

Acid Deposition Monitoring Network in East Asia (EANET)

**Network Center for EANET
Ken YAMASHITA**



**Secretariat (UNEP RRC.AP)
In Thailand**



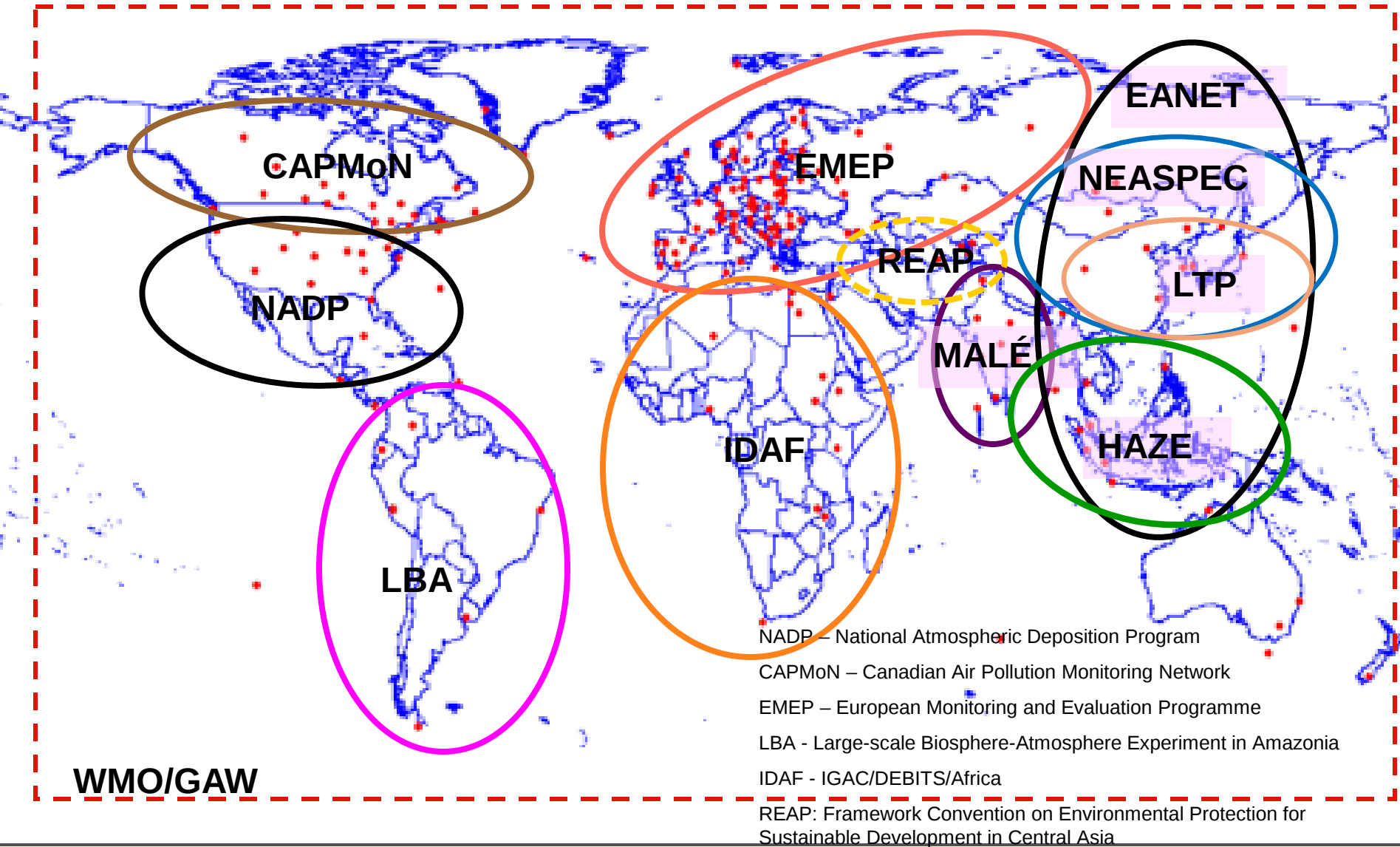
**Asia Center for Air Pollution Research (ACAP)
In Japan**

Table of Contents

- 1. Outline of EANET**
- 2. Recent progress of EANET**
- 3. Activities of ACAP**

1. Outline of EANET

Regional Air Pollution Monitoring Networks

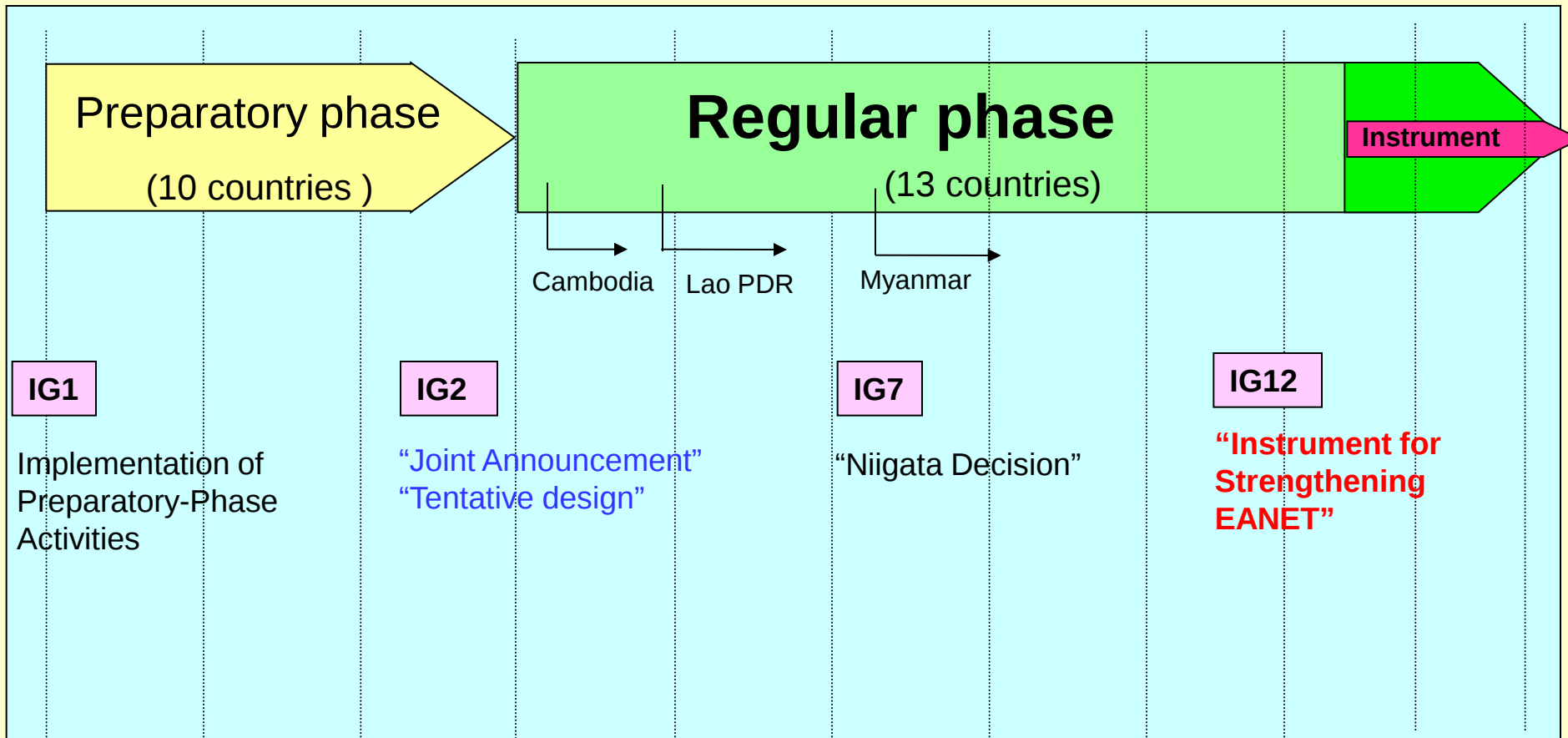


History

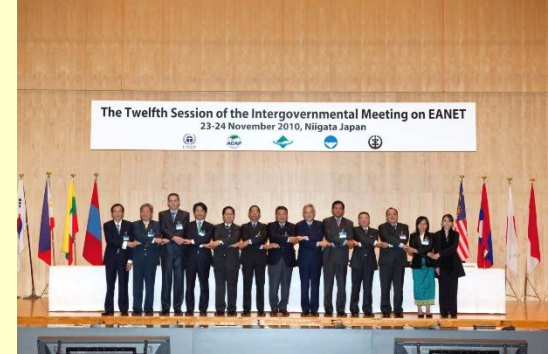
- 1993-1997 Expert meetings (4 times)
- 1998 **ADORC** established to play the role of the Interim Network Center
- 1998-2000 Preparatory Phase Activities of EANET (IG1, IG2)
- 2001 EANET established officially. Regular phase of EANET started based on “Joint Announcement” and “Tentative Design” adopted at IG2 (2000)
- 2010 “Instrument for Strengthening EANET” was adopted at IG12
Renamed of **ADORC** to **ACAP**
- 2012 “Instrument for Strengthening EANET” was operated

Development of EANET

1998 1999 2000 2001 2003 2005 2007 2009 2011 2013 2015



Objectives and Scope



IG12 in 2010

- to create a **common understanding** of the state of the acid deposition problems in East Asia
- to provide **useful inputs** for decision-making at local, national and regional levels aimed at preventing or reducing adverse impacts on the environment caused by acid deposition
- to contribute to **cooperation on the issues** related to acid deposition among the participating countries.
- The scope of this instrument **may be extended**, as decided by the IG

Major activities of EANET

1. Promotion of acid deposition monitoring (national monitoring plan(NMP))

- wet deposition, dry deposition, soil & vegetation, inland aquatic environment, catchment

2. Compilation, evaluation, storage and provision of data

- Development of periodic reports (5 years)

3. Promotion of quality assurance and quality control (QA/QC)

- Inter laboratory comparison project

4. Technical support and capacity building

- Dispatch of technical missions
- Training activities, technical assistance

5. Research activities

- Directions of research activities by SAC
- Joint researches with participating countries
- Fellowship research program

6. Promotion of public awareness

- Development of materials (Report for Policy Makers/RPM)

7. Cooperation with other international bodies

- NADP, EMEP, WMO etc.



Asia Center for Air Pollution Research (ACAP) (Niigata, Japan)

Handle scientific and technical matters of EANET

ACAP in Japan is designated as Network Center by IG



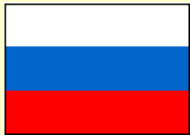
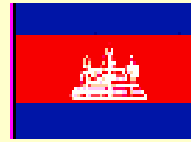
Secretariat for EANET

- Manage the administrative and financial arrangements of EANET
- United Nations Environment Programme, Regional Resource Centre for Asia and the Pacific (UNEP/RRC.AP) in Thailand is designated as the Secretariat by IG



Dr. Supat Wangwongwatana
Coordinator
EANET Secretariat

Participating Countries of EANET



- Designate the National Focal Point (NFP)
- Develop and implement the National Monitoring Plan
- Designate the National Center

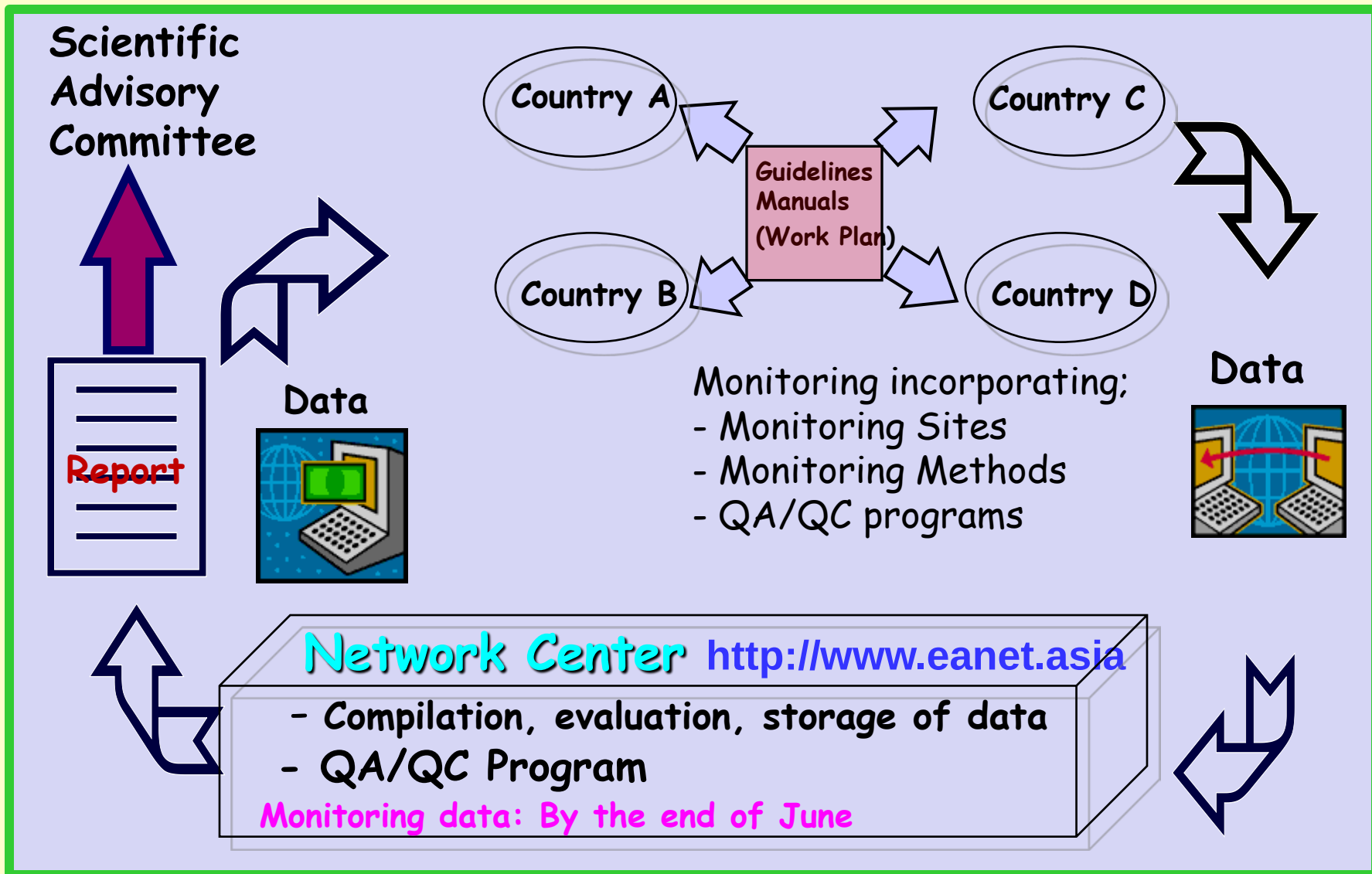
Financial Arrangement

- National Monitoring: Borne by each country
- Administrative and operational cost of EANET:
 - Financed by voluntary contributions by participating countries
- Budget for 2013
 - Secretariat: Around \$473,340
 - Network Center: Around \$1,138,263

(contribution to NC from participating countries: \$393,418)

3. Recent Progress of EANET

EANET Monitoring Activities



(Inter-lab. data: By the end of February)

Wet/Dry Deposition Monitoring Sites (54/47 sites) (2013)

Wet/dry

Russia: 4/4

Mongolia: 2/2

China: 8/3

R. of Korea: 3/3

Japan: 12/12

Philippines: 3/3

Vietnam: 4/4

Lao PDR: 1/1

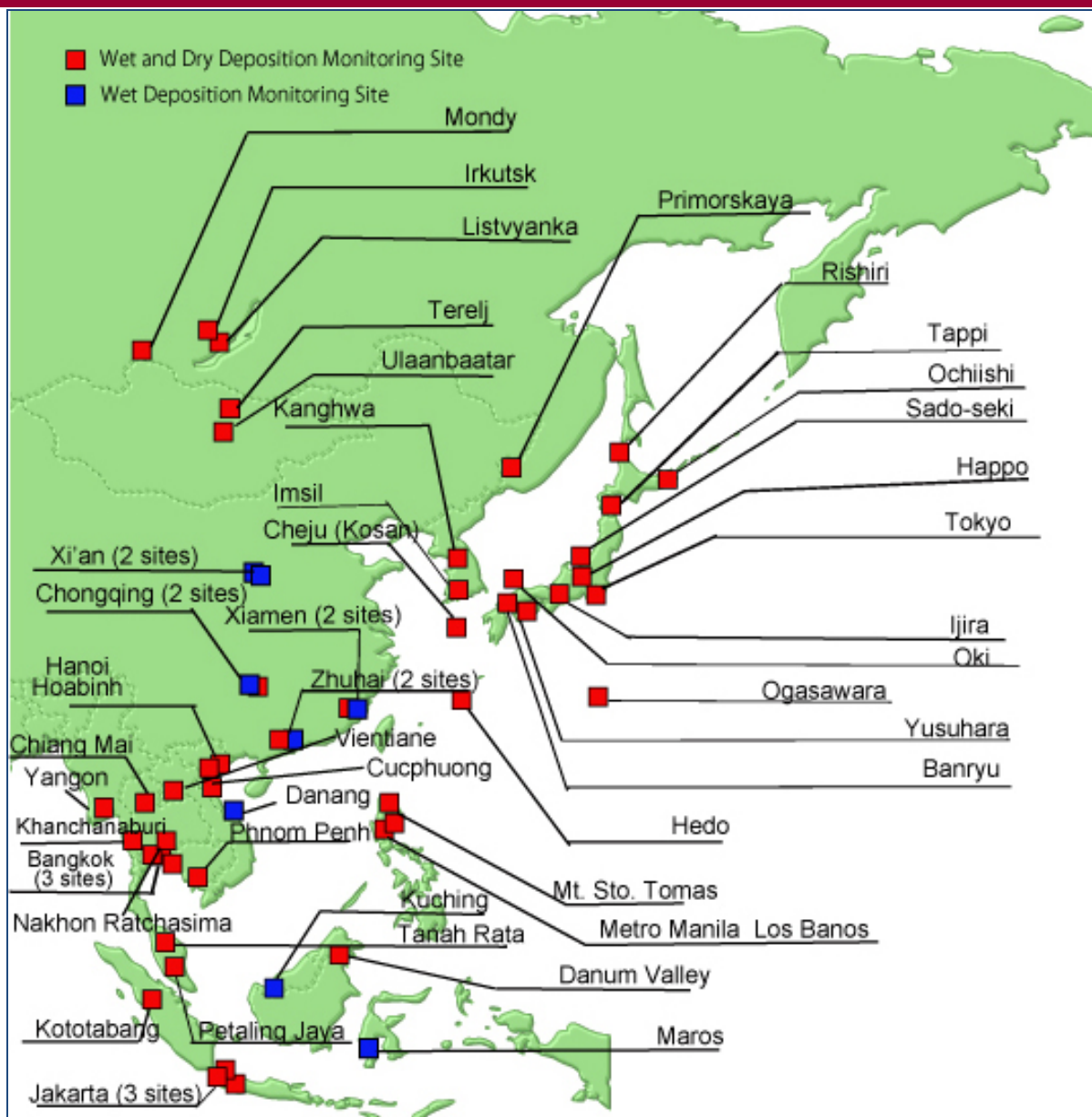
Cambodia: 1/1

Thailand: 6/6

Myanmar: 1/1

Malaysia: 4/3

Indonesia: 5/4



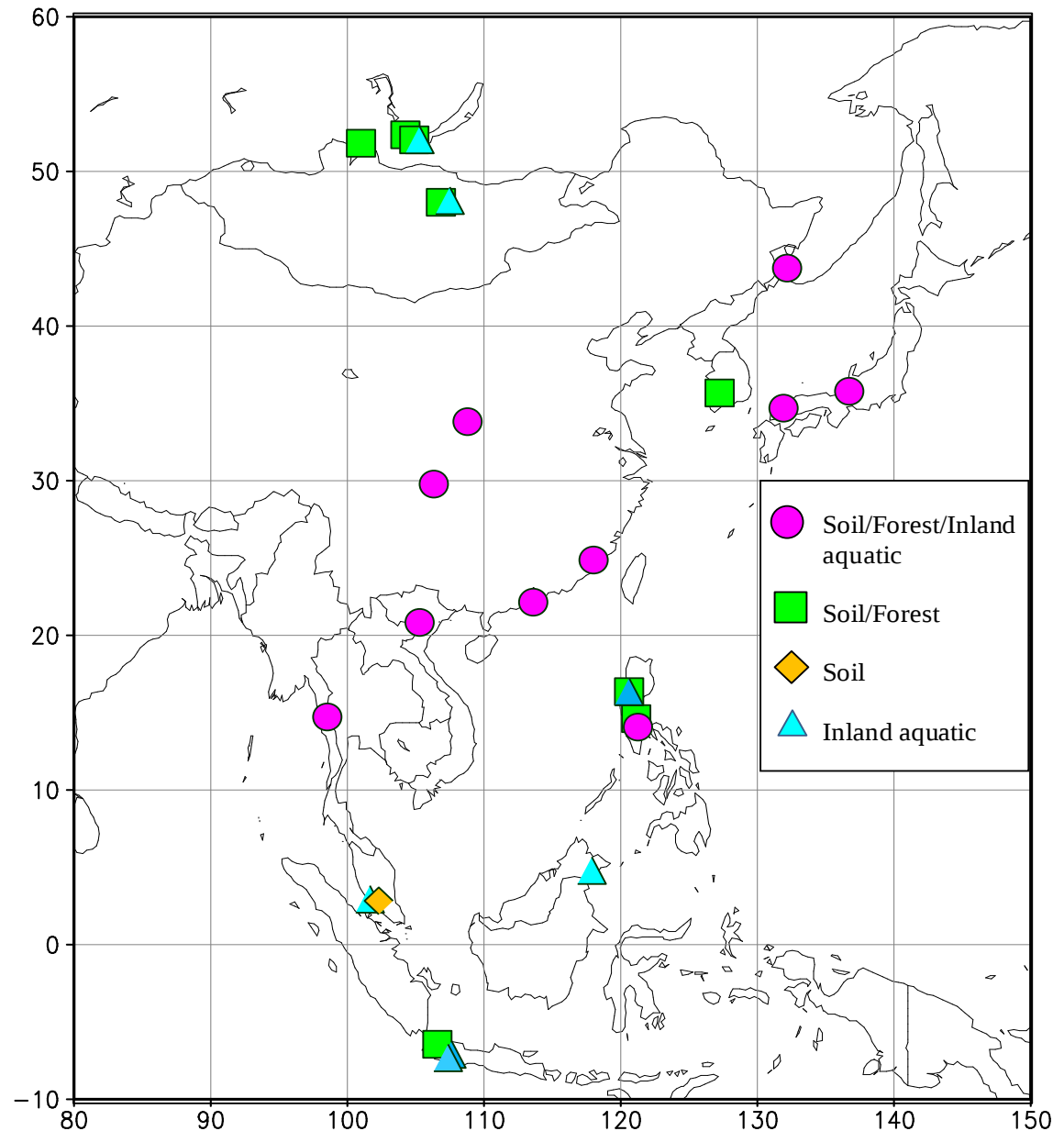
Ecological Impacts Monitoring sites (2013)

Soil & Vegetation

20 area 29 forest

Inland Aquatic Environment

18 Sites



EANET Monitoring Sites in 2013/2014

	Number of monitoring sites			
	Total	Urban	Rural	Remote
Wet Deposition*	54 (57*)	21 (22*)	13 (14*)	20 (21*)
Dry Deposition*	47 (50*)	17 (18*)	12 (13*)	18 (19*)
Soil	19 areas 28 forests			
Vegetation	18 areas 24 forests			
Inland Aquatic Environment	18 lakes/rivers	(5)	(7)	(6)
Catchment**	1		(1)	

* Vietnam will establish 3 wet/dry deposition monitoring sites.

** Philippines is preparing to establish a new catchment site.

EANET Monitoring Sites



Mongolia



Russia



China



R. of Korea



Japan



Philippines



Vietnam



Lao PDR



Thailand



Cambodia



Malaysia

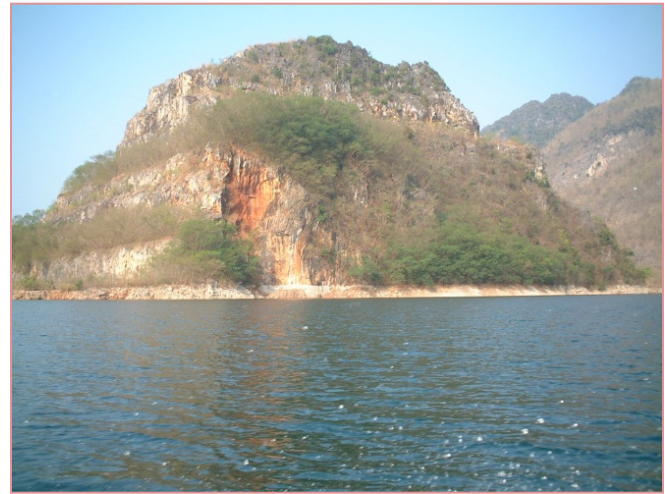
Myanmar



Indonesia



Mongolia



Thailand



Japan



Philippines

Monitoring Sites (soil/vegetation, Inland aquatic environment)

Monitoring components

● Wet deposition

Monitoring interval: every 24 hours or every precipitation event

Parameters: pH, EC, concentrations of SO_4^{2-} , NO_3^- , Cl^- , NH_4^+ , Na^+ , K^+ , Ca^{2+} and Mg^{2+}

● Dry deposition

Monitoring interval: every two weeks to one month/ every hour (automatic instrument)

Parameters: concentrations of SO_2 , NO_2 , NO , O_3 and PM, meteorological measurement

● Soil and vegetation

Monitoring interval: every 3-5 years

Parameters: (Soil) pH, exchangeable base cations (Na^+ , K^+ , Ca^{2+} , and Mg^{2+}),
exchangeable acidity, effective cation, exchangeable capacity (ECEC)
and others

(Vegetation) observation of tree decline

● Inland aquatic environment

Monitoring interval: more than four times a year / once a year / once in 3-5 years

Parameters: pH, EC, alkalinity, DOC / water color / sediment

● Catchment-scale

Monitoring items: rain water, stream water, air concentration, soil chemistry

Data report on the Acid Deposition in the East Asian Region 2013

Chapter 4 *Dry deposition (Air conc.) monitoring* *(Draft)*

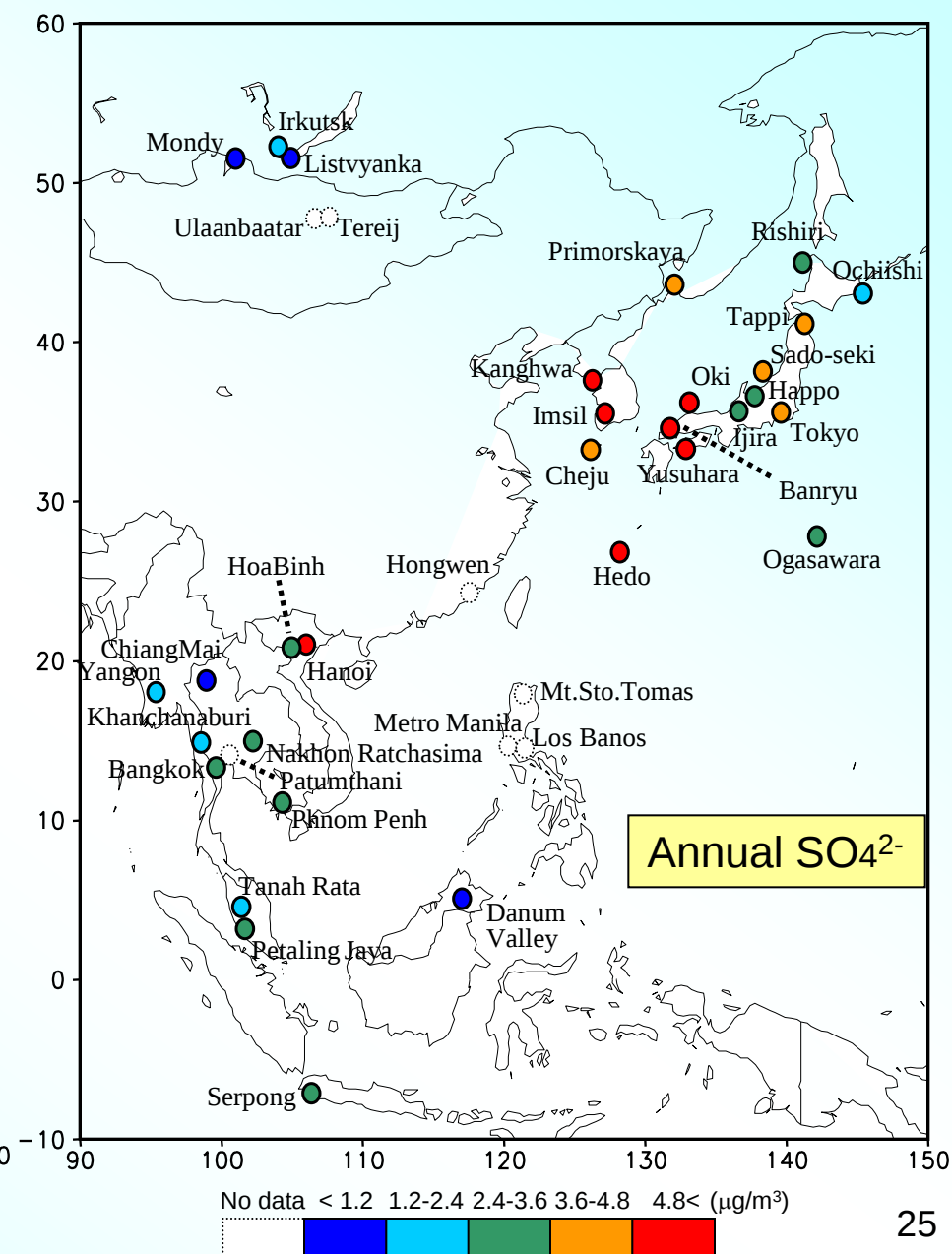
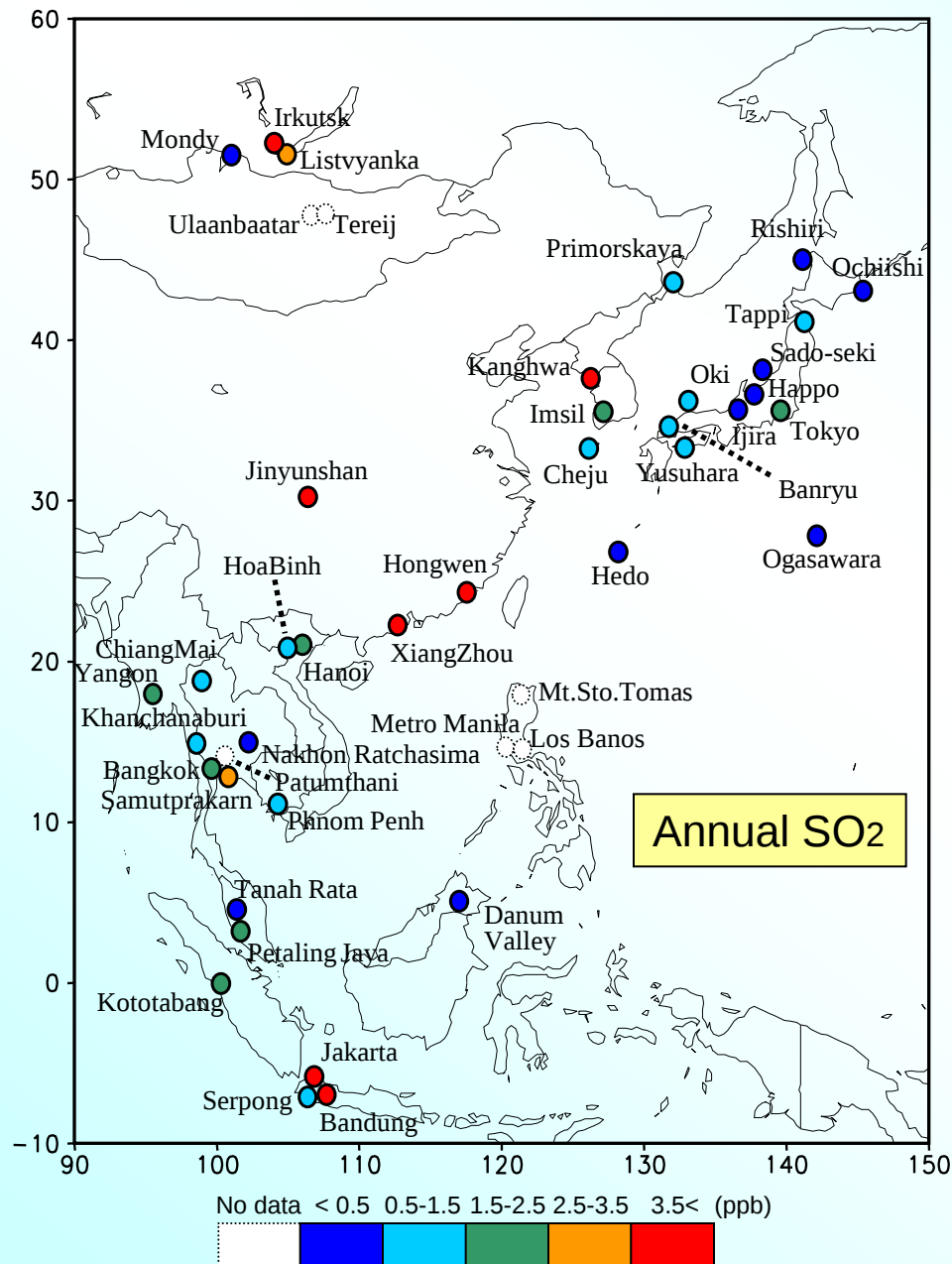
SAC 14

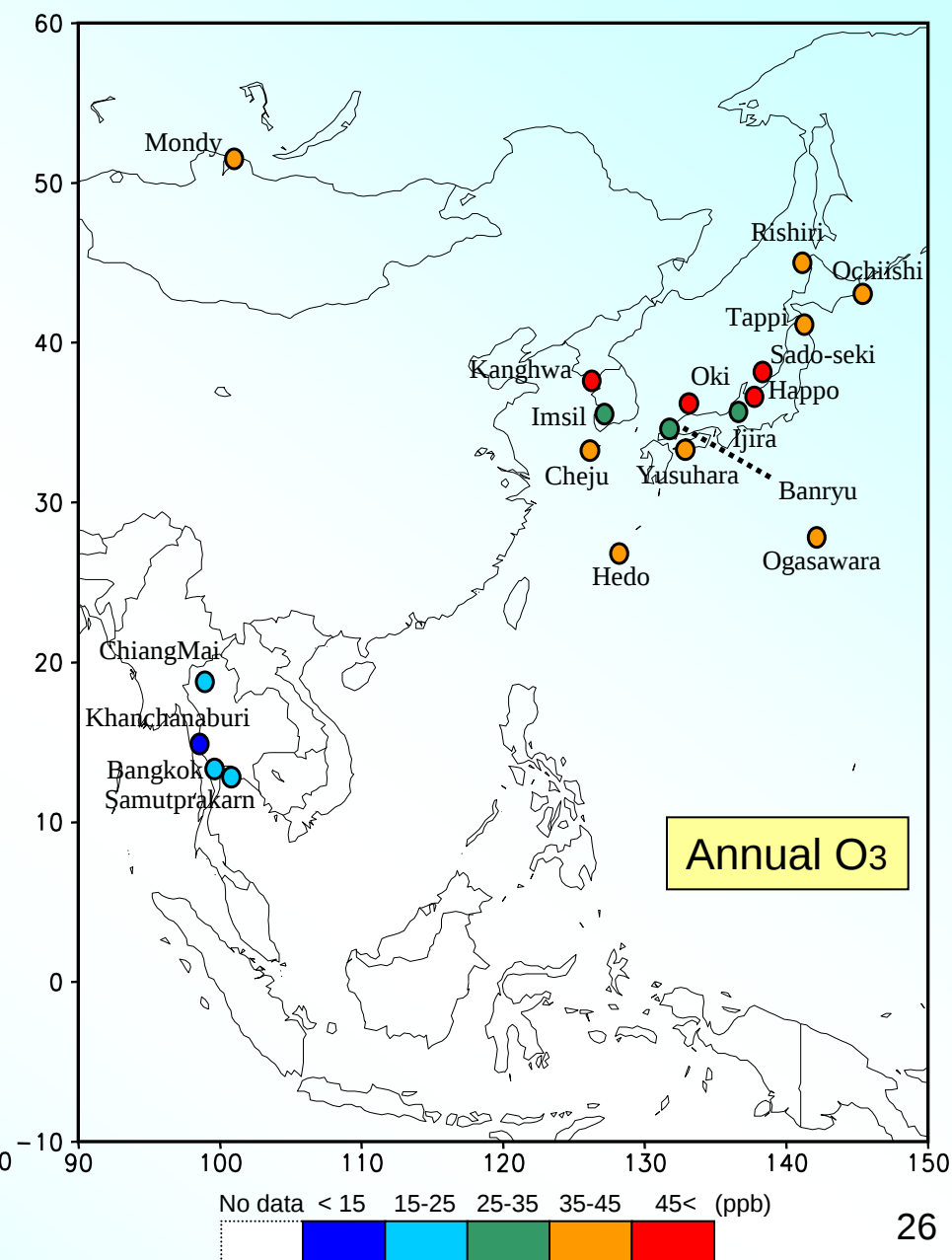
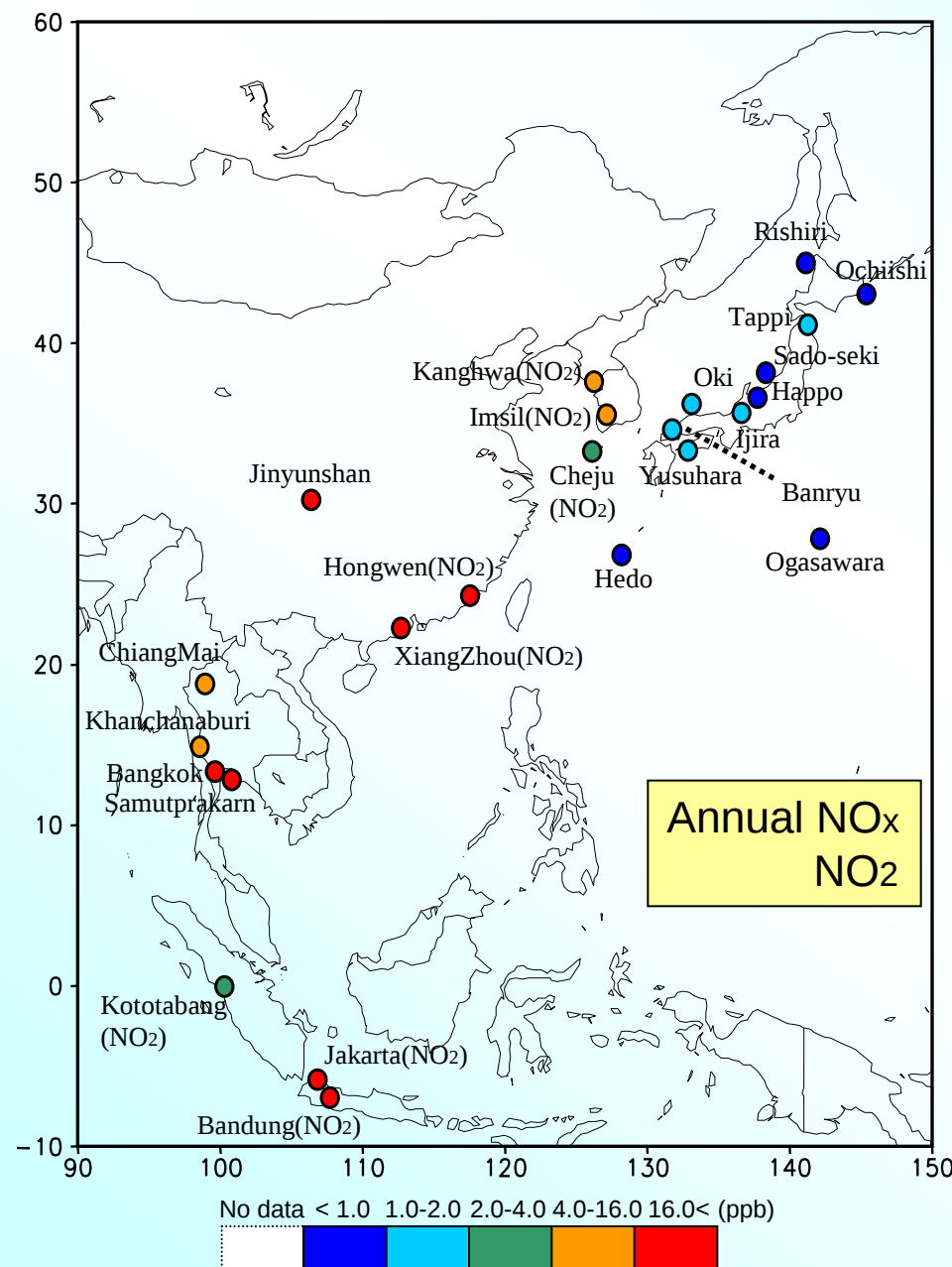
2-4 September, 2014

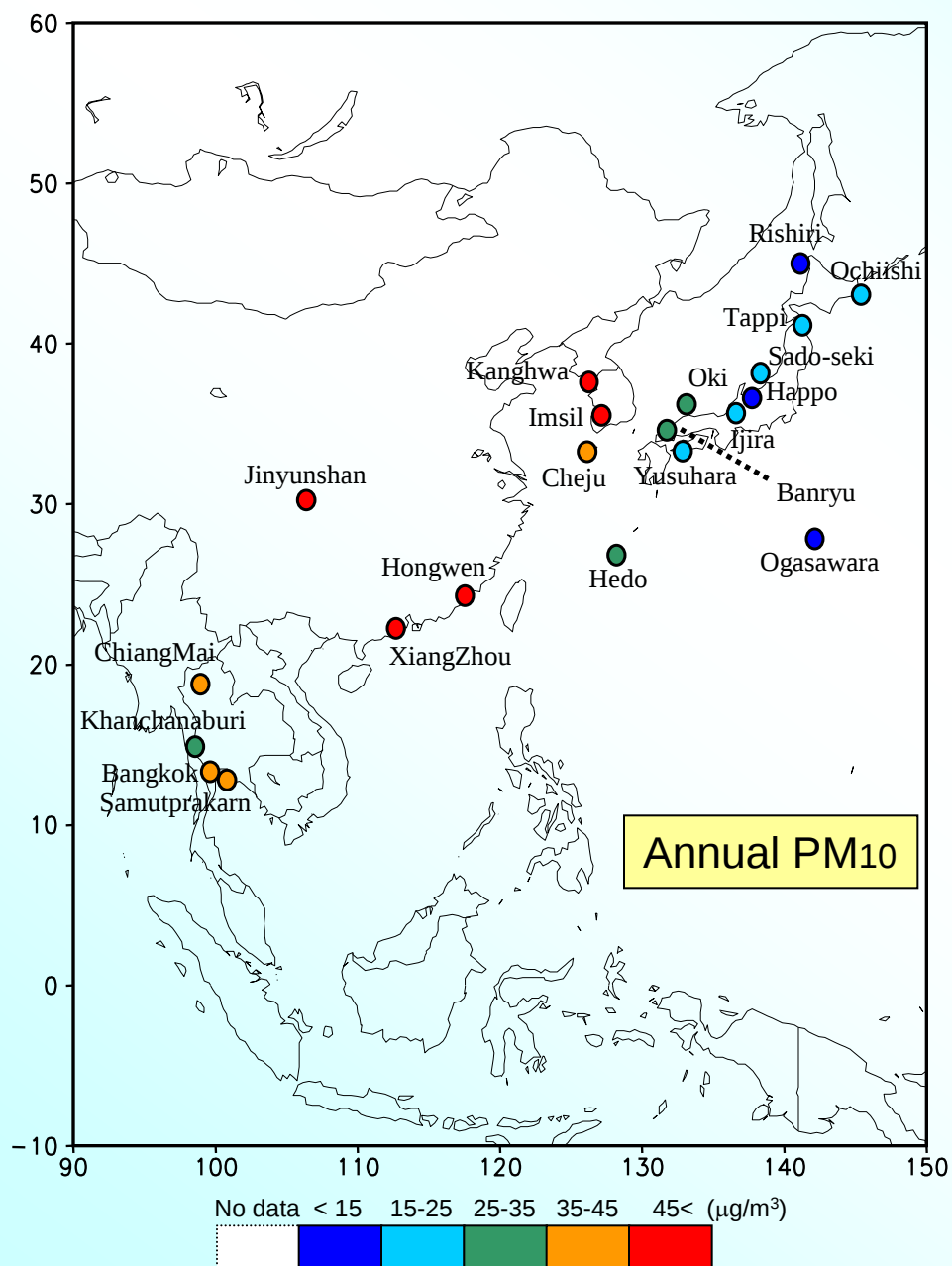
Incheon, Republic of Korea

Network Center for EANET

(Appendix Figs. 1-3 ~9, Data report 2013)

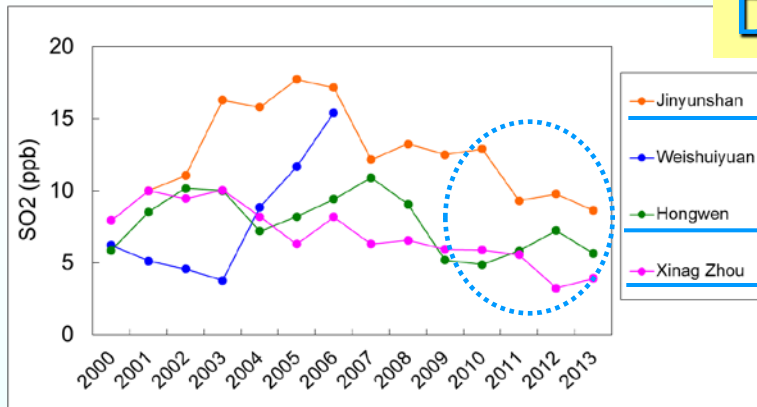






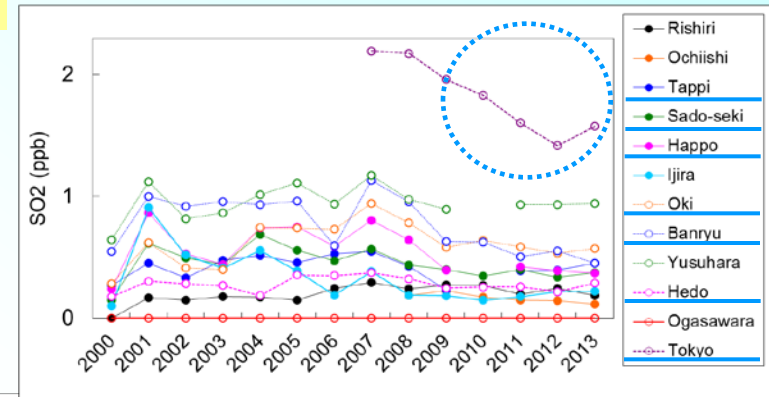
Annual trend during 2001-2013 (SO₂)

China

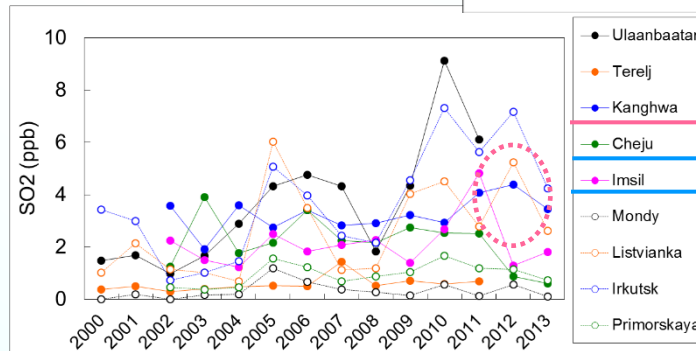


Decreasing

Japan



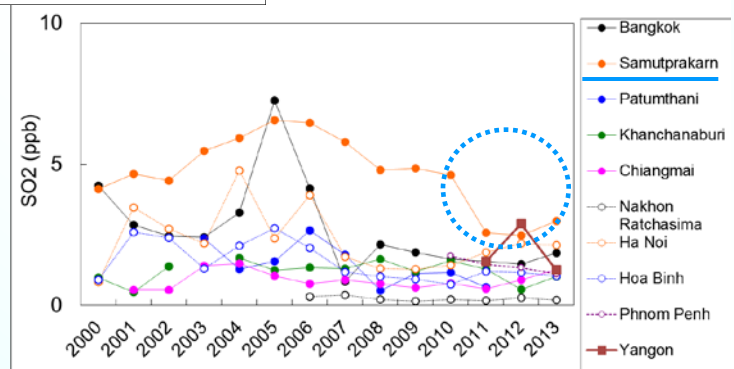
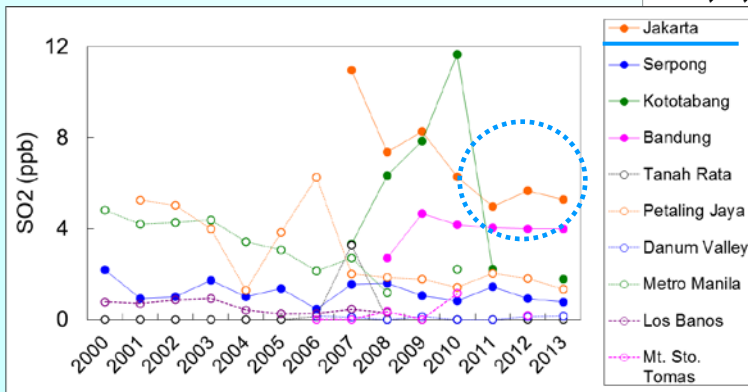
Mongolia, R.Korea, Russia



Increasing

Thailand, Viet Nam
Cambodia

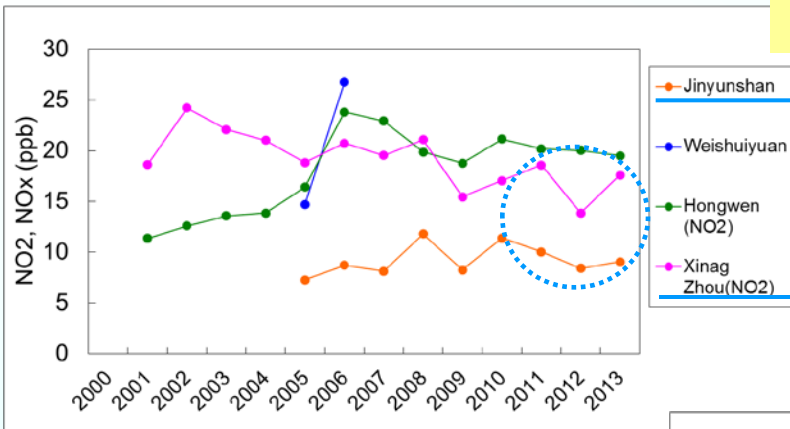
Indonesia, Malaysia, Philippines



(Table 4.21, Data report 2013)

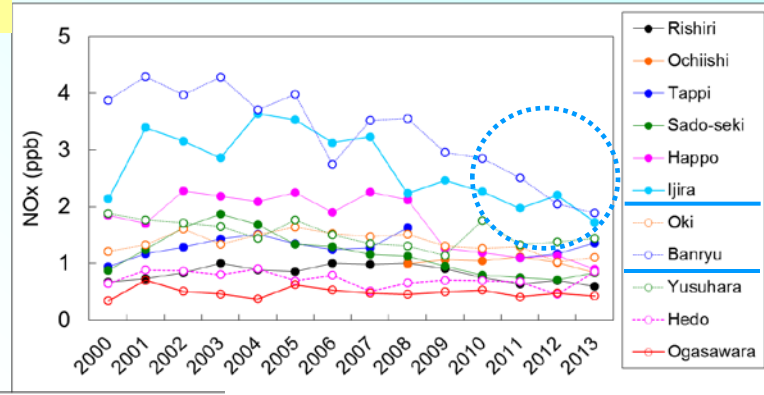
Annual trend during 2001-2013 (NO₂, NO_x)

China

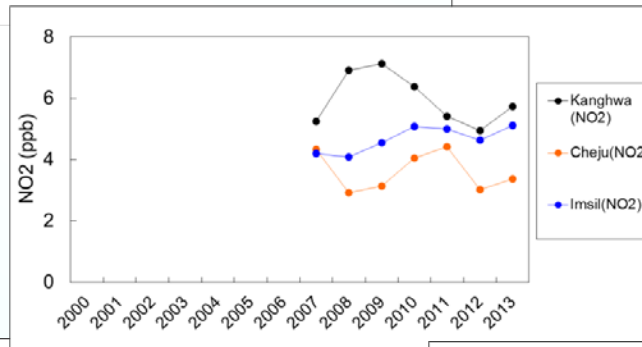


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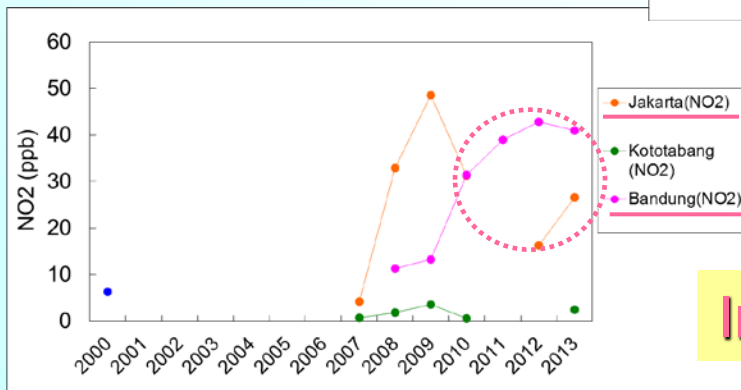
Japan



R.Korea

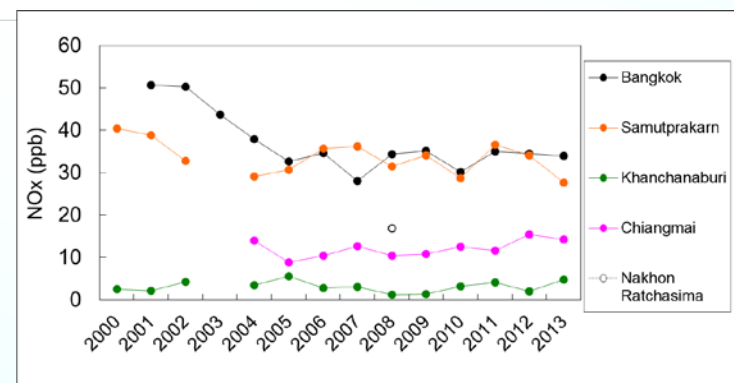


Indonesia



Increasing

Thailand

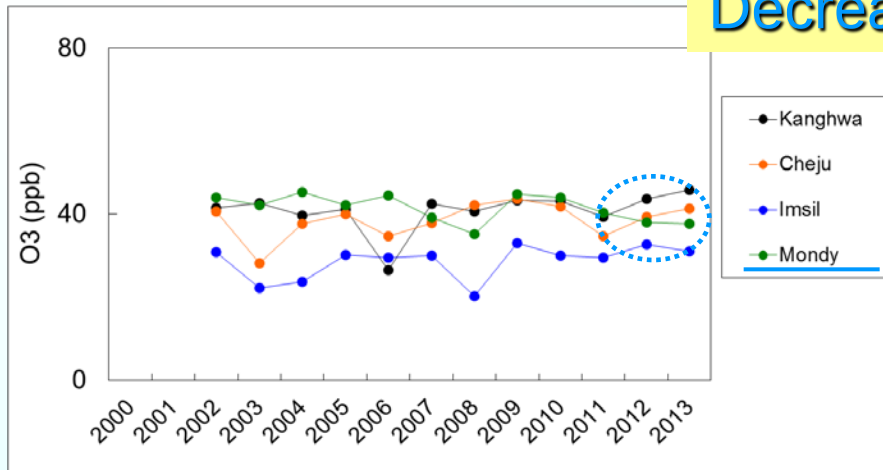


(Table 4.26-27, Data report 2013)

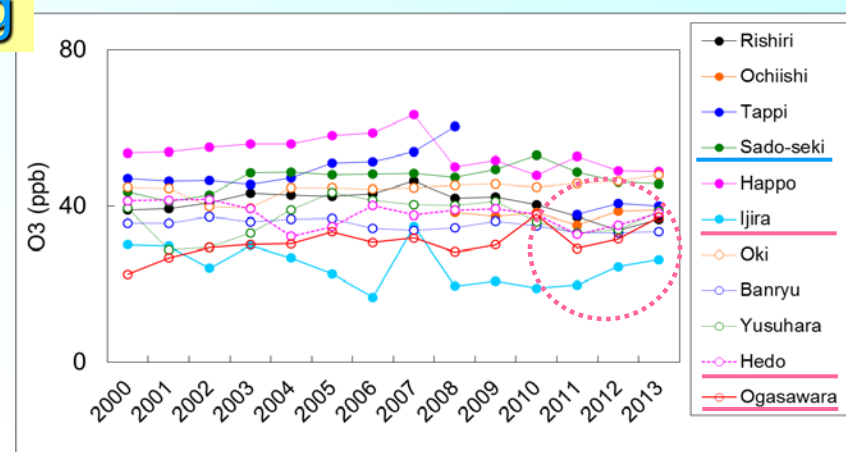
Annual trend during 2001-2013 (O₃)

R.Korea, Russia

Decreasing

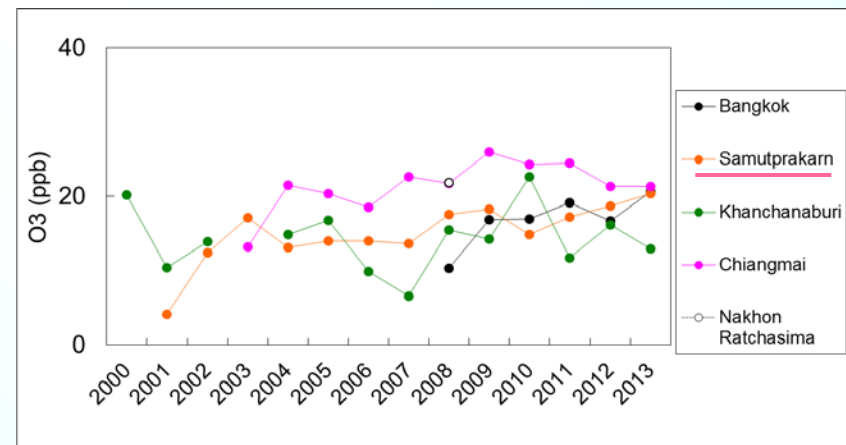


Japan



Increasing

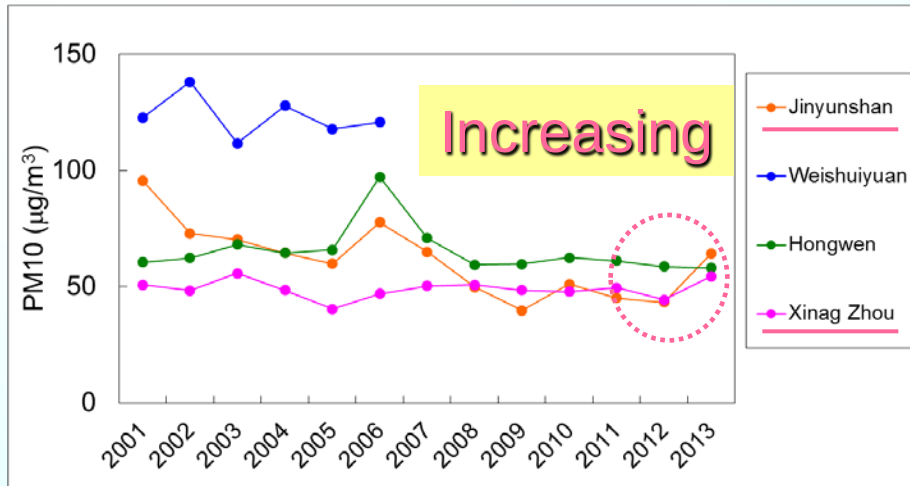
Thailand



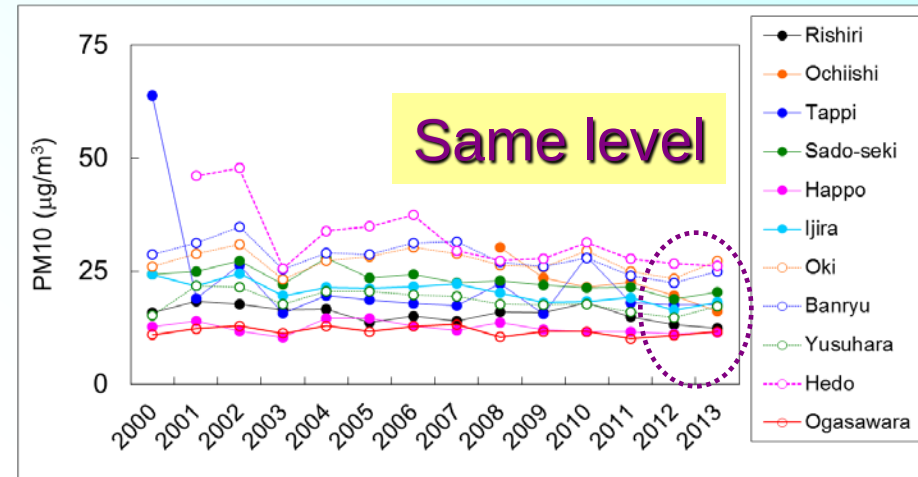
(Table 4.28, Data report 2013)

Annual trend during 2001-2013 (PM₁₀)

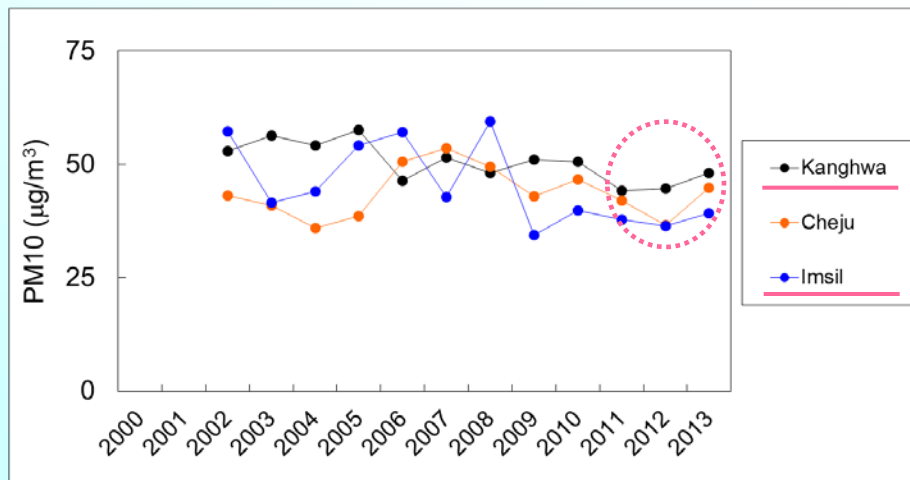
China



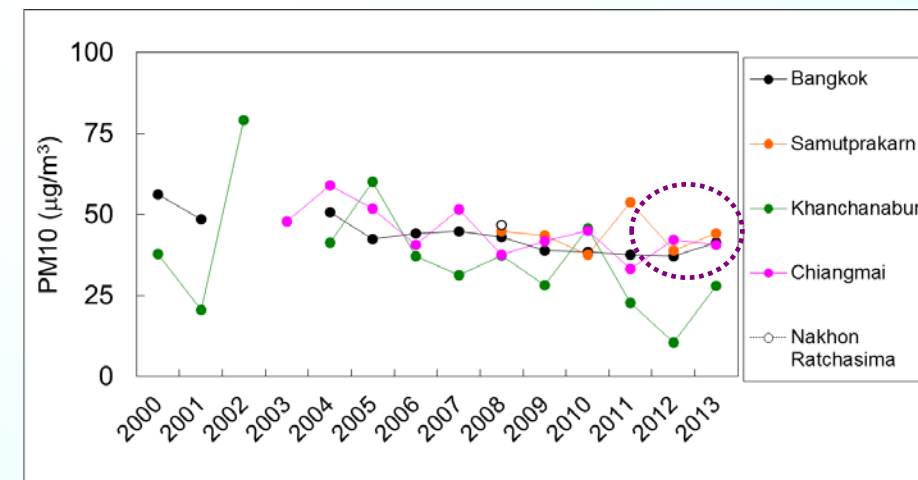
Japan



R.Korea



Thailand



(Table 4.29, Data report 2013)

Report of the Inter-laboratory Comparison Project 2013 on Dry Deposition (Filter Pack Method) Preliminary Draft

SAC14

**2-4 September, 2014
Incheon, Republic of Korea**



Asia Center for Air Pollution Research
Japan Environmental Sanitation Center

Summary of the analytical results

Table 3.3

Note : The results do not include outliers.

Analyte	Prepared*	Average	$\Delta V/V_p^*$	S.D.	Number	Min.	Max.
	(Vp)	(Va)	(%)		(N)		
<u>Sample No. 131d</u>							
SO ₄ ²⁻ (μg)	10	8.8	-12.2	1.41	24	5.39	11.5
Cl ⁻ (μg)	2.6	2.23	-14.1	0.27	23	1.76	3.02
NH ₄ ⁺ (μg)	6	5.64	-6.0	1.58	24	1.73	10.1
<u>Sample No. 132d</u>							
SO ₄ ²⁻ (μg)	70	67.7	-3.4	3.01	23	59.3	73.2
Cl ⁻ (μg)	13	11.9	-8.5	1.06	24	9.51	14.0
NH ₄ ⁺ (μg)	40	37.7	-5.7	4.13	23	27.7	49.2

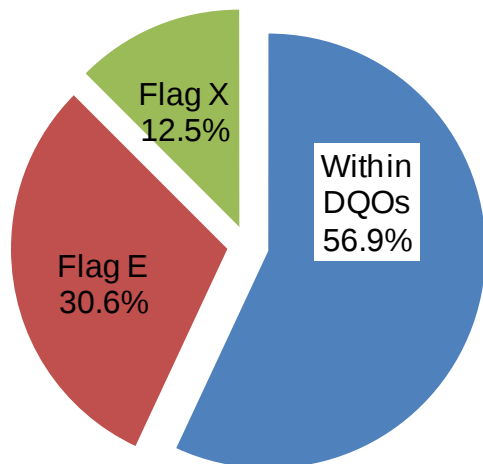
Prepared* : Prepared Values

$\Delta V/V_p^*$: (Average (Va)- Prepared (Vp)) / Prepared (Vp) × 100 (%)

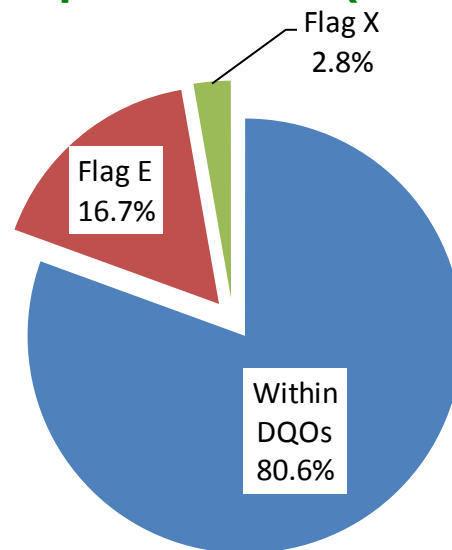
Percentage of flagged data for Sample No.131d and No.132d

Figures 3.2, 3.3

Sample No.131d (n = 72)



Sample No.132d (n = 72)

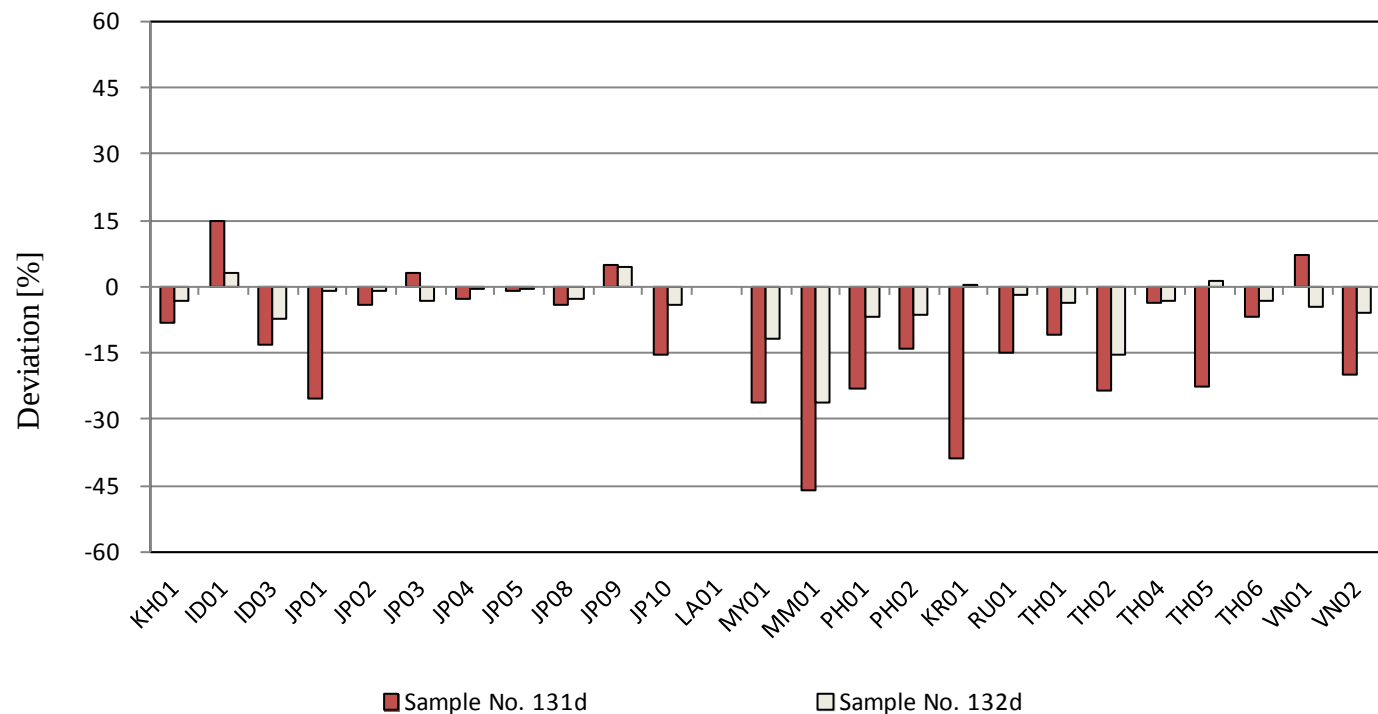


Flag E; $15 \% < | \text{Deviation} | \leq 30 \%$

Flag X; $30 \% < | \text{Deviation} |$

Deviation for SO_4^{2-} (by laboratory)

Figure 3.4

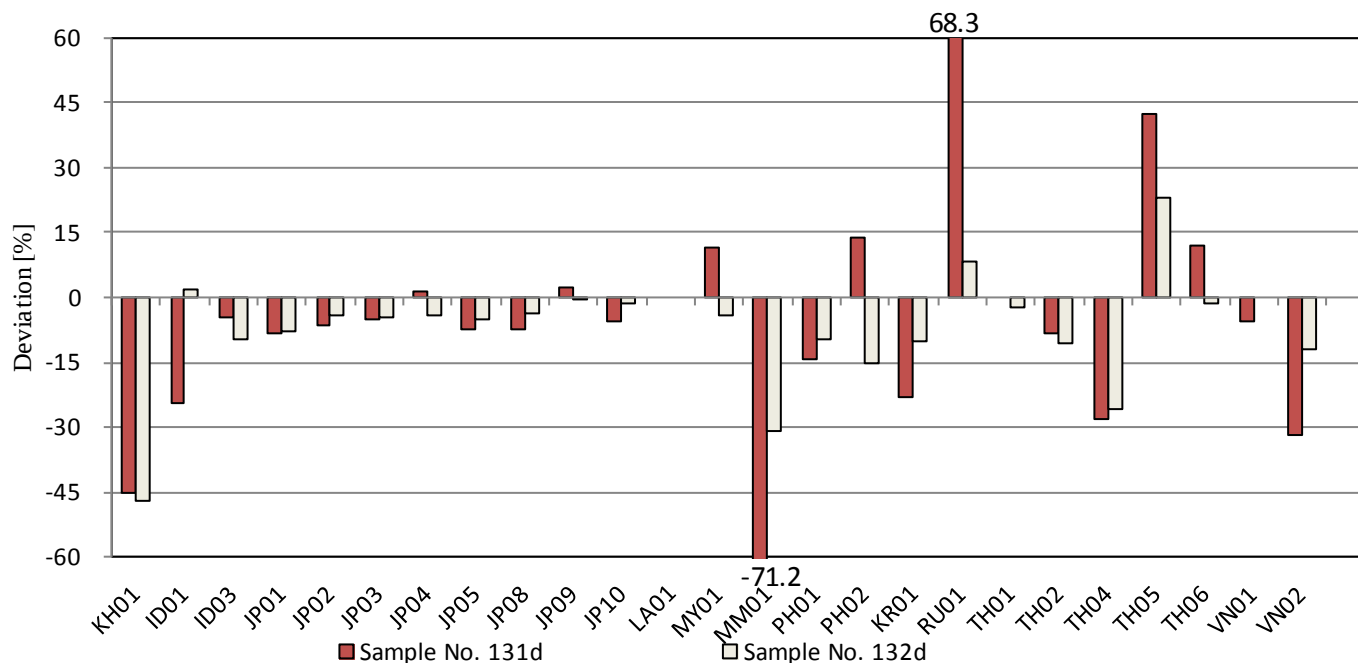


Deviation (%) = (Determined value – Prepared value)/ Prepared value x 100 (%)

All laboratories used Ion Chromatography for the analysis of SO_4^{2-} .

Deviation for NH_4^+ (by Laboratory)

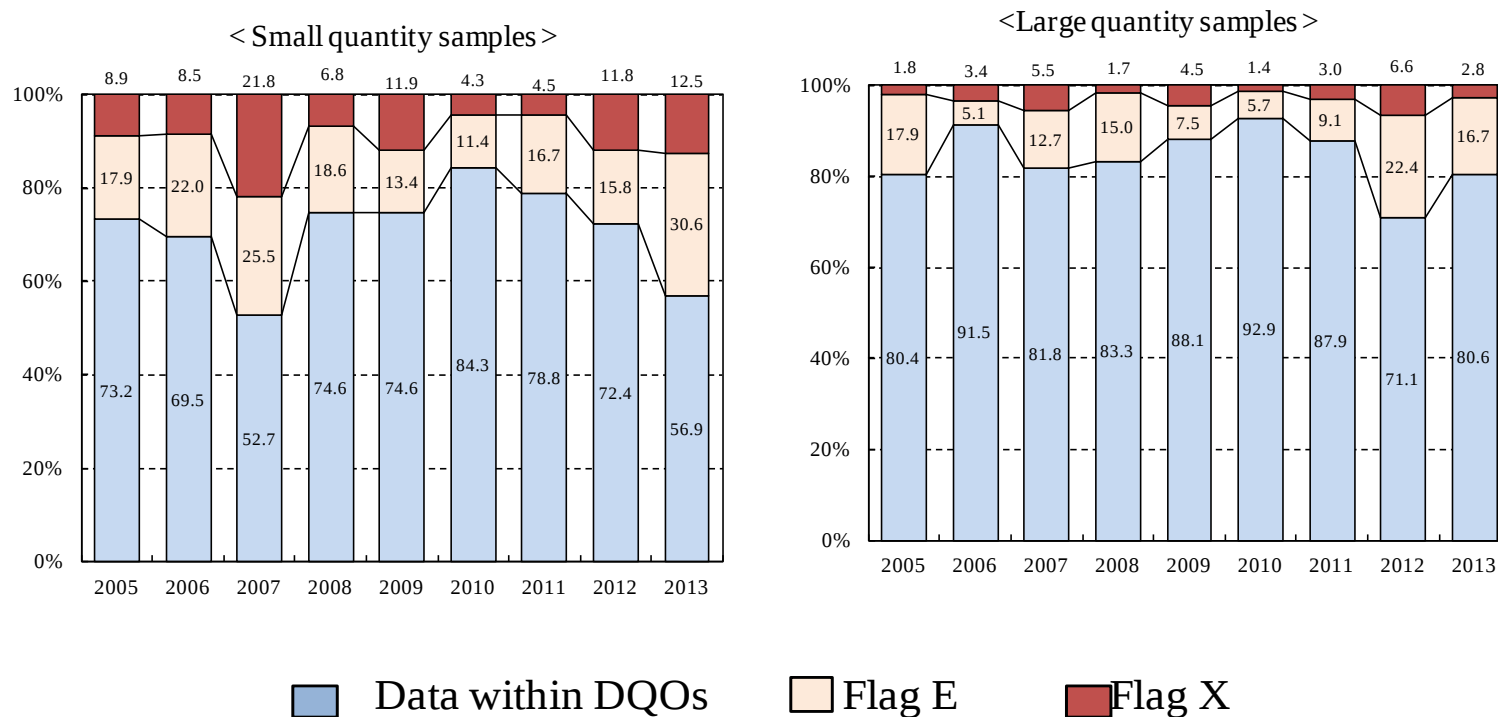
Figure 3.6



One laboratory used Spectrophotometry (Nessler) and the other laboratories used Ion Chromatography for the analysis of NH_4^+ .

Comparison with past studies

Figure 3.9



Data Report and Data Assessment

Issuing of Data Report

- Data Report (2001-2013) were published after adoption by the SAC every year.



Issuing of PRSAD2

- PRSAD2 was approved at SAC11 and endorsed at IG13 in Nov/Dec. 2012.
- It was distributed to the NFPs, SAC members, etc., and issued on the EANET website in 2012.
- PRSAD3 will be developed in 2016

<http://www.eanet.asia/product/index.html>



Second Periodic Report on the State of Acid Deposition in East Asia (PRSAD2)

Training Activities/ Individual Training

- A few trainees every year, duration: (less than) 1 month
- Totally 81 trainees in 1998-2014.

Training activities

Country	Till 2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Cambodia		1	1	1	1	1	1		1				1	8
China	11	1	1	1		1	1	1	1	1				19
Indonesia	5			1		1			1					8
Japan														
Lao PDR		1	1	1	1	1	1		1		1			8
Malaysia	1		1					2 (1*)		1	1		1	7
Mongolia	1							1			1			3
Myanmar						1	1		1				1	4
Philippines	3		1								1			5
R. of Korea														
Russia	2							1		1	1			5
Thailand	4	2		1*				1						8
Vietnam	1	1		1			1		1		1			6
Total	28	6	5	6	2	5	5	6	6	3	6		3	81



Note: *Travel cost was borne by the country.

Cooperation with other International/Regional Programs

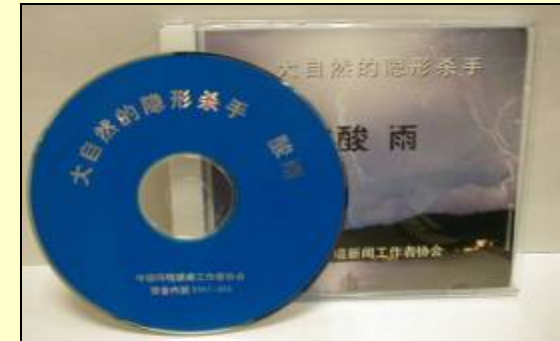
- ▶ Scientific cooperation with CLRTAP, EMEP and WMO
- ▶ Partnerships with UNEP and WHO on Regional Forum on Environment and Health
- ▶ Collaborative activities conducted with IIASA in the Model Inter-Comparison Study in Asia (MICS-Asia) project
- ▶ Participation with TF HTAP and LRTAP on Convention meetings
- ▶ Cooperation with ICPs on Forest Vegetation Monitoring
- ▶ Long-range Transboundary Air Pollutants in NE Asia Project (LTP)
- ▶ Cooperative activities with SEI, ASEAN, MALÉ, CAA, etc.

Public awareness activities

Brochures, VCD and Videotape



Developed brochures by the participating countries and NC/ACAP in English/their language



VCD developed by China and NC (Chinese)



Videotape developed in Japan (Japanese and English)

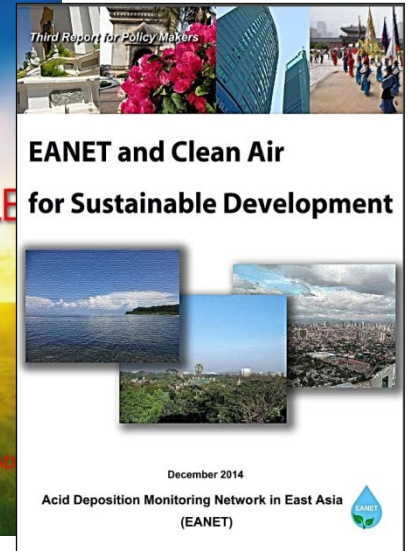
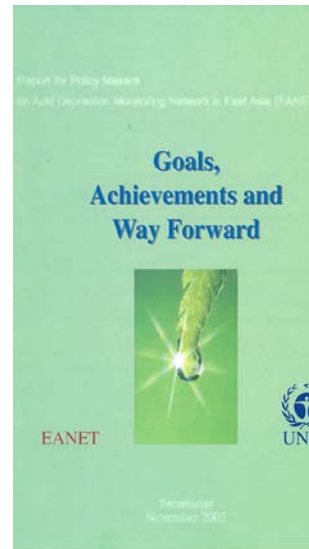
QA/QC, Training, Public Awareness



Technical Manual/Training material

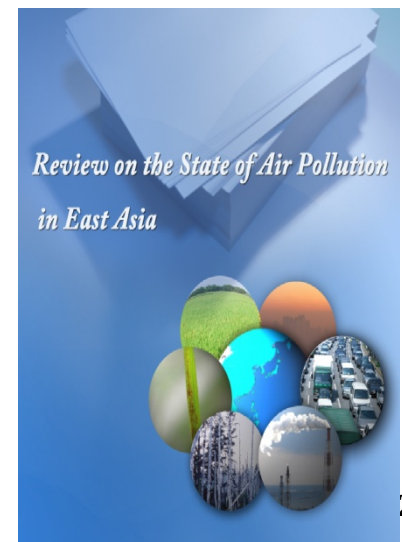


Fact Sheet



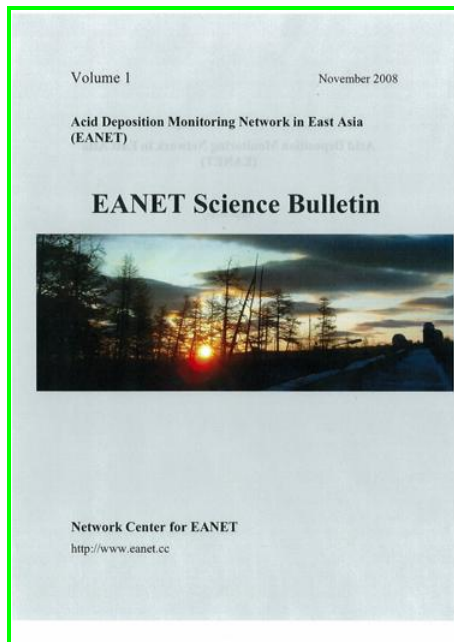
**Report for Policy Makers
(RPM1/2/3)**

**Review on the State of Air
Pollution in East Asia**

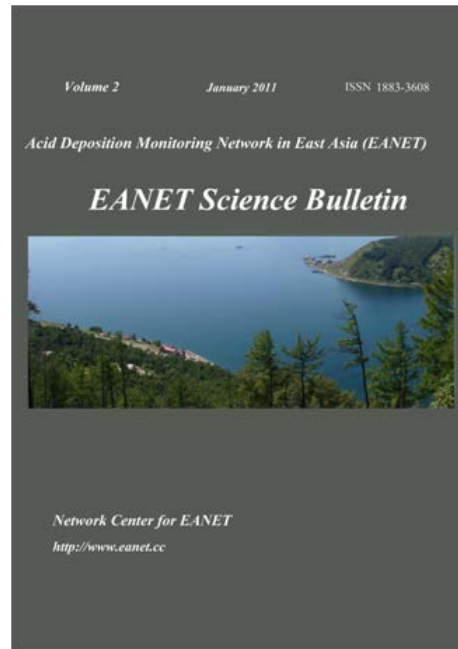


EANET Science Bulletin (issued in 2008, 2011, 2013 once/2 years)
Results of Research fellowship, Joint research activities, submitted papers from participating countries, Abstracts of relevant science papers

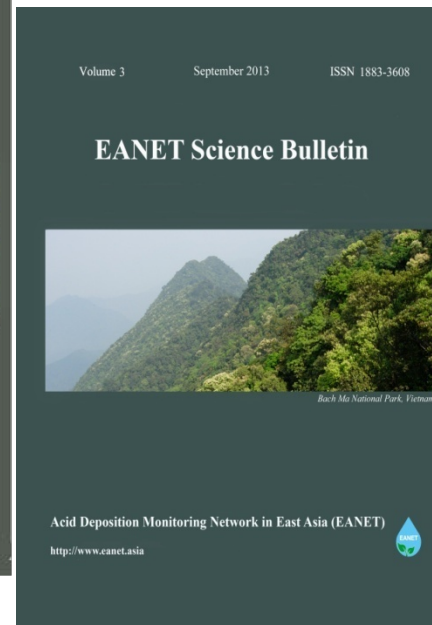
Brochure on **“Tropospheric Ozone A Growing Threat”**



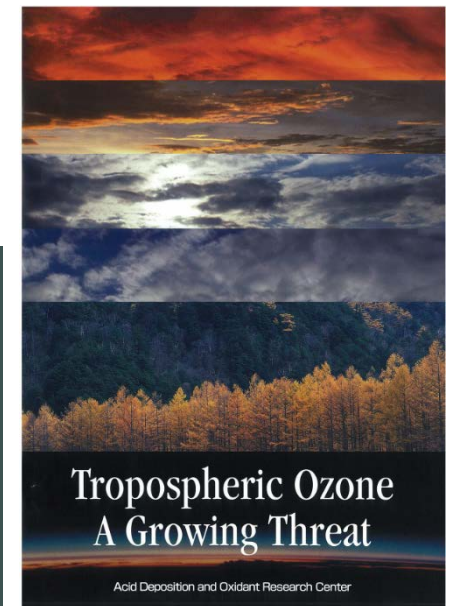
2008



2011



2013



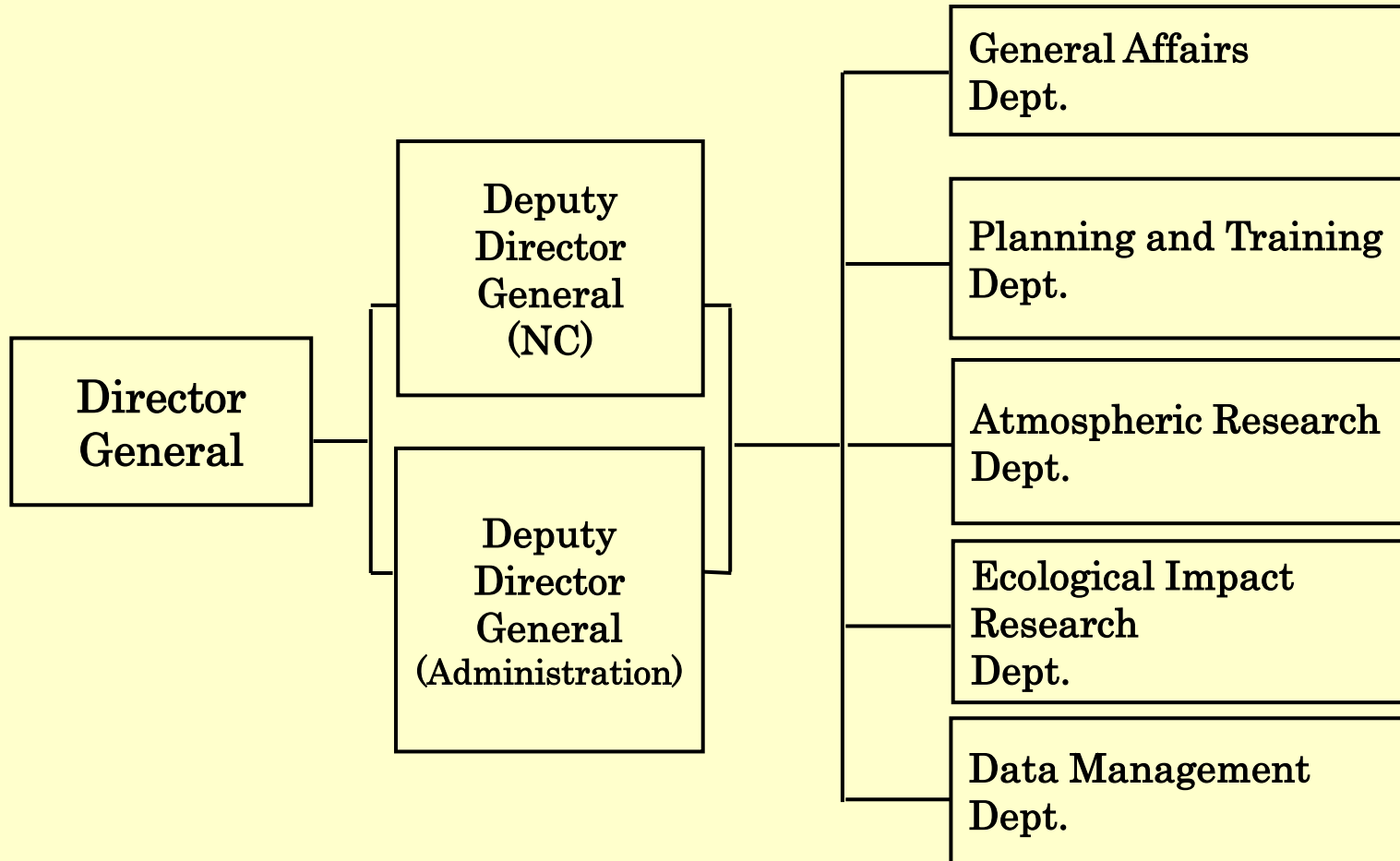
2007

3. Activities of ACAP

Asia Center for Air Pollution Research (ACAP)



Organization Chart



25 staffs are working at ACAP (as of 2015)

Tasks as the Network Center of EANET

- Compilation, evaluation and storage of data
- Preparation of Data Report on the Acid Deposition in the East Asian Region
- Dissemination of data and relevant information
- Implementation and coordination of QA/QC activities
- Technical support to the participating countries including dispatch of technical missions
- Implementation of training activities
- Support to Task Forces as their secretariats
- Research activities
- Promotion of public awareness

Tasks as the National Center of Japan

- Preparation of draft national monitoring plan
 - Collection, evaluation and storage of national monitoring data
 - Submission of monitoring data to the Network Center
 - Implementation of the national segment of the Network's QA/QC programs
-
- ⌘ other tasks
 - Operation and maintenance of a few monitoring stations in Japan
 - Other research activities

Thank you for your attention

