

Progress on measurement of Mercury in Air and Precipitation in Thailand

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Minamata Convention on Mercury

Recognizing that mercury is a chemical of global concern owing to

- Its long-range atmospheric transport
- Its persistence in the environment
- Its ability to bio-accumulate in ecosystems
- Its significant negative effects on human health and the environment

Minamata Convention on Mercury

Objective:

To protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds

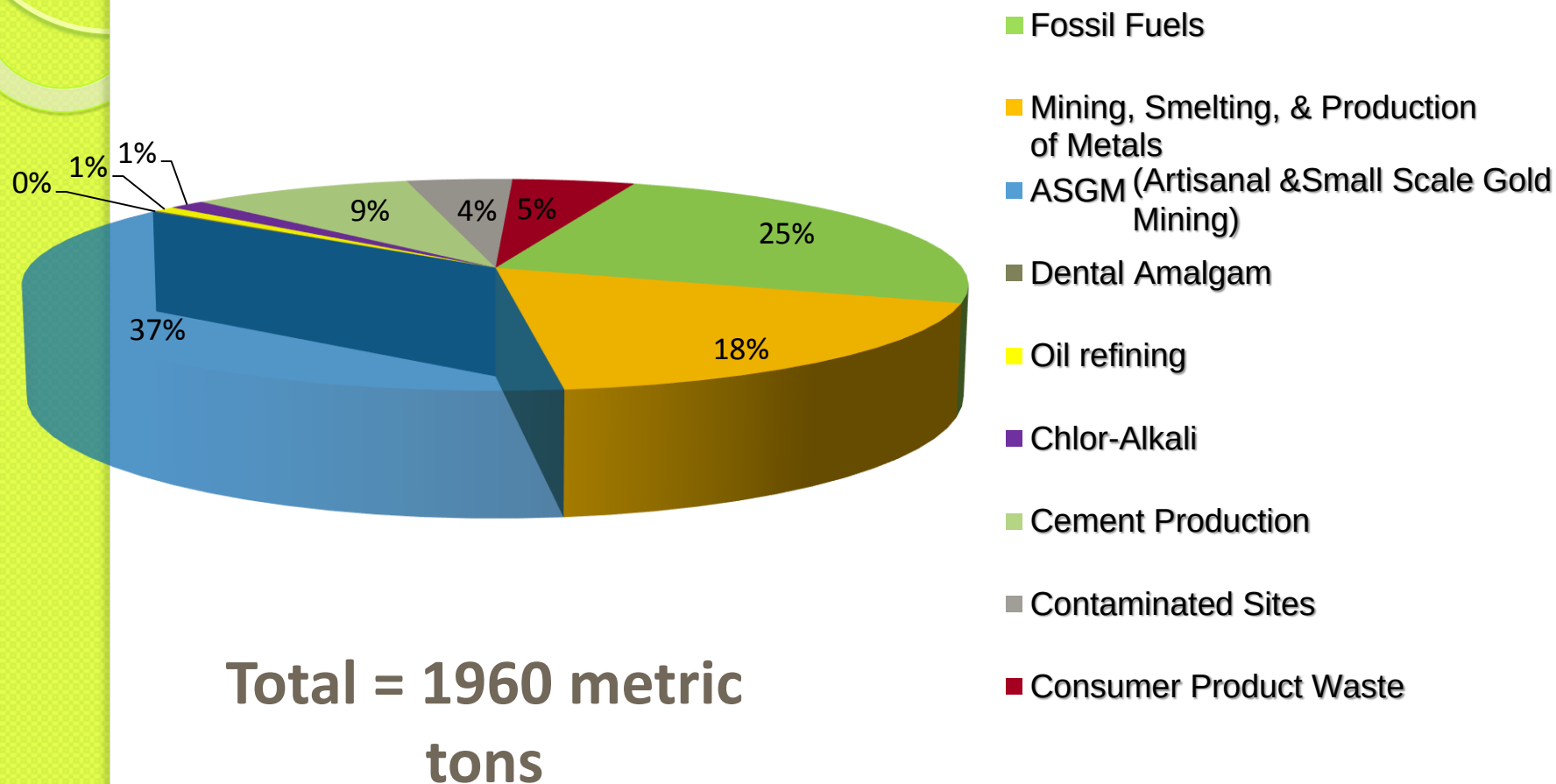
APMMN play an important role to the policy context of the Convention

- Article 19: Research, Development and Monitoring
- Article 22: Effectiveness evaluation

Participation in the APMMN workshops



Estimated proportion of global anthropogenic mercury emissions by sector, 2010



Source: United Nations Environment Programme (UNEP)
The Global Atmospheric Mercury Assessment: Sources, Emissions and Environmental Transport, 2013

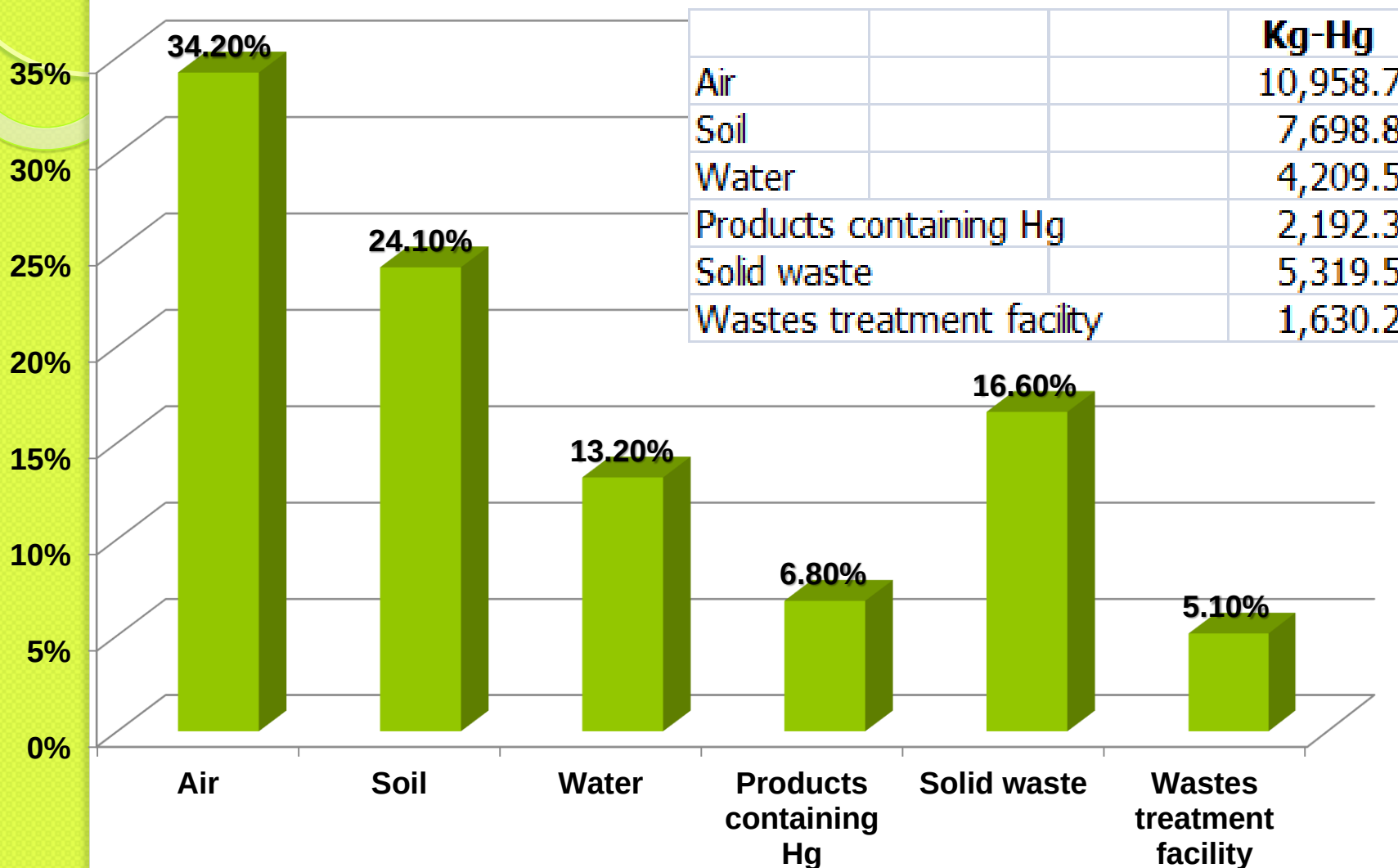
Thailand's mercury release inventory 2010

The inventory has been established based on the

“Toolkit for identification and quantification of mercury releases (UNEP, 2010)”



Distribution of mercury in the environment in Thailand 2010



Progress on atmospheric Hg measurement

- Department of Environmental Quality Promotion (DEQP)
ERTC: “Research & Development”
- Pollution Control Department (PCD)
Air Quality and Noise Management Bureau: “Air Quality Monitoring”

Ambient mercury monitoring (PCD)

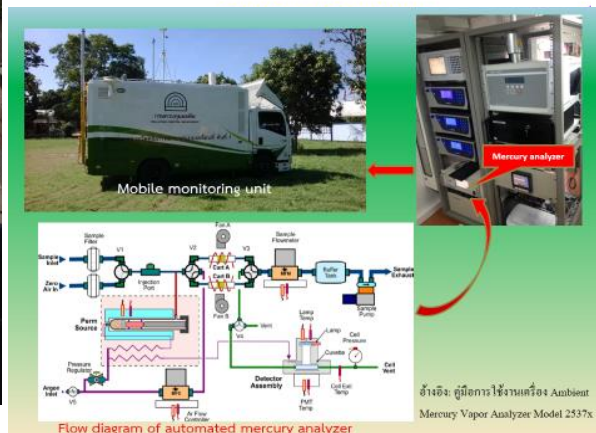
Objectives:

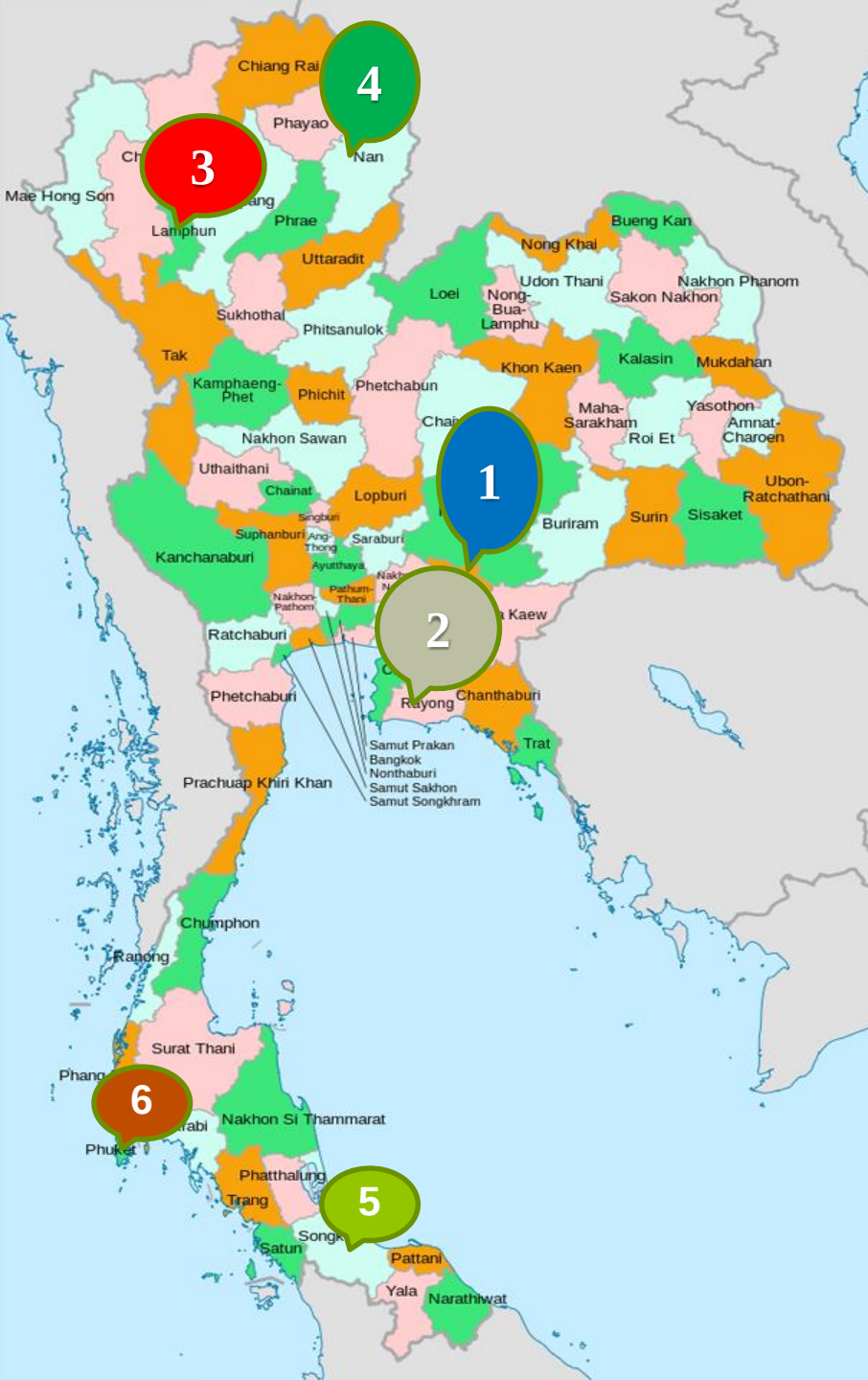
- Investigate and assess mercury contamination in ambient air
- Identify and prioritize hot spot areas
- Monitor and follow trend of ambient mercury in Thailand.
- Support further implementation of Minamata Convention for Thailand.

Pollution Control Department

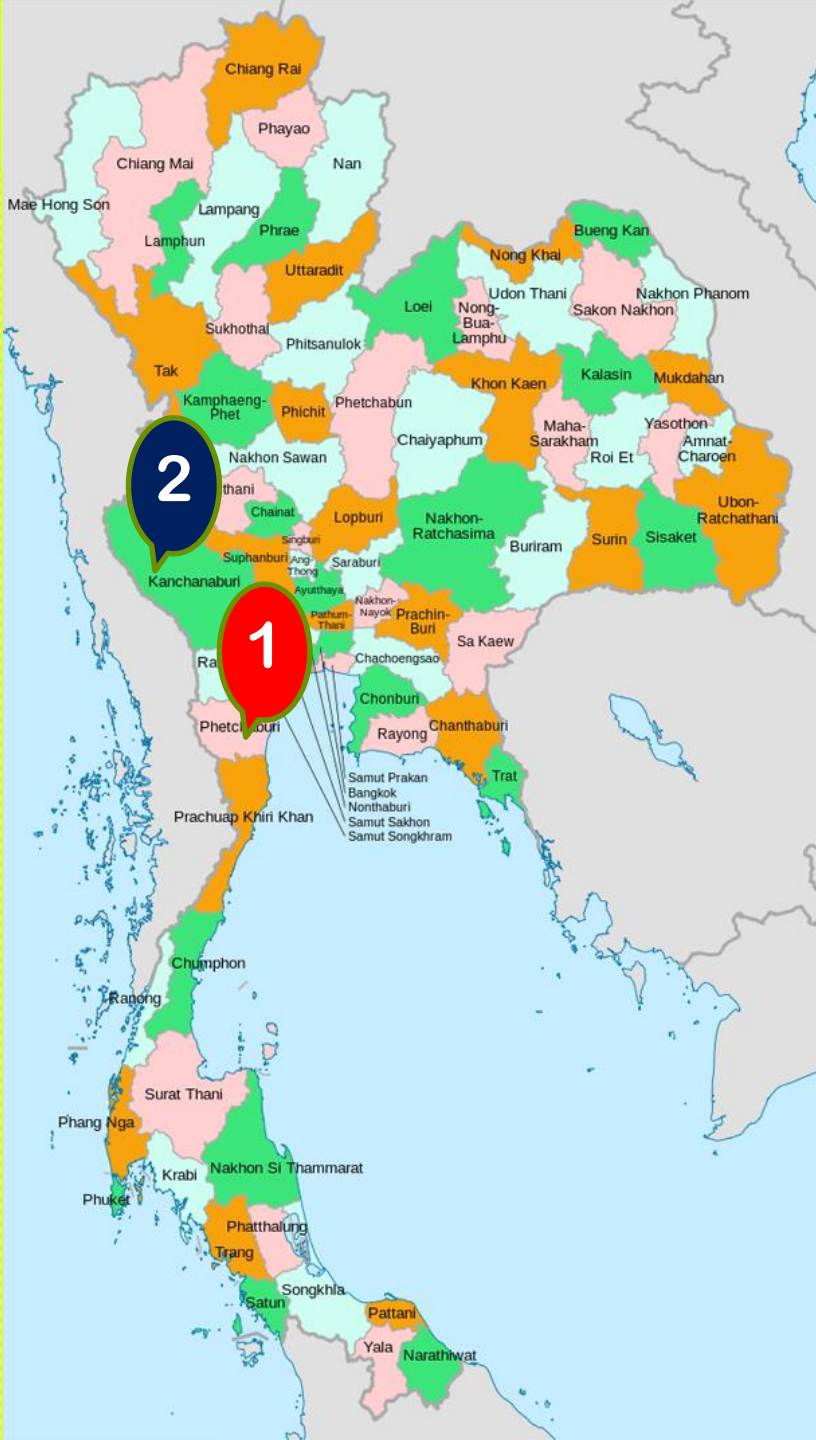


New Generation - Tekran Model 2537X





1. Prachinburi:
 - Power plant with biomass fuel, mixed biomass with sub-bituminous
 - Pulp and papers industry
2. Rayong: Oil Refinery
3. Lampang: Coal fired power plant
4. Nan: Air quality surveillance to assess future construction of coal fired power plant in Lao PDR
5. Songkhla: Municipal waste incinerator
6. Phuket: Municipal waste incinerator



**Remote
sites**

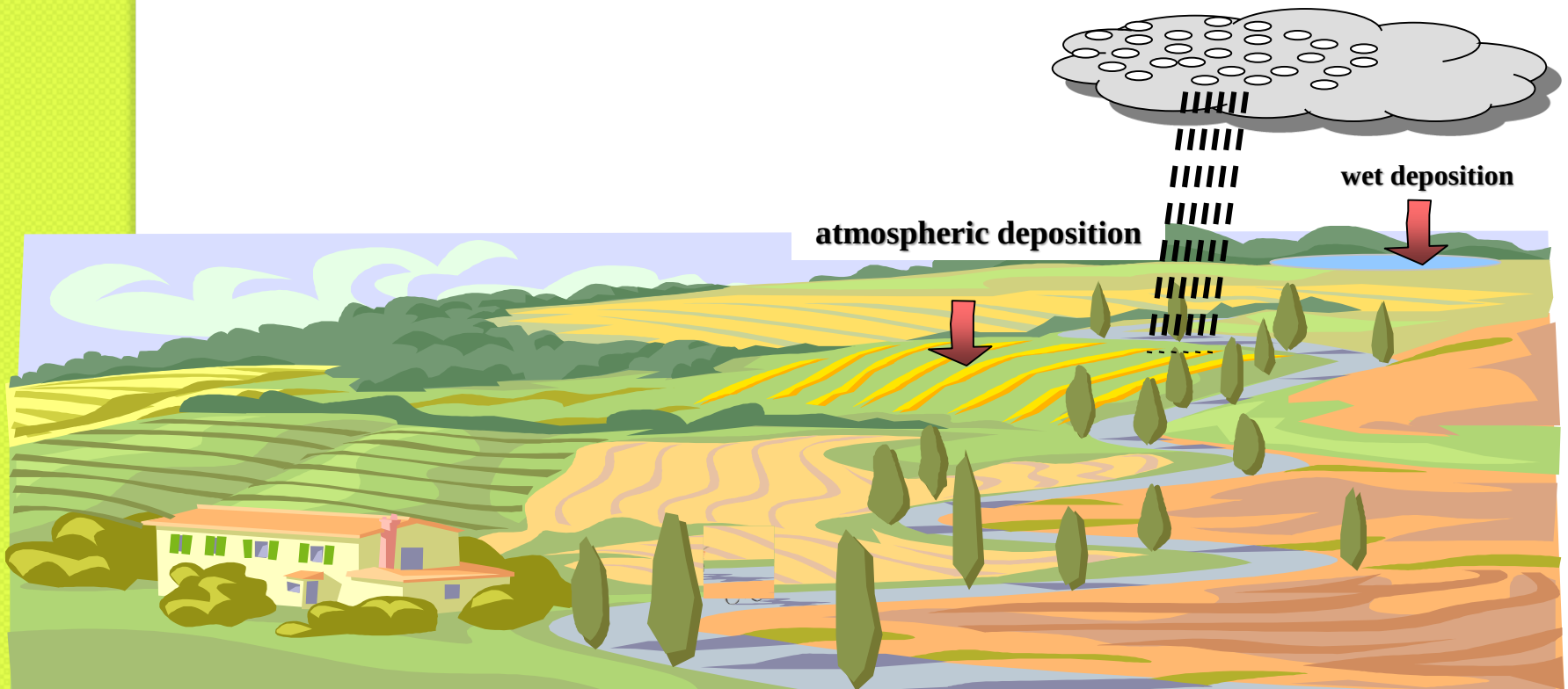
1. Petchaburi
2. Kanchanaburi

Atmospheric Mercury Monitoring Results

Location	Sampling period	Total Gaseous Mercury (TGM) concentration 1-hr average (ng/m ³)		
		Min	Avg.	Max
1. Prachin Buri	18 Nov. - 1 Dec. 2014	1.24	2.12	4.42
2. Rayong	2 - 25 Dec. 2014	1.12	3.05	9.26
3. Lampang	14 Jan. - 17 Feb. 2015	0.83	1.55	8.23
4. Nan	19 Feb. - 25 Apr. 2015	0.85	1.66	3.39
5. Songkhla	23 April – 1 May 2015	0.90	1.92	2.97
6. Phuket	4-12 May 2015	0.42	1.15	3.70
7. Petchaburi	28 Nov. - 16 Dec. 2015	0.52	1.30	2.27
8. Kanchanaburi	12 Nov. - 26 Dec. 2015	0.36	0.77	1.14

Measurement of Mercury in Air and Precipitation in Thailand (ERTC)

Objective is to develop an appropriate measurement methodology for Hg in air and precipitation for Thailand



New Instruments arrived 20 March 2016

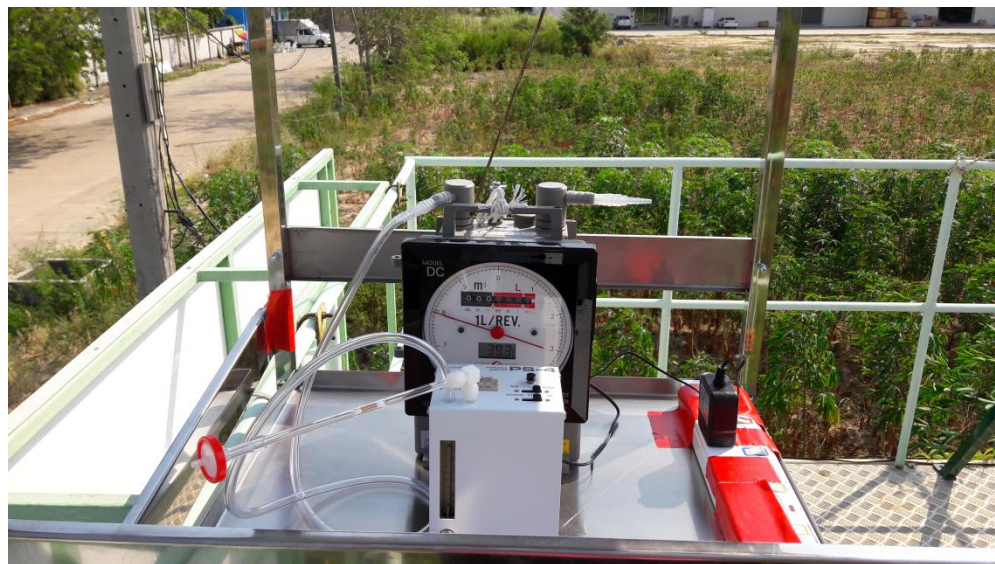


Atmospheric Hg analyzer
(dual gold amalgam CVAFS)



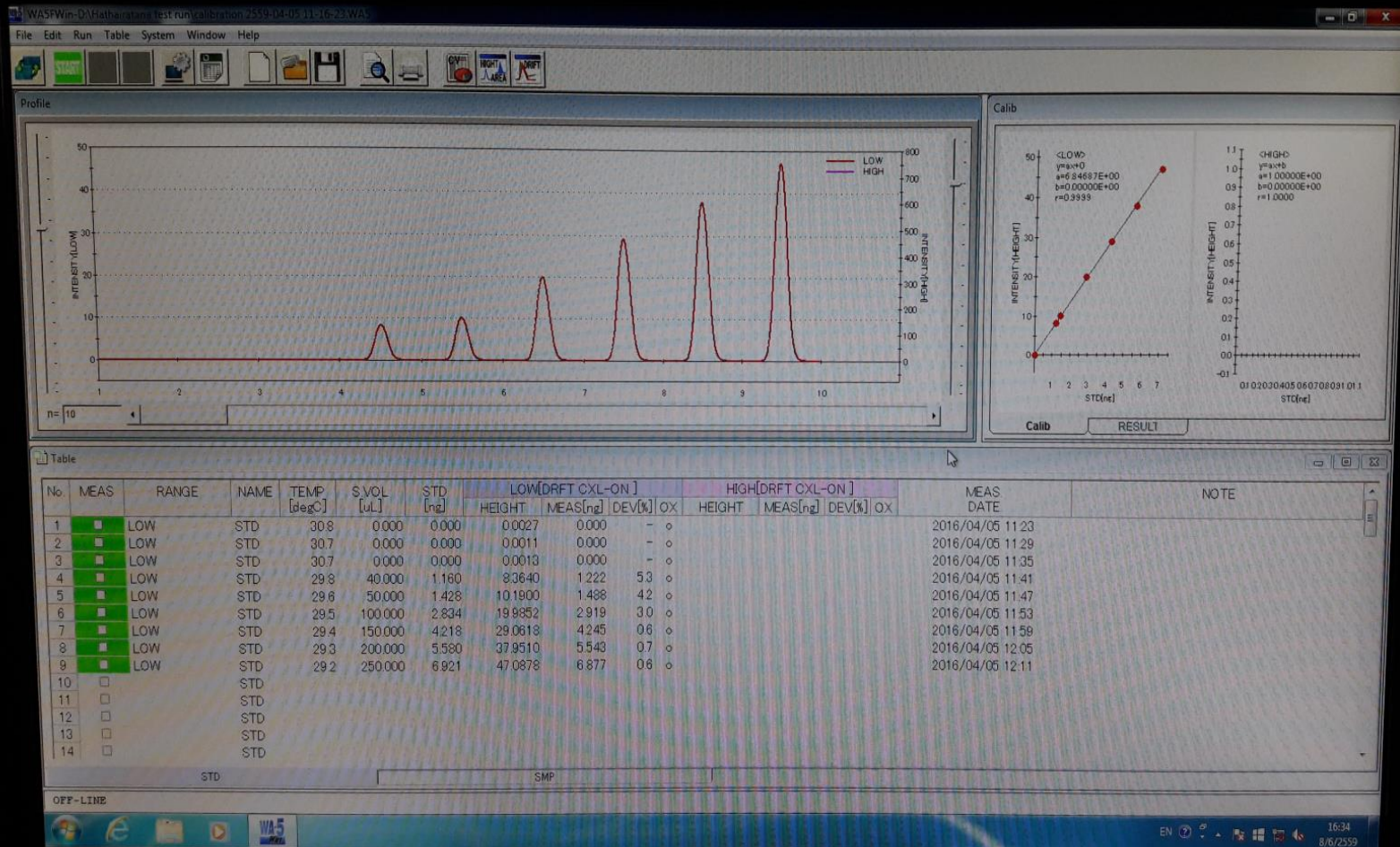
wet Hg deposition analyzer
(gold amalgam CVAFS)

Preliminary survey for atmospheric Hg

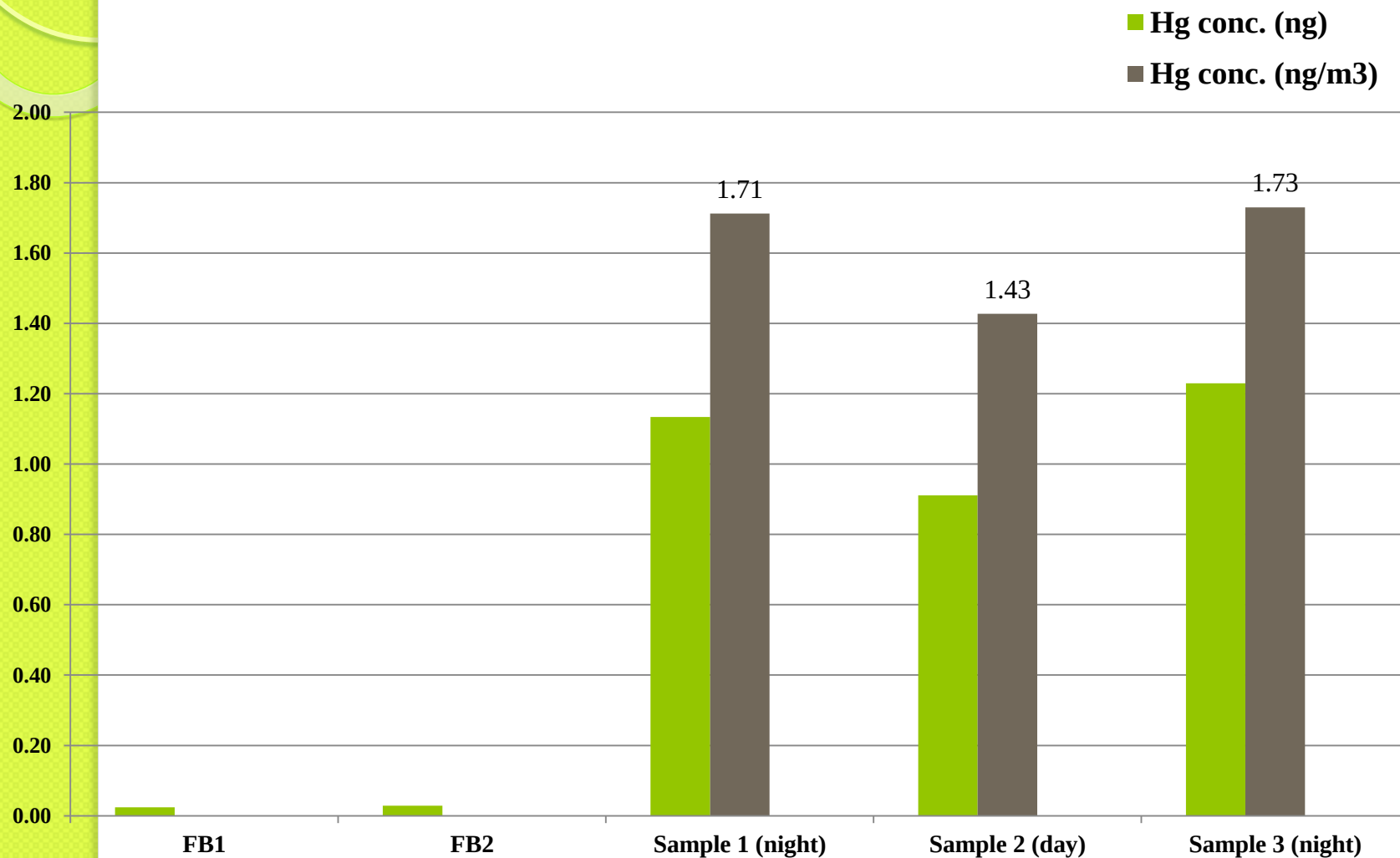


Rayong: Maptaput new town
25-27 April 2016

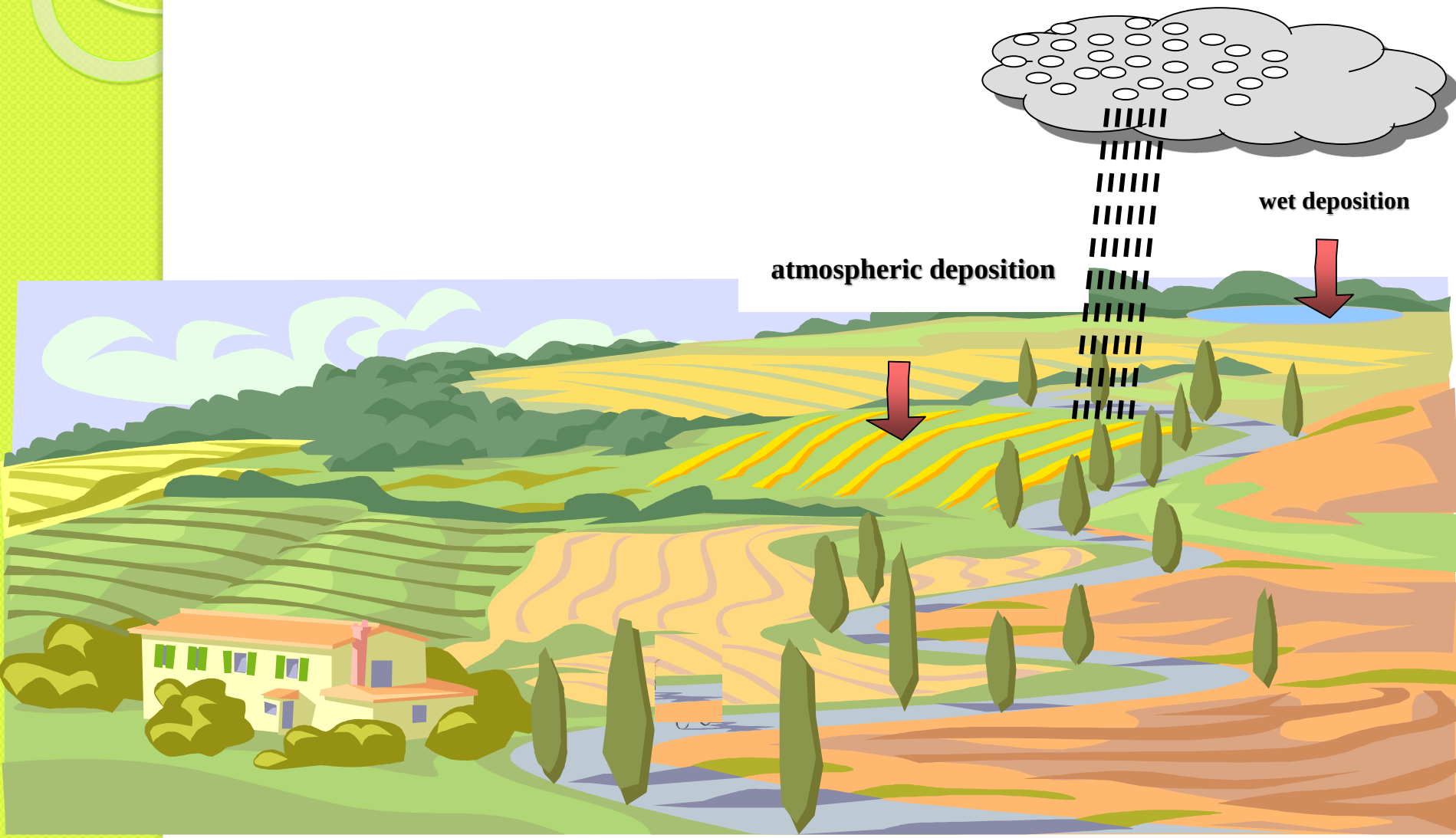
Data report WA-5F

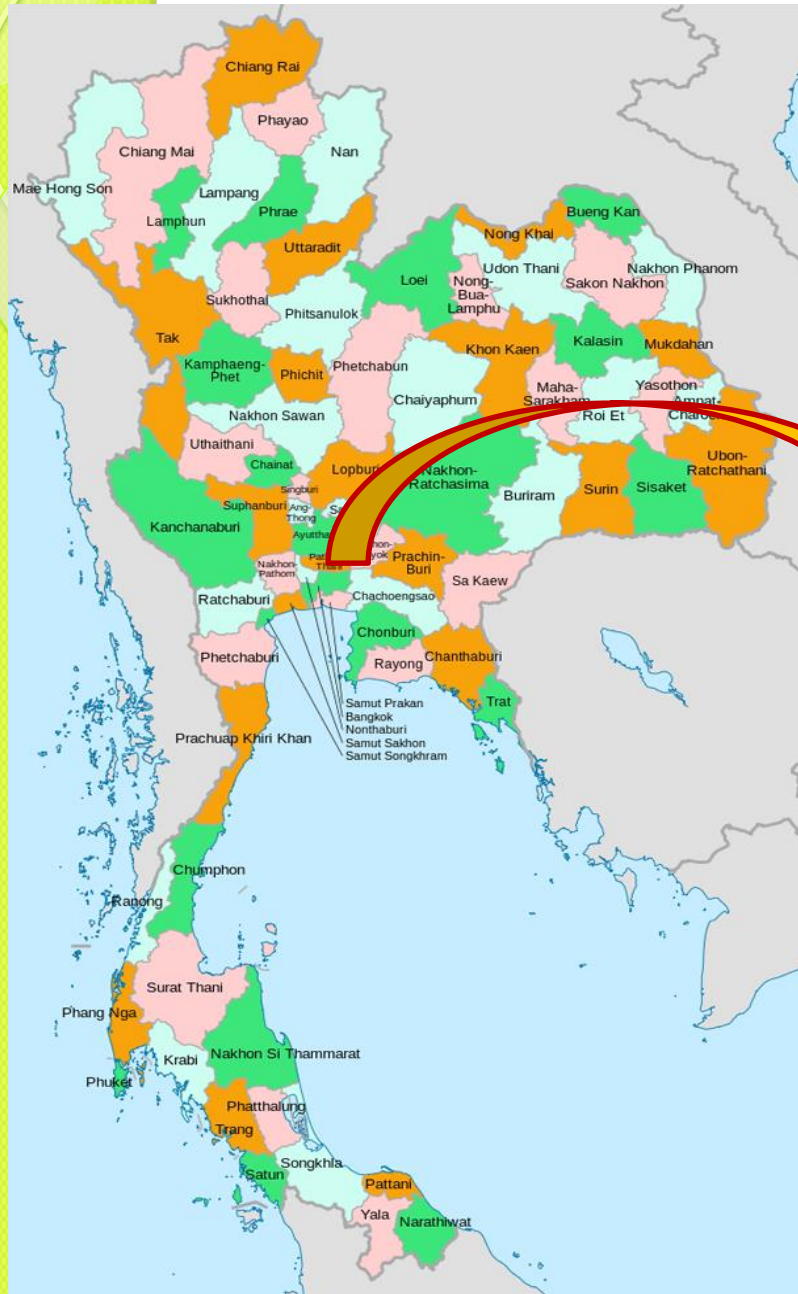


Maptaput New town 25-27 April 2016



Mercury wet deposition monitoring (ERTC)





ERTC station:

Latitude $14^{\circ} 02''$

Longitude $100^{\circ} 42''$

Elevation: 6 m msl

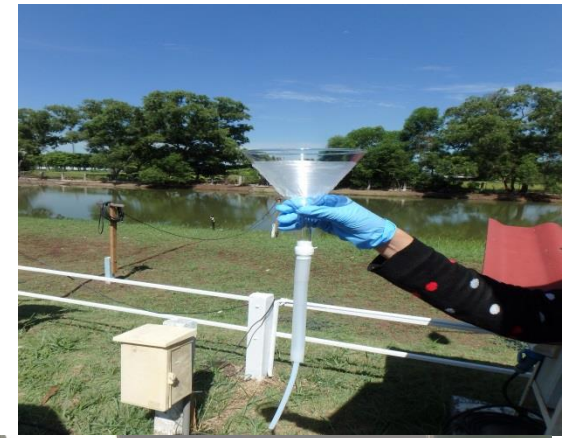


Mercury in wet deposition at ERTC



Guidelines for sampling and analysis

- ❑ APMMN Field Sample SOP
- ❑ EPA method: Method 1631 revision E

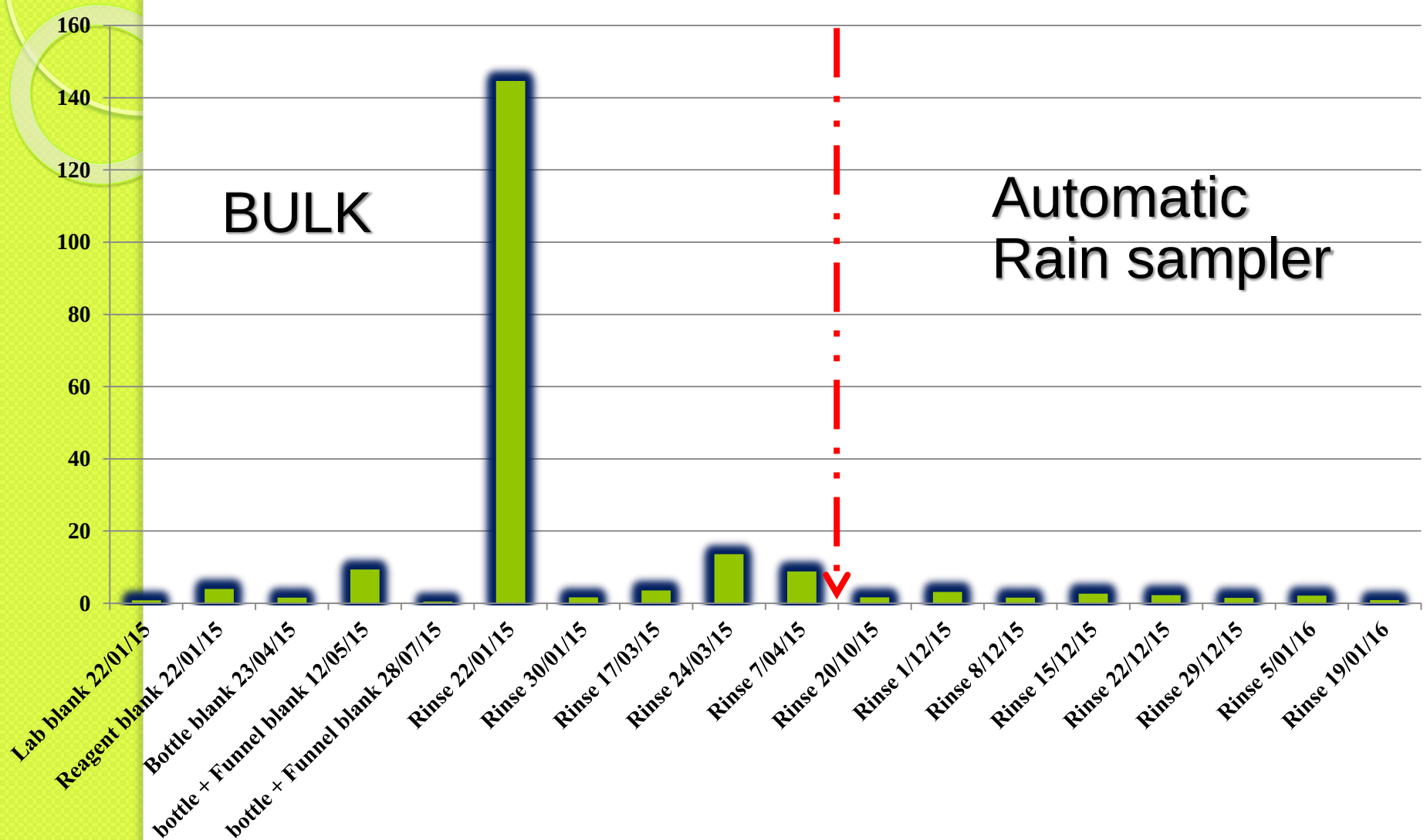


Automatic rain sampler modification



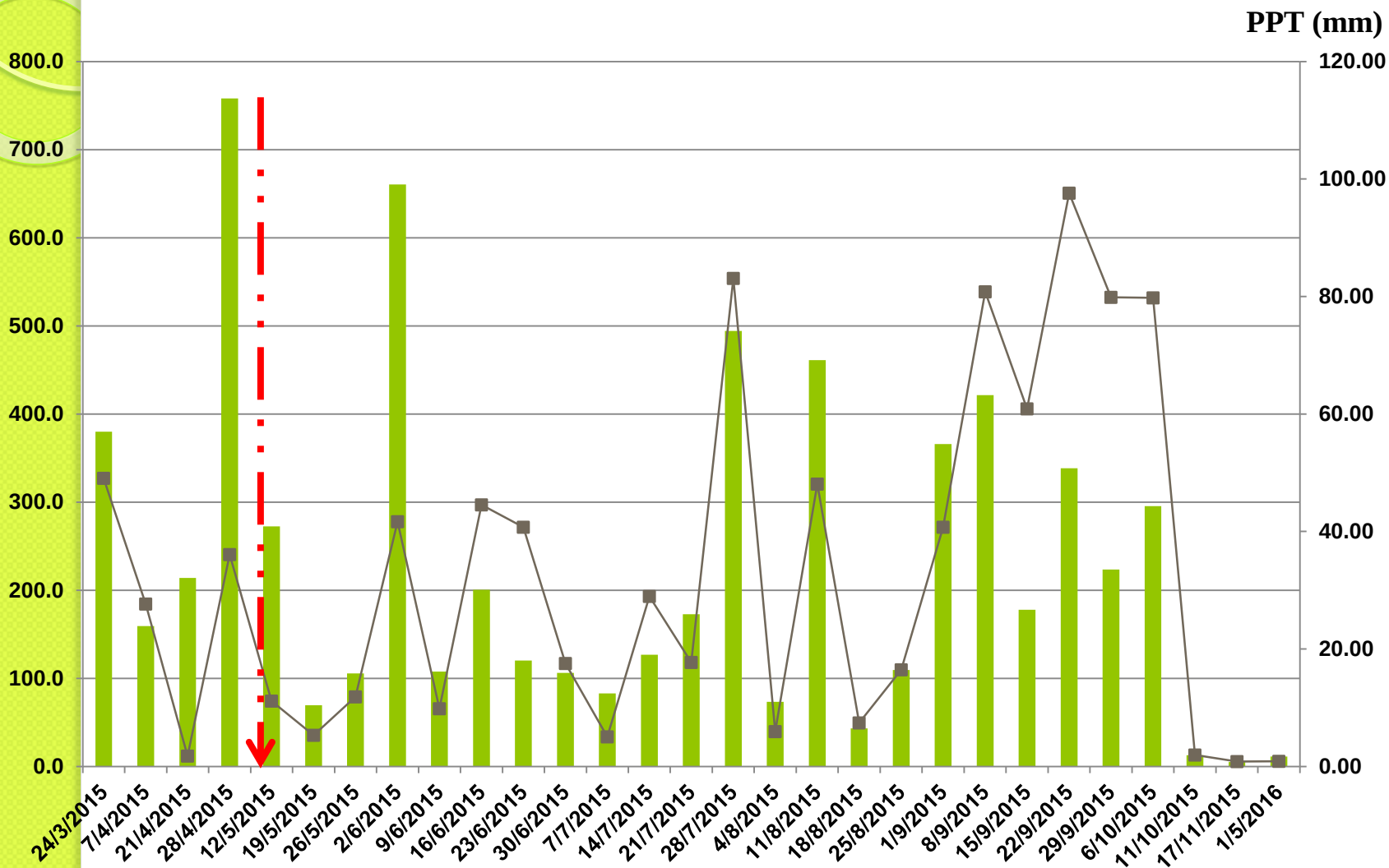
Sampling has started May 12, 2015

Hg conc. (ng/L) for Blanks and Rinsed water

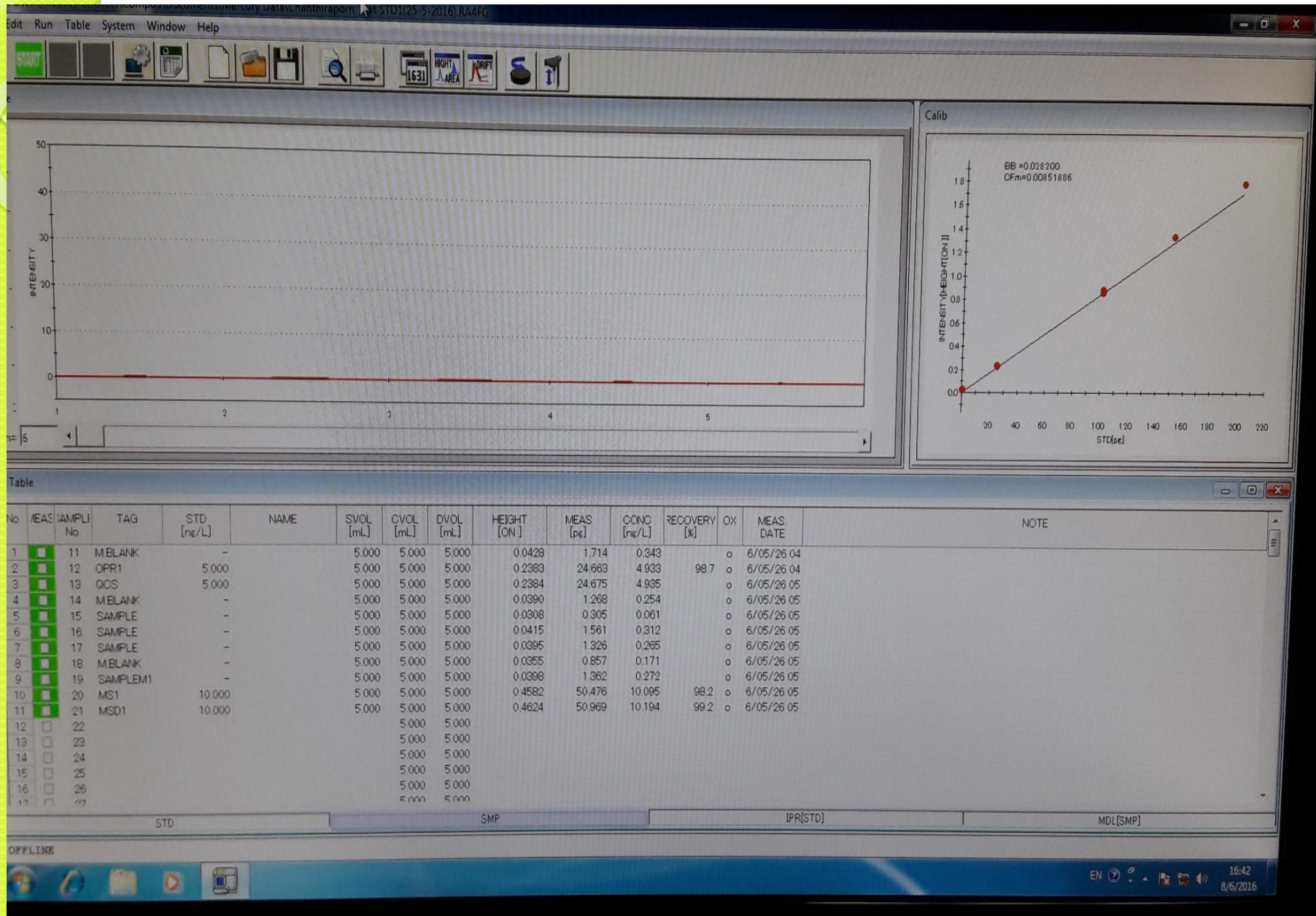


NO	SAMPLE	Sampling Start		Sampling Stop		RGPPT	Sample weight	CALPPT	CALPPT/RGPPT	Hg conc.	HgDep	Sample	QR
		Date	Time	Date	Time								
						(mm)	(g)	(mm)		(ng/L)	(ng/m ²)	type	
1	ERTC Hg-01	14/1/2015	10.05	22/1/2015	10.45	0.0	-	-		144.66		Rinse	
2	ERTC Hg-02	22/1/2015	10.45	30/1/2015	9.40	0.0	-	-		1.6		Rinse	
3	ERTC Hg-03	3/10/2015	9.20	17/3/2015	9.20	0.0	-	-		3.55		Rinse	
4	ERTC Hg-04	17/3/2015	14.10	24/3/2015	10.05	0.0	-	-		13.60		Rinse	
5	ERTC Hg-05	24/3/2015	10.50	27/3/2015	9.30	53.3	536.4	49.07	0.92	7.74	379.9		
6	ERTC Hg-06	31/3/2015	9.33	4/7/2015	9.25	0.0	-	-		8.80		Rinse	
7	ERTC Hg-07	4/7/2015	9.30	13/4/2015	8.27	24.9	302.3	27.66	1.11	5.76	159.4	Rain	B
8	ERTC Hg-08	21/4/2015	9.55	28/4/2015	9.50	1.1	19.3	1.77	1.61	121.12	213.9	Rain	B
9	ERTC Hg-09	28/4/2015	10.00	5/1/2015	9.50	33.1	394.1	36.06	1.09	21.03	758.3	Rain	B
10	ERTC Hg-10	5/12/2015	10.20	19/5/2015	9.45	8.6	121.6	11.12	1.29	24.49	272.5	Rain	B
11	ERTC Hg-11	19/5/2015	10.05	26/5/2015	9.50	5.5	57.8	5.29	0.96	13.15	69.5	Rain	B
12	ERTC Hg-12	26/5/2015	10.15	6/2/2015	9.25	11.3	129.7	11.87	1.05	8.89	105.5	Rain	B
13	ERTC Hg-13	6/2/2015	9.35	6/9/2015	9.45	36.6	455.5	41.67	1.14	15.85	660.6	Rain	B
14	ERTC Hg-14	6/9/2015	10.10	16/6/2015	9.30	8.9	107.6	9.84	1.11	10.95	107.8	Rain	B
15	ERTC Hg-15	16/6/2015	9.45	23/6/2015	9.40	38.1	486.8	44.54	1.17	4.50	200.6	Rain	B
16	ERTC Hg-16	23/6/2015	9.55	30/6/2015	9.45	38.2	445.0	40.71	1.07	2.95	120.3	Rain	B
17	ERTC Hg-17	30/6/2015	10.10	7/7/2015	9.25	15.7	191.8	17.55	1.12	6.05	106.2	Rain	B
18	ERTC Hg-18	7/7/2015	9.45	14/7/2015	9.50	4.8	55.3	5.06	1.05	16.39	82.9	Rain	B
19	ERTC Hg-19	14/7/2015	10.05	21/7/2015	9.35	26.2	316.5	28.96	1.11	4.38	126.7	Rain	B
20	ERTC Hg-20	21/7/2015	9.40	28/7/2015	9.40	15.6	193.6	17.71	1.14	9.75	172.7	Rain	B
21	ERTC Hg-21	28/7/2015	9.45	8/4/2015	9.50	83.58	908.1	83.08	0.99	5.95	494.2	Rain	B
22	ERTC Hg-22	8/4/2015	10.05	8/11/2015	9.30	5.6	64.9	5.94	1.06	12.34	73.3	Rain	B
23	ERTC Hg-23	8/11/2015	9.45	18/8/2015	9.20	43.3	525.7	48.10	1.11	9.59	461.1	Rain	B
24	ERTC Hg-24	18/8/2015	9.30	25/8/2015	9.45	6.8	80.8	7.39	1.09	5.85	43.2	Rain	B
25	ERTC Hg-25	25/8/2015	10.00	9/1/2015	9.30	14.8	179.8	16.45	1.11	6.65	109.3	Rain	B
26	ERTC Hg-26	9/1/2015	9.40	9/8/2015	9.45	37.9	445.0	40.71	1.07	8.98	365.8	Rain	B
27	ERTC Hg-27	9/8/2015	10.00	15/9/2015	9.30	73.0	883.1	80.79	1.11	5.22	421.4	Rain	B
28	ERTC Hg-28	15/9/2015	9.40	22/9/2015	9.25	64.1	665.5	60.89	0.95	2.92	177.8	Rain	B
29	ERTC Hg-29	22/9/2015	9.40	29/9/2015	9.30	88.2	1066.7	97.59	1.11	3.47	338.5	Rain	B
30	ERTC Hg-30	29/9/2015	9.45	10/6/2015	9.25	74.3	873.0	79.87	1.08	2.80	223.4	Rain	B
31	ERTC Hg-31	10/6/2015	9.30	13/10/2015	9.45	72.0	871.8	79.76	1.11	3.70	295.5	Rain	B

Wet mercury deposition at ERTC (ng/m²)



Data report RA-4300 FG



Future plan

- ERTC will be able to analyze gaseous Hg and wet deposition Hg
- We will soon compare the wet deposition data with Prof. Sheu.
- Collaborate closely with PCD and compare the results of atmospheric Hg using different methods in Thailand.



*Thank you very much
For
Your kind attention
And
Welcome to Thailand
For
the 5th APMMN
workshop*