over time at Alert, Canada*, Atmos. Chem. Phys., 2014.



A time series of GEM, GOM, and PBM at Mount Bachelor Observatory. This was the first published study showing elevated GOM in the free troposphere.
Source: Swartzendruber, et. al., *Observations of reactive gaseous mercury in the free troposphere at the Mount Bachelor Observatory*, J. Geophys. Res., 2006.



This air quality study showed the influence of nearby mercury point sources (power, chemical & manufacturers) on the levels of GOM at the Athens, Ohio Supersite.
Source: Yatavelli, et. al., *Mercury, PM2.5 and gaseous co-pollutants in the Ohio River Valley region: Preliminary results from the Athens supersite*, Atmos. Env. 2006.

330 Nantucket Boulevard
Toronto, ON M1P 2P4
Phone: 416-449-3084
Toll Free: 888-583-5726
lab-air-info@tekran.com

TEKRAN®
Instruments Corporation
WHERE MEASUREMENT BEGINS™

Tekran® 2537X-1130-1135 Notable Research Papers

Ebinghaus, R., et al., (1999) International field intercomparison measurements of atmospheric mercury species at Mace Head, Ireland, Atmos. Env. 33:3063.

Landis, M.S., et al., (2002) Development and Characterization of an Annular Denuder Methodology for the Measurement of Divalent Inorganic Reactive Gaseous Mercury in Ambient Air, DOI: 10.1021/es015887t.

Zhu, W., et al., (2015) Mercury vapor air-surface exchange measured by collocated micrometeorological and enclosure methods - Part I. Data comparability and method characteristics, DOI: 10.5194/acp-15-685-2015.

Fu, X.W., et al., (2015) Observations of atmospheric mercury in China: a critical review, DOI:10.5194/acp-15-9455-2015.

Gay, D.A. et al., (2013) The Atmospheric Mercury Network: measurement and initial examination of an ongoing atmospheric mercury record across North America, DOI:10.5194/acp-13-11339-2013.

Slemr, F., et al., (2015) Comparison of mercury concentrations measured at several sites in the Southern Hemisphere, DOI:10.5194/acp-15-3125-2015.

Cole, A. S., et al., (2014) A Survey of Mercury in Air and Precipitation across Canada: Patterns and Trends, Atmosphere 5, 635-668.

Zhang, L., et al., (2013) Atmospheric mercury concentration and chemical speciation at a rural site in Beijing, China: implications of mercury emission sources, DOI:10.5194/acp-13-10505-2013.

Steffen, A., et al., (2014) Atmospheric mercury speciation and mercury in snow over time at Alert, Canada, Atmos. Chem. Phys., 14, 2219-2231.

Sprovieri F., et al., (2010) A review of worldwide atmospheric mercury measurements, DOI:10.5194/acp-10-8245-2010.

Sommar, J., et al., (2010) Circumpolar measurements of speciated mercury, ozone and carbon monoxide in the boundary layer of the Arctic Ocean, DOI:10.5194/acp-10-5031-2010.

Brunke, E.-G., et al., (2010) Gaseous elemental mercury depletion events observed at Cape Point during 2007–2008, DOI:10.5194/acp-10-1121-2010.

Wang, Y., et al., (2010) Impacts of the Canadian Forest Fires on Atmospheric Mercury and Carbonaceous Particles in Northern New York, DOI: 10.1021/es1024806.

Eckley, C., et al., (2011) Scaling Non-Point-Source Mercury Emissions from Two Active Industrial Gold Mines: Influential Variables and Annual Emission Estimates, DOI: 10.1021/es101820q.

Soerensen, A.L., et al., (2010) Global concentrations of gaseous elemental mercury and gaseous oxidized mercury in the marine boundary layer, DOI: 10.1021/es903839n.

Slemr, F., et al., (2008) Gaseous mercury distribution in the upper troposphere and lower stratosphere observed onboard the CARIBIC passenger aircraft, DOI:10.5194/acp-9-1957-2009.

Swartzendruber, P.C., et al., (2006) Observations of reactive gaseous mercury in the free troposphere at the Mount Bachelor Observatory, DOI:10.1029/2006JD007415.