Update on recent mercury monitoring activities in Japan

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Workshop on APMMN in Hanoi, Vietnam 10-12 September 2014

Objectives of our activities:

- Monitoring current levels of mercury (Hg) in air, airborne particles and precipitation;
- To obtain long term trend on wet and dry deposition fluxes of Hg in Japan;
- To obtain useful information on the long-range transportation of Hg in Asia-Pacific region;
- Development of monitoring methodologies and technologies;
- To contribute to international efforts in atmospheric Hg monitoring

Monitoring Sites

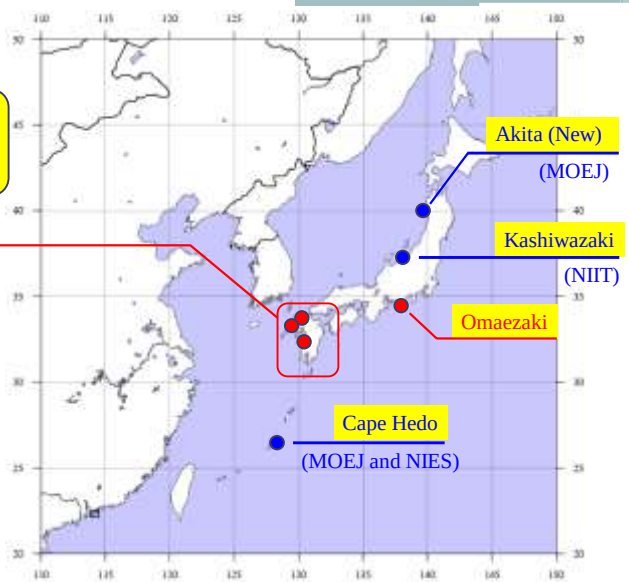
- NIMD
- Others

Kyushu 3 sites

Fukuoka

Hirado

Minamata

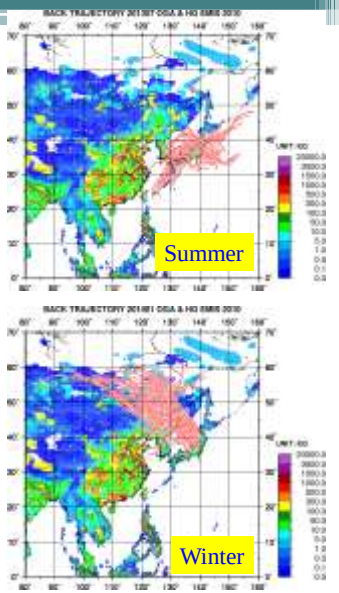


New monitoring site (Akita)

Monitoring station for atmospheric Hg

Monitoring station for air pollutants

SO_2
NOx
Oxidants (O_3)
SPM
PM2.5



Mercury observation sites by NIMD	Minamata	Hirado	Fukuoka	Omaezaki (Shizuoka) December 2013 Start
Continuous monitoring for atmospheric Hg	TGM using NIC Hg monitor Since March 2011		GEM, GOM and PBM(<2.5μm) using TEKRAN Since March 2012	
Manual sampling for GEM, GOM and PBM(<2.5μm)	6 or 8 days a month (semi-diurnal) Until Dec., 2013	6 or 8 days in each season (semi-diurnal) Until May 2014		
Weekly sampling (4 times a month) (Sampling is carried out at every Tuesday since December, 2013.)	Wet deposition (T-Hg, MMHg) PBM (Total) in the air using FP method* Since Sep., 2008	Wet deposition (T-Hg, MMHg) PBM (Total) in the air using FP method* Since June 2011	Wet deposition (T-Hg) PBM (Total) in the air using FP method* Since June 2013	Wet deposition (T-Hg) PBM (Total) in the air using FP method* Since Dec., 2013
Others	Meteorological parameters CO	Meteorological parameters	Meteorological parameters Collaboration with other organizations	Meteorological parameters

* FP method : Filter Pack method

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Mercury observation sites by Others	Hedo, Okinawa (MOEJ and NIES)	Akita (MOEJ)	Kashiwazaki (NIIT)	
Continuous monitoring for atmospheric Hg	GEM, GOM and PBM(<2.5μm) using TEKRAN Since October 2007	GEM, GOM and PBM(<2.5μm) using TEKRAN From Sep, 2014	GEM, GOM and PBM(<2.5μm) using TEKRAN Since July 2010	
Manual sampling for GEM, GOM and PBM(<2.5μm)			Hg analysis have been carried out by NIMD.	
Weekly sampling	Wet deposition (T-Hg) Since April 2008	Wet deposition (T-Hg) From Sep, 2014	Wet deposition (T-Hg) PBM (Total) in the air using FP method* From July, 2014	
Others	Meteorological parameters Collaboration with other organizations	Meteorological parameters	Meteorological parameters	

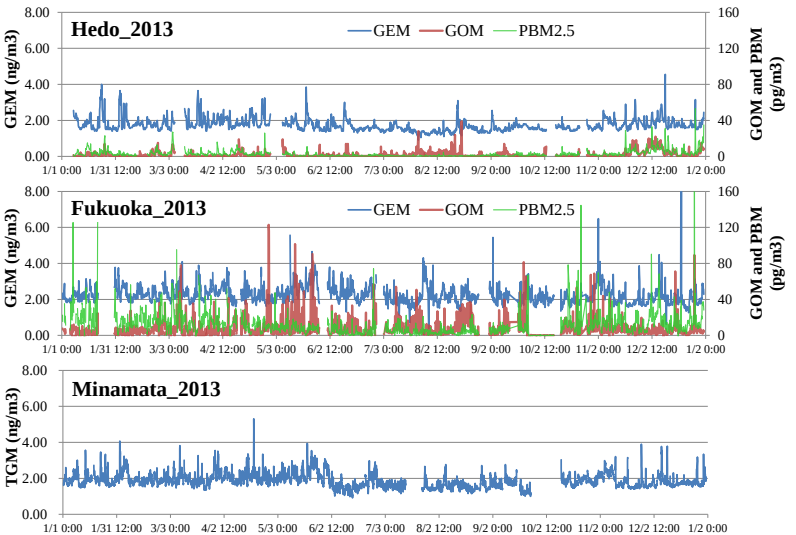
* FP method : Filter Pack method

Standard **O**perating **P**rocedures for Atmospheric Mercury Analysis

for Tekran mercury speciation system

- Develop the QA/QC procedure in hot and humid conditions based on Draft USEPA's SOP (Oct. 2008)
- GEM: Good correlation with MOEJ manual method*
  * Measurement of gaseous mercury including GEM and GOM
- GOM and $PBM_{2.5}$: Good correlation with a manually-operated offline system with quartz filter and annular denuder

Continuous monitoring data at 3 sites in 2013



Latest data on atmospheric monitoring at 4 sites

From December 2013 to May 2014	Minamata	Hirado	Fukuoka	Omaezaki
Volume weighted mean concentration (ng/L)	5.3	7.1	9.6	3.8
Wet deposition flux (6 month, ng/m^2)	3292	4026	4230	3293
Precipitation depth (mm)	621	567	441	860
Total PBM in air (pg/m^3)	22.2±9.9	20.0±9.1	23.6±9.1	15.2±5.2

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Summary of today's talk:

- The monitoring using a continuous atmospheric Hg monitor at 3 sites (Okinawa, Fukuoka and Minamata) have been continued. In addition, Hg wet deposition fluxes have been also measured at 6 sites.
- The observation on atmospheric Hg and wet Hg deposition flux started at Akita site in September 2014.
- The data obtained in these monitoring can provide an international atmospheric Hg monitoring network.