

Review of Existing and Required Capacities for Addressing Adverse Environmental Impact of Transboundary Air Pollution in North-East Asia

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Asia Center for Air Pollution Research (ACAP)

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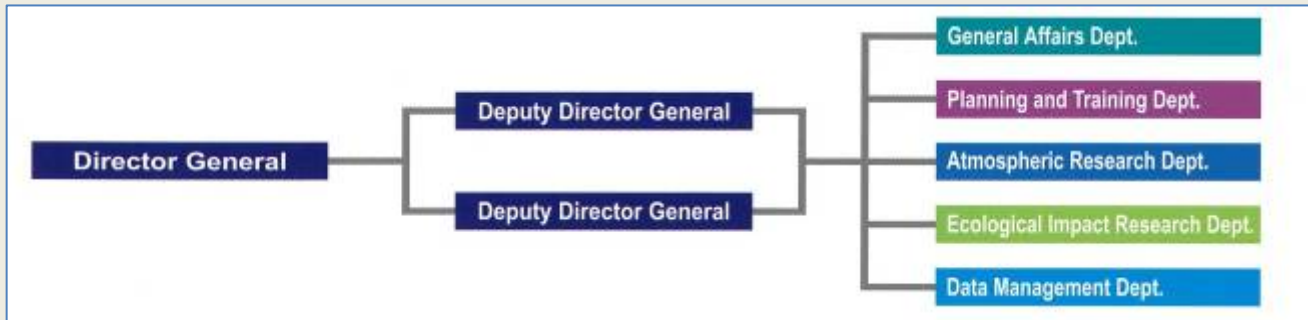
Contents of the Report

- 1. Review of the scope and future plans of the subregional/ regional scientific frameworks on transboundary air pollution:**
 - ◆ Acid Deposition Monitoring Network in East Asia (EANET)
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 - ◆ Model Inter-Comparison Study in East Asia (MICS-Asia)
 - ◆ Relevant academic programmes of transboundary air pollution:
 - (1) Atmospheric Brown Clouds (ABC)
 - (2) Joint Forum on Atmospheric Environment in Asia and the Pacific
- 2. Review of Japan's National Plans for Addressing Air Pollution and its Potential Linkage with Activities under Subregional/ Regional Frameworks. Summary of Japan's Priority.**
- 3. In accordance with the above reviews:**
 - ◆ Identification of institutional and knowledge gaps in subregional/ regional frameworks, and relevant needs and priorities of a subregional framework in North-East Asia
 - ◆ Inputs to the formulation of options for a strengthened subregional framework on transboundary air pollution

Asia Center for Air Pollution Research (ACAP)



Niigata Tokyo



**Name was changed
from ADORC to
ACAP in June 2010.**

Number of Staff: 27 (including administrative staff)

ACAP: <http://www.acap.asia> EANET: <http://www.eanet.cc>

1. Review of the Scope of Current Activities and Future Plans of Existing (Sub-) Regional Frameworks on Transboundary Air Pollution

1-1. EANET

1-2. Research Cooperation on Photochemical Oxidant under TEMM

1-3. MICS-Asia

1-4. Others

(1) ABC

(2) Joint Forum

1-1. “Acid Deposition Monitoring Network in East Asia (EANET)”

History and framework of EANET

(1) **Expert Group Meeting:** 1993-1997 (4 times)

(2) **Preparatory-phase activities:** 1998-2000 (10 countries)

(3) **Regular-phase activities:** 2001-2011 (13 countries)

Activities were in accordance with the Joint Announcement (**JA**) on the Implementation of EANET and Tentative Design of the EANET (**TD**) which were issued by the IG2 in 2000.

(**JA : Annex 1/ TD: Annex 2**)

(4) **Secretariat**

United Nations Environmental Programme
Regional Resource Centre for Asia and the
Pacific (UNEP RRC. AP) in Thailand

(5) **Network Center (NC)**

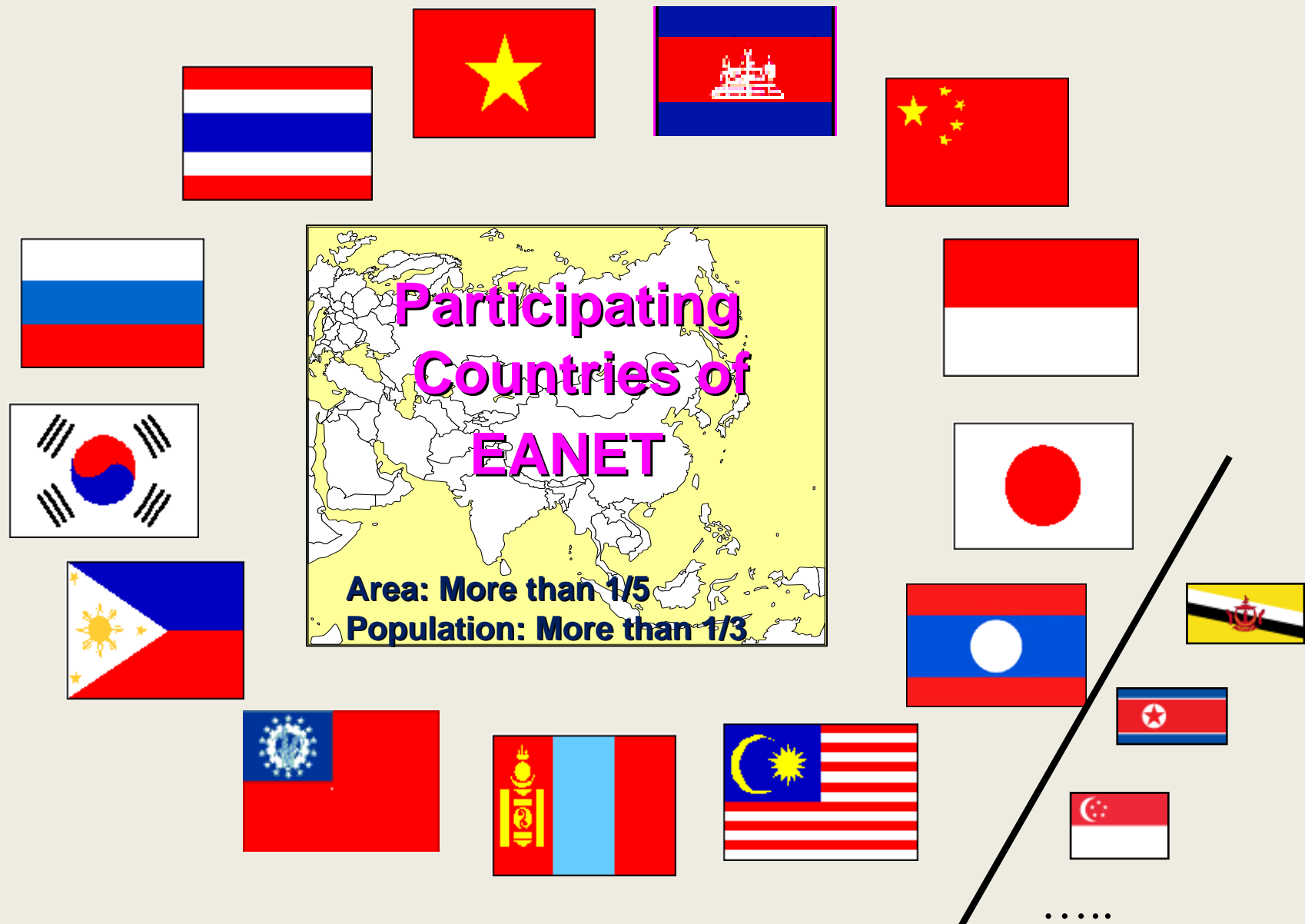
Asia Center for Air Pollution Research (ACAP)

in Japan (former name: Acid Deposition and
Oxidant Research Center (ADORC))

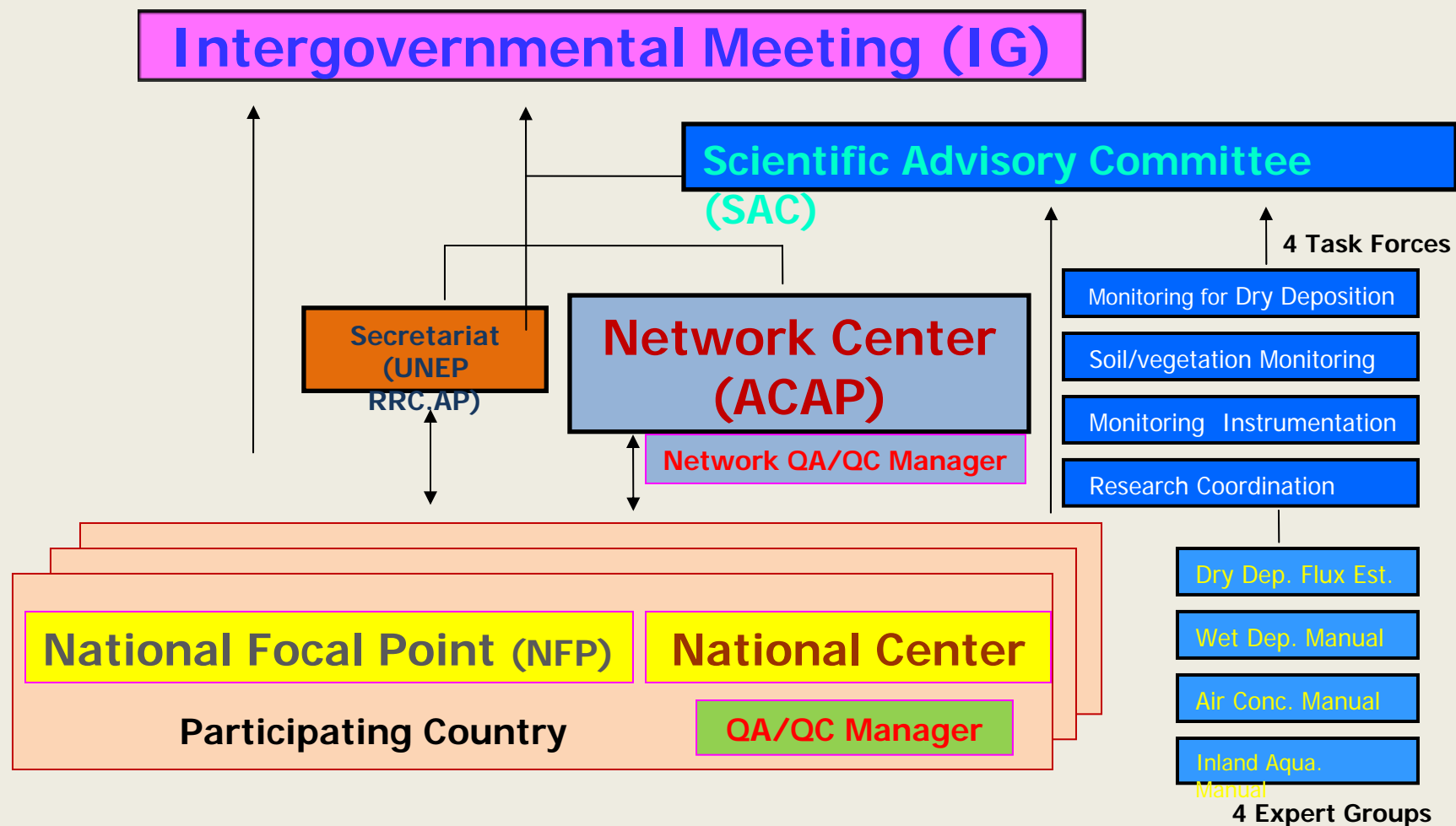


IG2 in Niigata in 2000

EANET (2)



Framework of EANET



Activities of EANET from 2012

It was started in accordance with the new Instrument.

(1) Name: **Instrument for Strengthening the Acid Deposition Monitoring Network in East Asia (EANET) (Annex 3)**

(2) Adoption: IG12 in 2010

(3) Operational: From 1 January 2012

(4) Signature: 11 countries
(except Indonesia and Russia)

(5) Activity: Monitoring of acid deposition (**including ozone and P** assessment, research (including emission inventory and modeling.) training, public awareness, information exchange, etc.

(6) **Scope: Can be extended as decided by IG.**

(7) Others:

- **Network Center: One or more network centers could be designated, as the need arises.**
- **Financial arrangement: Draw attention to the estimated financial amount to the UN burden sharing practice.**



Signature by Japan during IG12

High Level Segment at IG12 in 2010

EANET (5)



Contents of the Instrument for Strengthening the EANET

(1) Item 1/Definition

“Acid deposition” in this Instrument means deposition of **major acidifying species and related chemical substances. (ozone and PM)**

(2) Item 2/Objectives and Scope

1. The objectives and scope of this Instrument are:

- a) to create a common understanding of the state of acid deposition problems in East Asia;
- b) 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; and
- c) to contribute to cooperation on the issues related to acid deposition among the participating countries.

2. The scope of this Instrument may be extended, as decided by the IG.

Discussion on “Expansion of the scope of EANET” was already started in 2011. Firstly, “Review of the present status of air pollution in East Asia” will be implemented in 2012-2014.

Future Plan of EANET

(1) Medium Term Plan for EANET (2011-2015)

IG12 in 2010 adopted “**Medium Term Plan (MTP) for EANET (2011-2015)**”, which describes the strategic direction and objectives of the EANET, activities and expected outputs, the time table and estimated costs. 22 activities included with their set targets, expected outputs and implementation periods.

(2) Activities to be implemented in the MTP

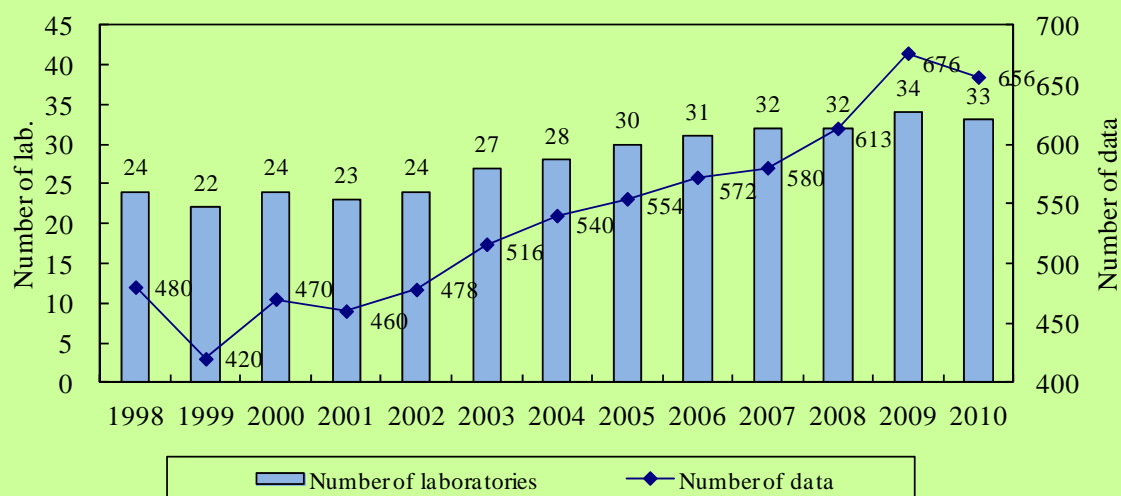
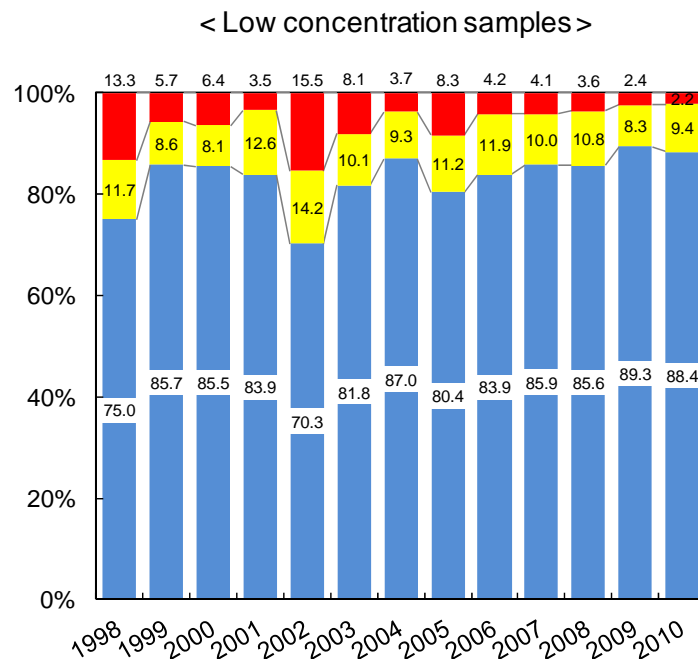
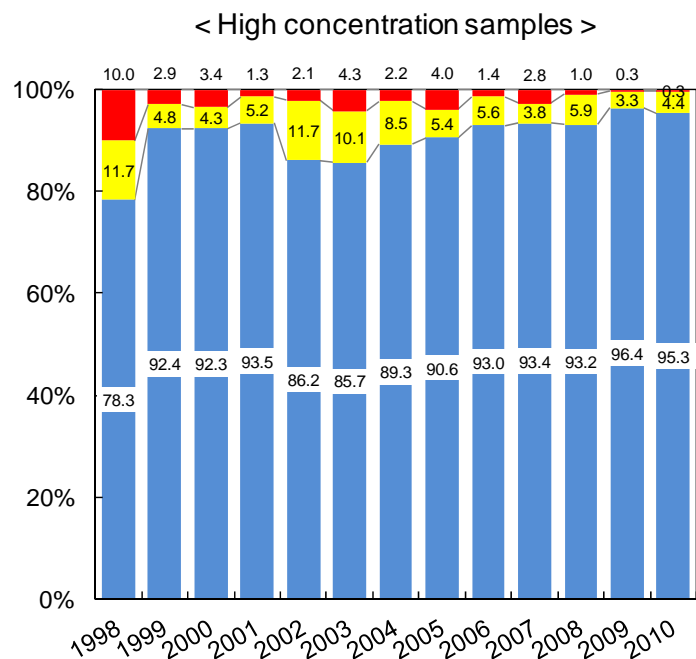
- ◆ Promotion of research studies particularly on the applicability of various methodologies for measurement of air concentrations in East Asia.
- ◆ Promotion of studies on the effects of acid deposition and other priority chemical species on the ecosystem, human health and socio-economics.
- ◆ Promotion of studies on models to assess and analyze the trend of national and regional acid deposition and other related air pollutants in East Asia by evaluation of existing models and providing a suitable one, and promotion of atmospheric simulation model through workshops, training courses, etc.

Future Plan of EANET (2)

(3) Recommendations from Second Periodic Report (PRSAD2)

- ◆ Extended assessment of the state of acid deposition, including other relevant atmospheric pollutants and climate change.
- ◆ Improvement of acid deposition monitoring, including ozone and particulate matter (PM), with increased transparency.
- ◆ Promotion of research activities, including the development of modeling and emission inventories.
- ◆ Establishment of an epistemic community and promotion of public awareness to achieve a common understanding on atmospheric pollution.
- ◆ Enhancement of the policy relevance of activities relating to the provision of policy advice and information based on sound science and assessment.
- ◆ Enhancement of collaboration with organizations outside the region.

Achievement of EANET (Inter-lab project)



■ Data within DQOs
 ■ Flag E
 ■ Flag X

E: Exceed the DQOs ($\pm 15\% \sim \pm 30\%$)
 X: Exceed the DQOs ($< -30\%$ or $> 30\%$)

EANET Wet/Dry Deposition Monitoring Sites 54/47

EANET (10)

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

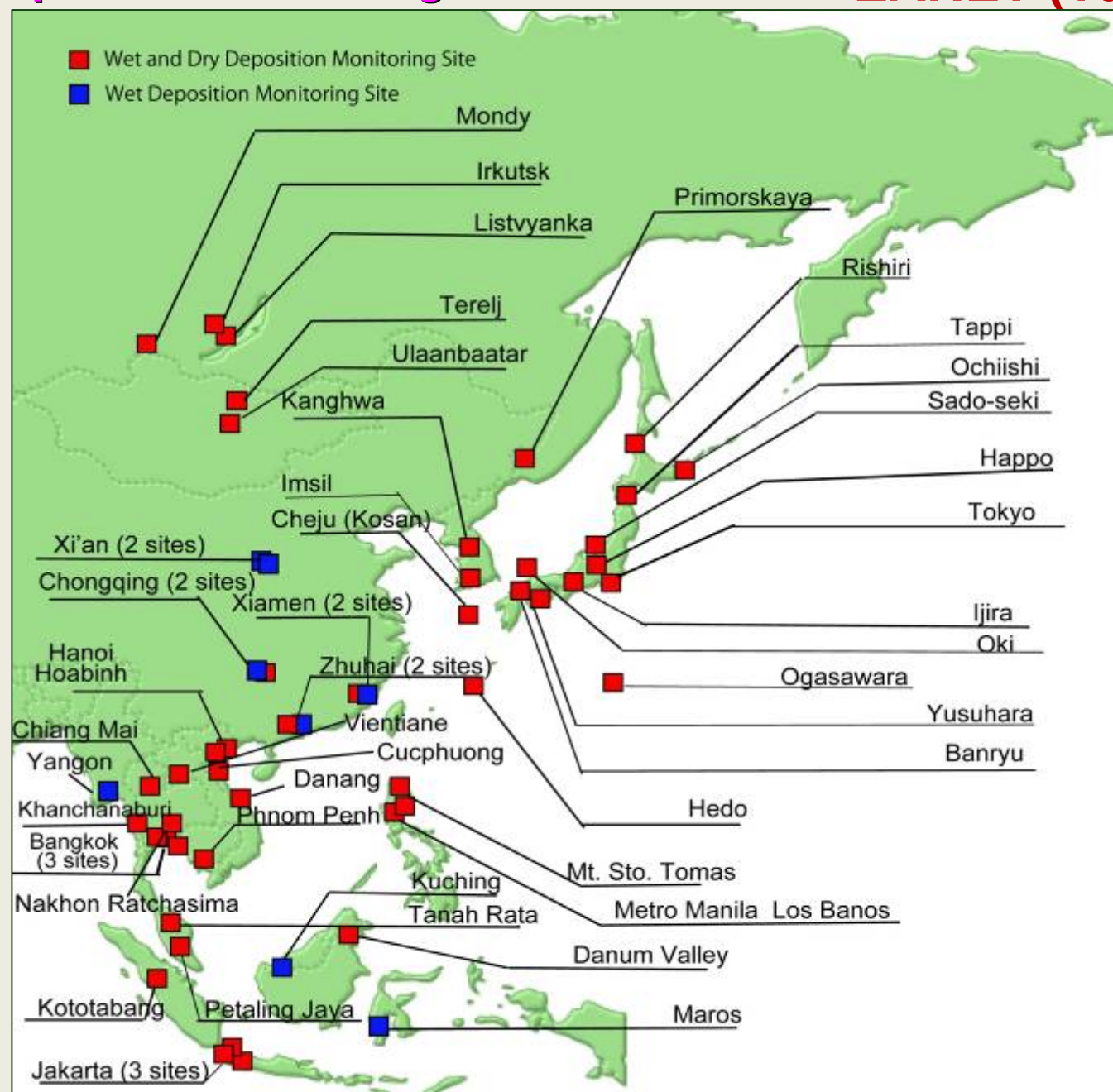
Cambodia: 1/1

Thailand: 6/6

Myanmar: 1/1

Malaysia: 4/3

Indonesia: 5/4



Photos of monitoring Sites (Northeast Asia)



Listvyanka, Russia



**Terelj,
Mongolia**



Xiamen, China



Imsil, R. of Korea



Sado-seki, Japan

Ozone Monitoring in EANET (Automatic instrument): Only Japan, Korea, Russia and Thailand



A Automatic monitoring
(only 4 countries)

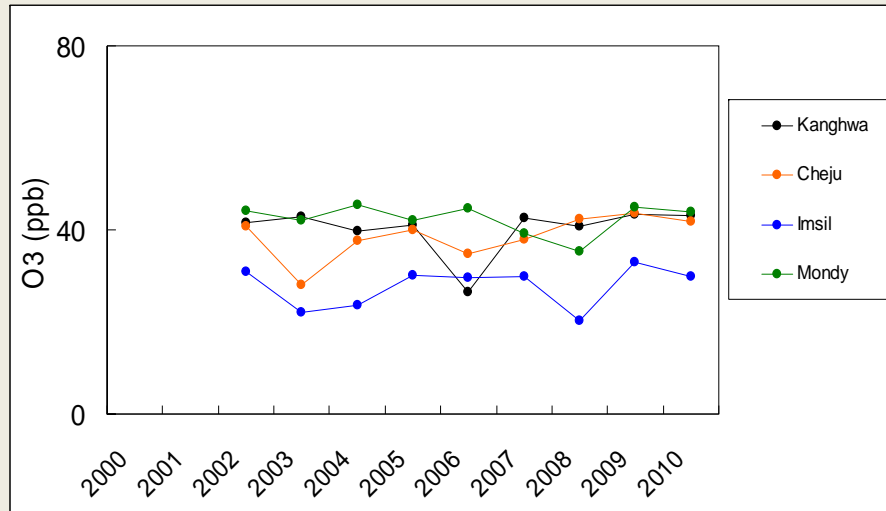
P Passive monitoring

Passive monitoring:
Low time resolution
in

Need to develop low
cost automatic
monitor equipped
battery

Annual trend during 2001-2010 (O₃)

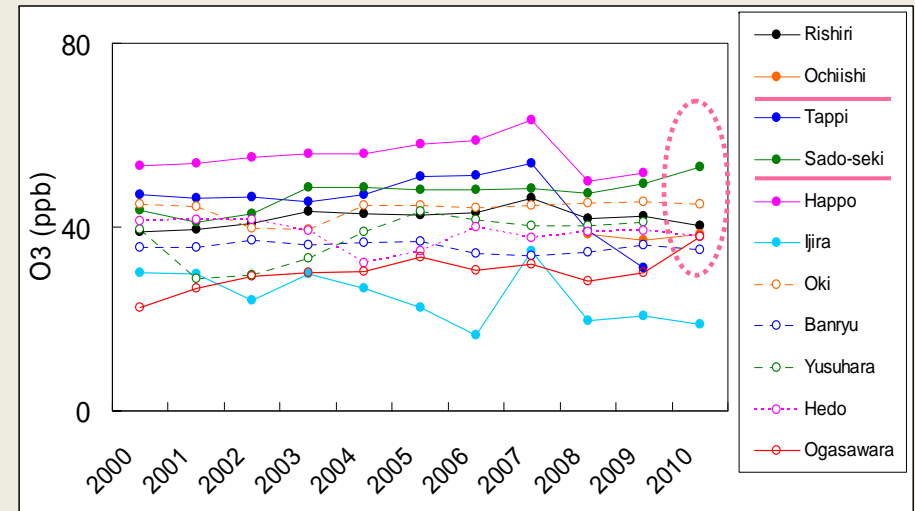
R. Korea, Russia



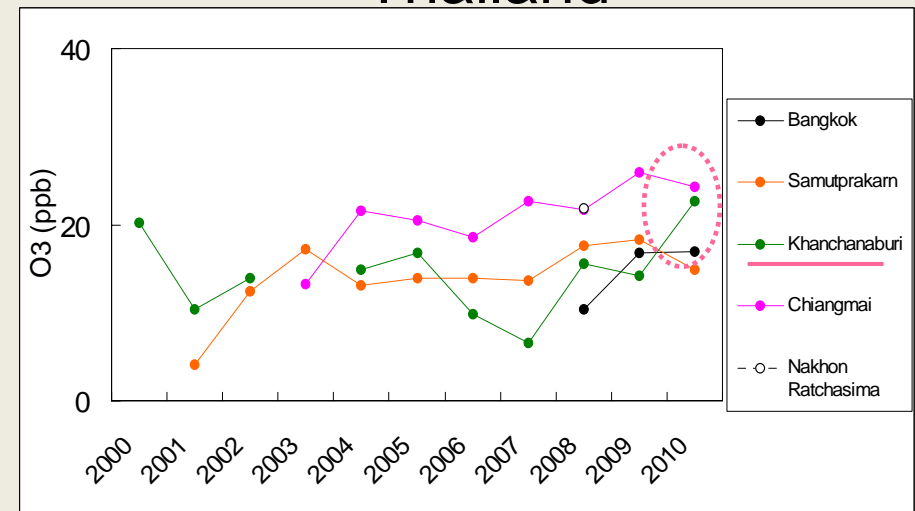
EANET (13)

Japan

Increasing



Thailand



Second Periodic Report on the State of Acid Deposition in East Asia (PRSAD2) published in Mar. 2012

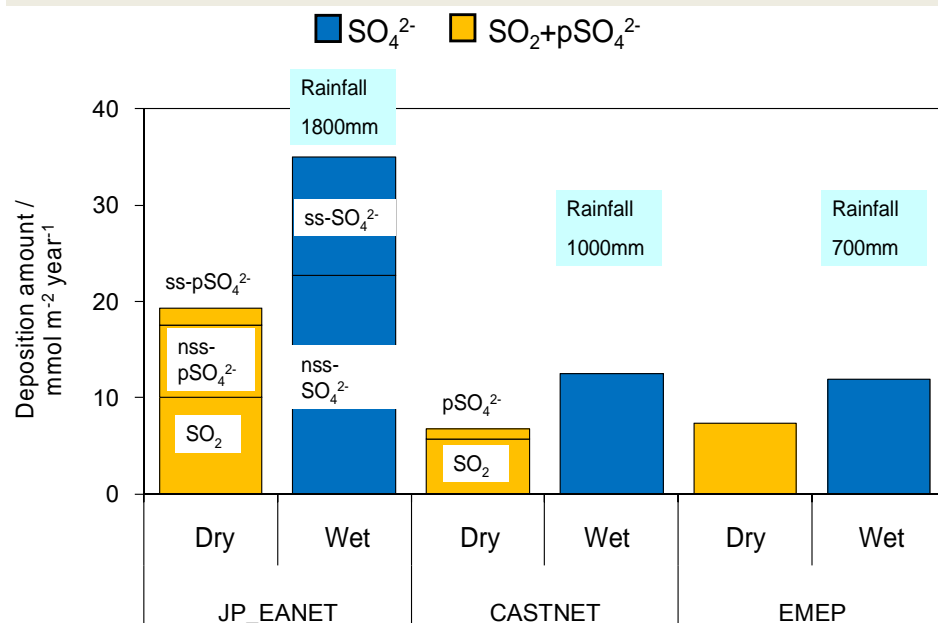


Figure 4.6.1. Comparison of dry, wet, and total deposition amounts of sulphur compounds among Japanese EANET sites, CASTNET in US and EMEP in Europe. (Average of 2003-2007)

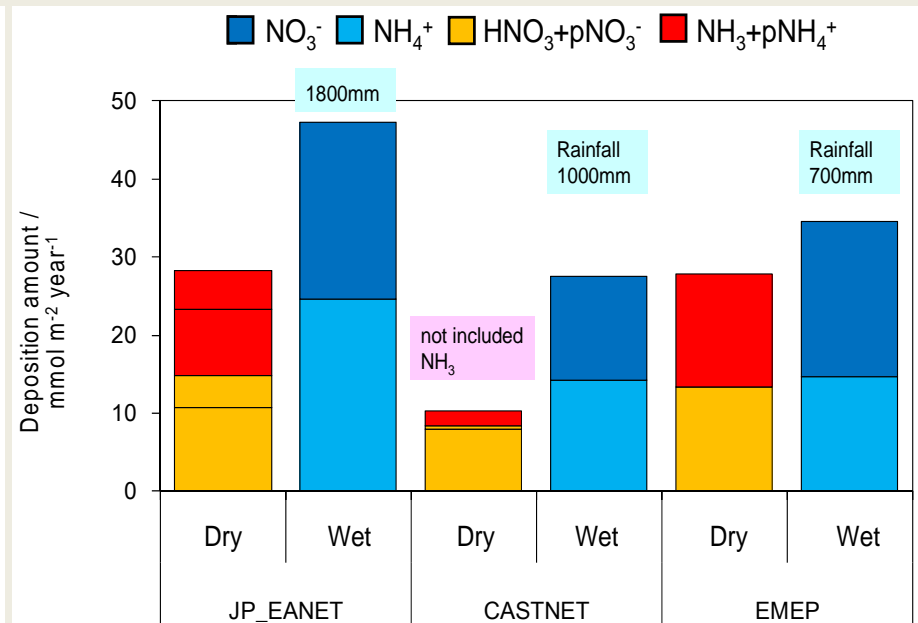
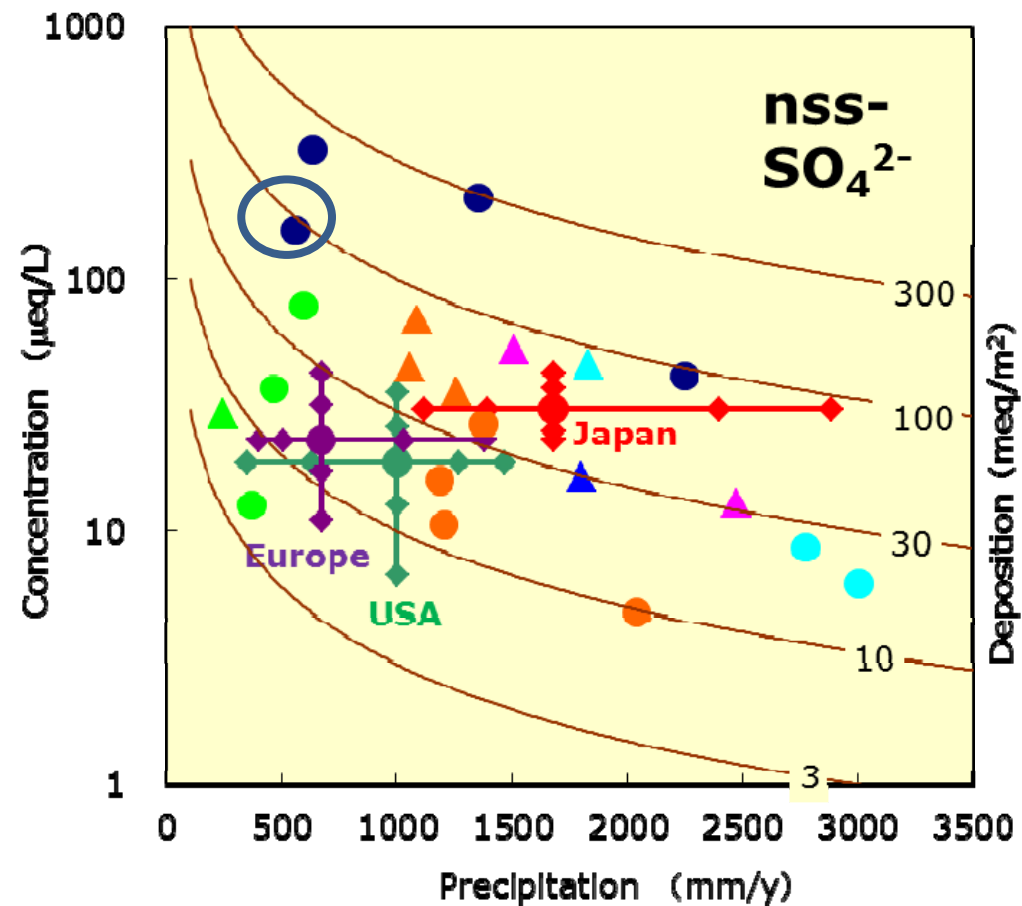


Figure 4.6.2. Comparison of dry, wet, and total deposition amounts of nitrogen compounds among Japanese EANET sites, CASTNET in US and EMEP in Europe. (Average of 2003-2007).

Relevant information

Relationship among Concentration-Deposition-Precipitation amount (2003-2006)



1 Japan: MOE + JELA, n=68, North America: NADP, n=250, Europe: EMEP, n=97, East Asia: EANET

2 Data distributions for Japan, North America, and Europe are presented by 10, 25, 50, 75, and 90 percentile values

Photochemical Oxidant-TEMM (1)

1-2. “Research Cooperation on Photochemical Oxidant under Tripartite Environment Ministers Meeting (TEMM)”

Outline

- (1) **Commencement:** 2008 (TEMM meeting was held from 1999.)
- (2) **Member countries:** China, Japan and Republic of Korea
- (3) **Objectives:** to promote research cooperation among the three countries in order to identify and form common understandings on the mechanism of ozone pollution, with the aim to mitigate transboundary photochemical oxidant pollution in Northeast Asia.
- (4) **Activity areas:** Annual workshop and cooperative research activities.

Scope of current activities and future plan

Sharing the concern on high concentration of photochemical oxidant (O_3) around metropolises and their surrounding area and noting the increase in average concentration of O_3 throughout the Northern Hemisphere, TEMM agreed to cooperate in scientific research on the issue of O_3 , e.g. sharing existing findings as appropriate to facilitate the formation of common understandings, at TEMM9 in 2007.

Photochemical Oxidant-TEMM (2)

Scope of current activities and future plan-2

Following the discussion held at the 3rd workshop in 2010 in Beijing, China, the researchers discussed the cooperative joint research studies on photochemical air pollution and developed draft research plan at the 4th workshop in Nov. 2011 in Tokyo, Japan.

(1) Duration: 4 years from 2011 to 2014.

(2) Tripartite workshops will be held annually.

(3) Research target (1. Field campaign)

- ◆ Inter-comparison of automatic monitoring instruments (O_3 , VOC, NO_y , PM)
- ◆ Analysis of temporal variability of O_3 , PM, precursors
- ◆ Modeling analysis of the observed data

(4) Research target (2. QA/QC of ozone monitoring)

- ◆ Inter-comparison of ozone working standards in the three countries.



4th Workshop in Tokyo in Nov. 2011

Photochemical Oxidant-TEMM (3)

Scope of current activities and future plan-3

(4) Research target (3. Ozone trend analysis in North East Asia)

- Ozone trend utilizing existing monitoring data/report/papers in the three countries
- The first target of the region to be analyzed is remote sites in China, Korea and Japan
- The second target is rural and urban sites in northeast Asia
- Analytical results in Korea to be synthesized with the existing analysis results in Japan

Subsequently, a draft research plan of joint field campaign in China was developed based on the discussion among experts in these three countries. The draft plan has been circulated among the ministries of the three countries for discussion at TEMM14 in May 2012 in Beijing, China.

TEMM14 welcomed the outcome of the 4th workshop, taking note of the cooperative research initiatives promoted by experts, and agreed to have further discussion on the future activities.

1-3. Model Inter-comparison Study in Asia (MICS-Asia)

History of MICS-Asia

- ◆ Model inter-comparison studies are effective procedures to overcome these challenges. In addition, this type of studies can yield information to improve the model's reproducibility of observations and understand the cause of uncertainties, and establish a community of researchers of modeling and emission inventories, which is essential for the study of air quality in East Asia.
- ◆ With this background and objectives, **Model Inter-comparison Study in Asia (MICS-Asia) was started in 1998.**
 - During the Phase I from 1998 to 2000, the project was carried out with the focus on long-range transport and deposition of sulfur, coordinated by Central Research Institute of Electric Power Industry (CRIEPI), Japan.
 - The Phase II from 2001 to 2009 was financially supported by the ADORC (present ACAP). The targets were expanded in the Phase II to cover nitrogen compounds, ozone and aerosols. The findings in the MICS-Asia Phase II were published in the special issues of Atmospheric Environment in May, 2008.

Outline of MICS-Asia

- (1) **Activities:** Phase I: 1998, Phase II: 2001 and Phase III: 2010
- (2) **Secretariat (Phase III):** ACAP in Japan and Institute of Atmospheric Physics (IAP), Chinese Academy of Science, China
- (3) **Members:** Experts from Asian countries (Japan, China, Korea, Thailand, Malaysia, Vietnam, etc.), European countries, USA and Canada, etc. (voluntary basis)
- (4) **Objectives:**
 - General objective:** to have a common understanding of model performance and uncertainties in Asia.
 - Objectives of Phase III:**
 - ◆ to evaluate strengths and weaknesses of current **multi scale air quality models** and provide techniques to reduce uncertainty in Asia;
 - ◆ to develop a reliable **anthropogenic emission inventories** in Asia and understand uncertainty of bottom-up emission inventories in Asia; and
 - ◆ to provide **multi-model estimates of radiative forcing** and analysis of estimates to key processes/inputs.

Current activities-1

- ◆ From 2010, the “International Workshop on Atmospheric Modeling Research in East Asia” has been held annually in China in order to solicit experts on modeling in East Asia, and the activities in the MICS-Asia Phase III were discussed at the workshop.
- ◆ In February 2011, the Institute of Atmospheric Physics, Chinese Academy of Science (IAP/CAS), China, and ACAP jointly launched the Joint International Center on Air Quality Modeling Studies (**JICAM**).
- ◆ From the 3rd International Workshop on Atmospheric Modeling Research in East Asia, MICS-Asia is organized by JICAM. The third workshop was held in September 2011 in Chengdu, China. Following three themes were discussed as the activities of the Phase III and almost decided, though the activities are voluntary bases.
 - I. **Multi-scale model inter-comparison** (Chief: Dr. Zifa Wang, IAP, China)
 - II. **Inter-comparison of emission inventory** (Chief: Dr. Jun-hum Woo, R. of Korea)
 - III. **Interaction between air quality and climate change in view of model inter-comparison** (Chief: Dr. Carmichael, USA)

Current activities-2

The outcome of MICS-Asia can provide important information for policy analysis which aims at analyzing long-term strategies for air pollution controls at local, national and regional levels in East Asia. **Therefore, it is essential to increase model's reproducibility of observational data by improving input data (such as emission inventories and boundary conditions), parameters and modules in the atmospheric chemistry model.** For the purpose, monitoring data of EANET are expected to be used for model validation in the inter-comparison study. This is even more important since many government monitoring data are hardly used by the scientific community. **Thus, the collaboration with MICS-Asia and EANET is required to keep playing an important role in the Phase III.**

General work plans and schedule were agreed by the participants of the third workshop. Agreed schedule is as follows:

- ◆ **Harmonization among three themes: By the end of 2011.**
- ◆ **Preparations required for model run: By the end of March 2012 and first simulated results are analyzed by the end of 2012.**

1-4. Atmospheric Brown Clouds (ABC)

Outline of ABC

(1) Establishment: 2002, **(2) Secretariat:** UNEP

(3) Objectives: To investigate the reasons, behavior and effects of ABC.

(4) Observation: Regional scale plumes of air pollutants mainly aerosol (particles) such as BC, and precursor gases and ozone, precipitation and meteorological parameters.

(5) Major activities:

- Monitoring by ABC observatories;
- Impact assessments on climate, water, agriculture and health;
- Reduce emissions of GHGs, soot, and other air pollutants;
- Study the linkage between and ABCs and glacial melting, develop and demonstrate adaptation measure;
- Archival of data, improve knowledge management and dissemination, awareness;
- Convene a Regional Policy Forum for ABC in Asia.

(6) Provision of scientific basis: By ABC Science Team (V. Ramanathan (Chair), etc.)

History of ABC

- ◆ ABC are regional scale plumes of air pollutants, mainly aerosol (particles), such as black carbon (BC), and precursor gases which produce aerosols and ozone.
- ◆ ABC and its interaction with build-up of greenhouse gases significantly affect the regional climate, glacial melting, agriculture and human health.
- ◆ The ABC effect is an outstanding problem which prevents a complete understanding of climate change and its impacts, and needs to be more fully explored. In order to better understand this emerging environmental issue, UNEP commissioned the Project ABC in 2002.
- ◆ In its first phase, the Project ABC focused on Asia due to the likely impacts on the region's population of over 3 billion and the presence of several special features that are relevant to ABCs.
- ◆ **Major achievements/findings in Phase I:**
 - Establishment of climate observatories and capacity building.
 - Formation of impact study groups, initiation of impact studies.
 - Formation of emission inventory group, initiation of mitigation studies.
 - Identification of ABC hotspots and understanding of ABCs influence.

Publication in 2008

- ◆ Based on extensive research studies carried out by the Project of ABC and results of relevant research projects implemented in all over the world, the “**ATMOSPHERIC BROWN CLOUDS – REGIONAL ASSESSMENT REPORT WITH FOCUS ON ASIA**” was published.

What are ABCs?

Basically, ABCs are the same as the aerosols that are mentioned in reports by the Intergovernmental Panel on Climate Change (IPCC). In principle, tropospheric ozone should be part of ABCs,

ABC hotspots are defined as regions where the annual mean anthropogenic aerosol optical depth (AOD) exceeds 0.3 and the percentage of absorbing aerosols exceeds 10 per cent.

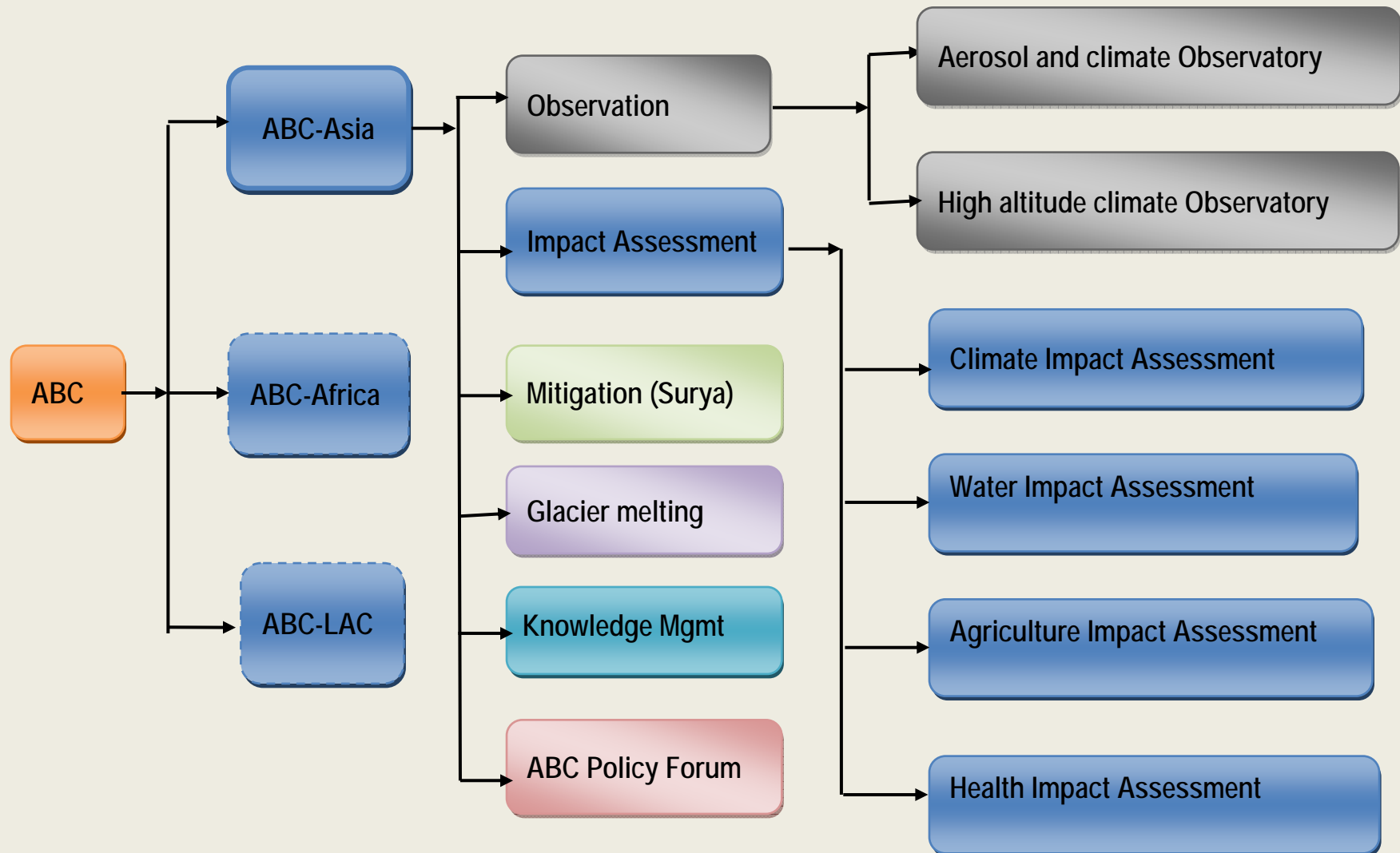
The following 13 mega-city ABC hotspots in Asia have been identified: Bangkok, Beijing, Cairo, Dhaka, Karachi, Kolkata, Lagos, Mumbai, New Delhi, Seoul, Shanghai, Shenzhen and Tehran.

Ozone concentrations vary across Asia as a result of regional and local scale variations in precursor emissions and atmospheric circulation patterns. Ozone concentrations across Asia appear to follow a well-defined annual profile with two ozone peaks (during spring and autumn, when ozone concentrations commonly reach monthly mean values of 50 and 40 ppb, respectively) and a mid-summer trough associated with the main monsoon season.

Activities of ABC-Asia

- (1) **Observation:** Observation of aerosol, radiation, precipitation and meteorological parameters.
- (2) **Impact Assessment:** Conduct comprehensive impact assessments on climate, water, agriculture and health.
- (3) **Mitigation:**
 - i. Reduce emissions of GHGs, soot, and other air pollutants through implementation of green technologies; and
 - ii. Compilation of emission inventories.
- (4) **Glacial Melting:** Study the linkage between and ABCs and glacial melting, develop and demonstrate adaptation measures for glacial melting through inventory of glaciers/glacial lakes and identification of areas at most risk, develop and demonstrate adaptation measures, capacity building).
- (5) **Knowledge Management:** Archival of data, improve knowledge management and dissemination, awareness.
- (6) **Regional Policy Forum for ABC:** Convene a Regional Policy Forum for ABC in Asia.

Framework of ABC (Secretariat: UNEP)



Others: Joint Forum (1)

1-5. Joint Forum on Atmospheric Environment in Asia and the Pacific (Joint Forum)

History of Joint Forum

- ◆ Given an extensive range of regional and sub-regional networks on atmospheric issues in Asia, **there was a need to develop a mechanism to help the participating countries share experiences and identify opportunities for effective collaboration** and thus speed the development of knowledge regionally as a pre-requisite for political and social action to reduce the pollution burden on people and ecosystems. Enhanced coordination among the regional/sub-regional networks is expected to provide win-win situations for all the networks and form a regional force to address atmospheric issues.
- ◆ At the First Joint Meeting of the **Intergovernmental Networks on Regional Air Pollution in Asia and the Pacific Region** held in March 2009, it was agreed that this initiative could be **continued as the “Joint Forum on Atmospheric Environment in Asia and the Pacific”**. The meeting also requested the secretariat to develop the future plan for the activities of the joint forum.

Scope of current activities and future plan

- ◆ Joint Forum set following 5 goals
 - **Development and expansion of the knowledge base** on the cases, sources, types and impacts of air pollution and their relation to associated issues, including cost-effective solutions for the whole region, and good practices for prevention and control;
 - **Better understanding of the methodologies and technologies** involved in managing atmospheric environment;
 - **Development of skills through systematic capacity-building and training** of individuals and institutions and provision of necessary instrumentation and support;
 - **Integration of this knowledge** base with policy-making and public awareness-raising for development of social, political, moral and economic echoes to carry forward relevant plans for mutual benefits; and
 - **Facilitation of consensus-building** within the region, taking into account the situation of sub-regions.

Others: Joint Forum (3)

Scope of current activities and future plan-2

- ◆ **During the initial three years (2010-2012), the Joint Forum will focus on capacity building and the consolidation of information sharing.**
 - Development of a network of databases on air pollution.
 - Sharing of good practices for atmospheric pollution control applied in individual countries.
 - Capacity building activities on the abatement technologies, including best available technology not entailing excessive cost. Facilitation of exchange and transfer of technologies through bilateral and multilateral cooperative schemes. Assessment of cost differentials.
 - Dissemination of data on air pollution.

In accordance with the Joint Plan, the First Capacity Building Workshop of the Joint Forum on Atmospheric Environment in Asia and the Pacific was held in July 2011 in Pathumthani, Thailand.

2. Review of Japan's National Plans for Addressing Air Pollution and its Potential Linkage with Activities under (Sub) regional Frameworks

2-1. Review of the “Fourth Basic Environmental Plan” of Japan for addressing air pollution

2-2. Linkage of Japan's National Plans/Programmes with Activities under Sub-regional/Regional Frameworks

Japan's National Program (1)

2-1. Review of 4th Basic Environmental Plan

Present situation of air pollution and issues to be tackled

- (1) **General views:** Although the trend of air pollution in Japan has been improving as a whole owing to implementation of various measures, **there are still many challenges.** In some urban areas, the national environmental standard of NO₂ has still not been attained yet, and **attainment ratio of the national environmental standard of photochemical oxidants is only less than 1%. Regarding PM_{2.5} for which the national environmental standard was established in 2009,** some monitoring data suggested that the current nationwide levels would exceed the national environmental standard.
- (2) **Air pollution in large cities:** Air pollution caused by NO₂ and Suspended Particulate Matters (SPM) has been improving as a whole and the national environmental standard has been almost attained. However, **there are some areas where the national environmental standard for NO₂ has not been attained yet.**

Japan's National Program (2)

- (3) **Photochemical oxidants:** Although the emissions of **VOC, main causative substances of photochemical oxidant, would be reduced, as expected, by more than 30% in the year 2010** compared with the total amount in 2000, concentration **of photochemical oxidants has not shown outstanding improvement**, and attainment ratio of the national environmental standard is **still less than 1%**.
- (4) **Regional air pollution:** Government endeavored the accumulation of scientific information and international cooperation through the initiatives of the EANET and those on DSS and photochemical oxidant under the TEMM. **In order to address regional air pollution in East Asia, international cooperation should be further promoted.**

As for acid deposition, photochemical oxidants, $PM_{2.5}$ and DSS, it is necessary to enhance national and international monitoring system including improvement of monitoring technology, and to accumulate scientific information through determination of the mechanism of emission, transportation and deposition, and physical and chemical properties. Furthermore, **it is important to extend the administrative efforts towards the management of regional atmospheric environment in East Asia.**

Japan's National Program (3)

Trend of annual average data (ave. of maximum 1 hour data) of Ox (Oxidant) concentration in Japan

(Unit: ppb)

Year	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93
Ambient Site	54	45	39	38	36	35	35	38	38	39	38	41	38	37	42	39	43	41
Automobile site	57	43	31	29	27	27	27	28	29	29	28	32	29	30	35	31	34	33
Year	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11
Ambient Site	45	44	45	44	43	44	44	45	44	45	46	47	46	48	48	48	48	
Automobile site	37	33	35	33	33	35	34	33	34	34	37	38	37	40	41	41	43	

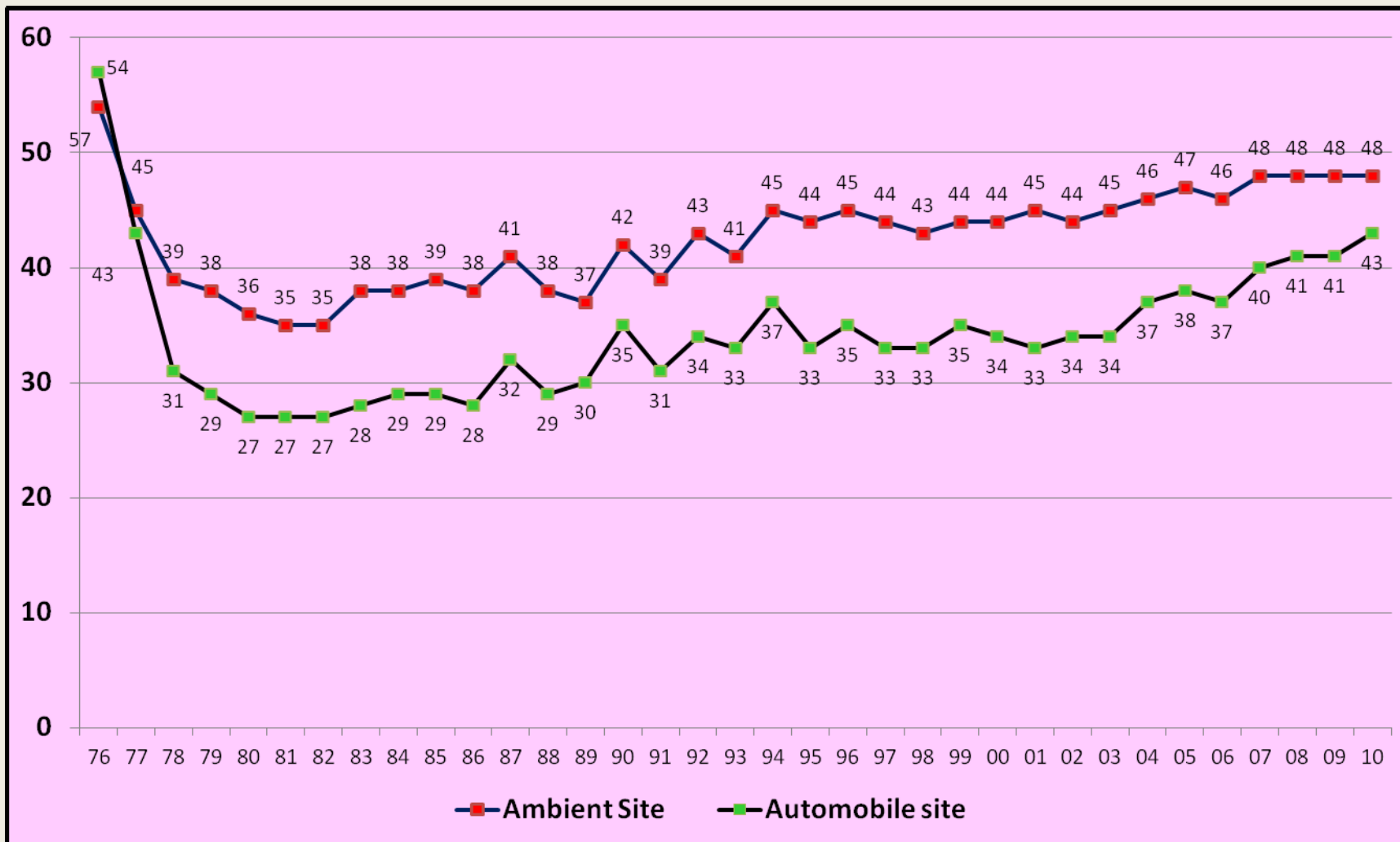
Ambient air quality monitoring sites (AAQMS) in 2010: **1,144** sites

Automobile exhaust gas monitoring sites (AEGMS) in 2010: **33** sites

Japan's National Program (4)

Annual trend of average data (ave. of maximum 1 hour data) of Ox in Japan

Conc. of Ox (ppb) from MOEJ



Trend (Difference of averages of 06-10/80-84)

From MOEJ2010

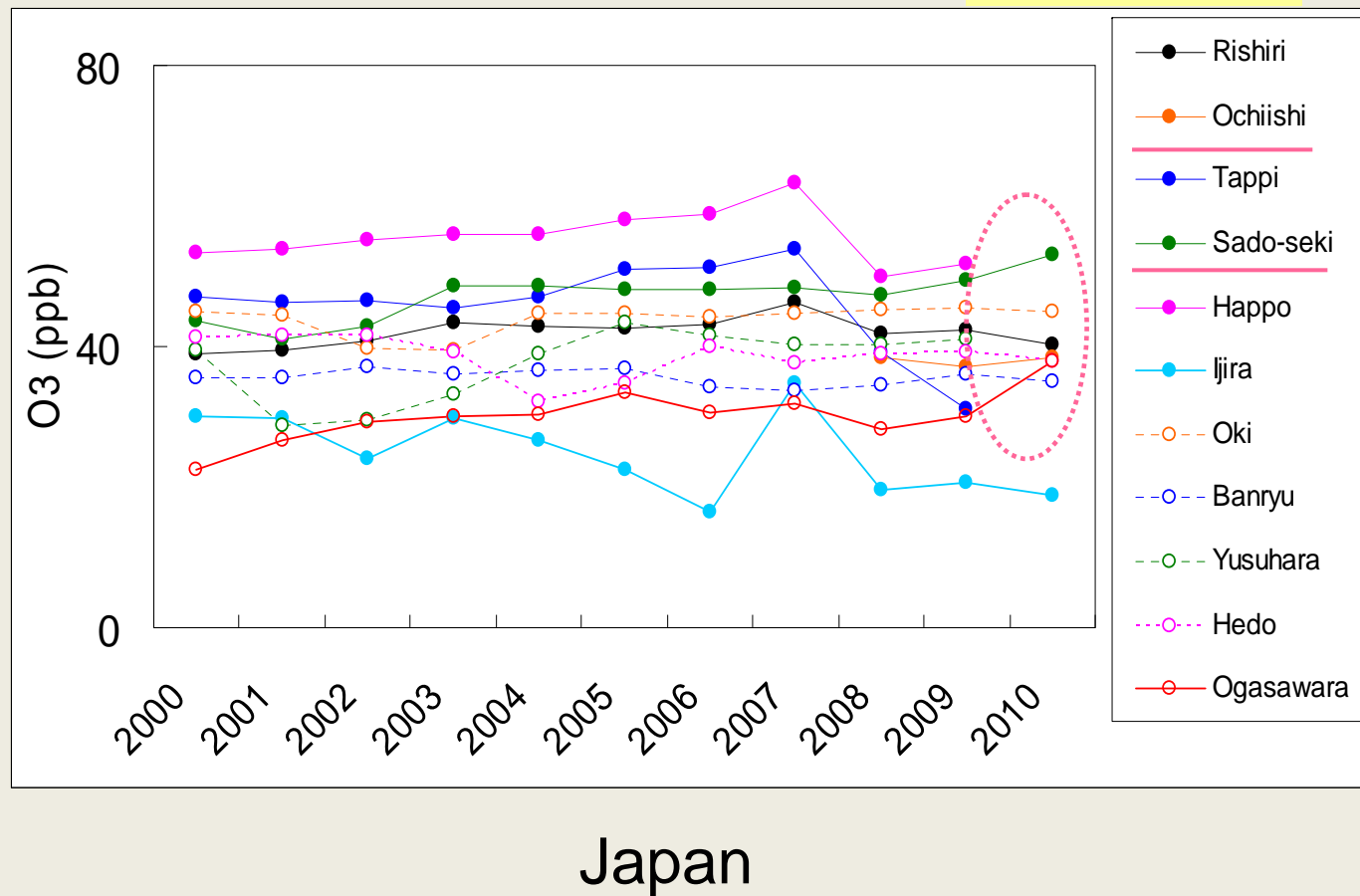
Ambient site: + 11.2 ppb (0.43 ppb/year, 1.2% increasing/year)

Automobile site: + 12.8 ppb (0.49 ppb/year, 1.8% increasing/year)

Japan's National Program (5)

Annual trend of EANET sites of Japan during 2001-2010 (O₃)

Increasing

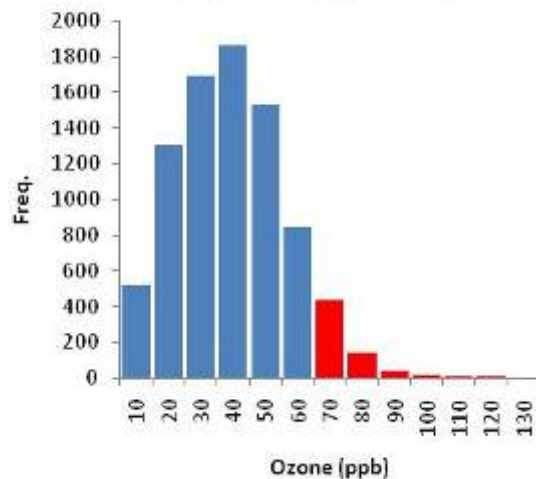


Japan's National Program (7)

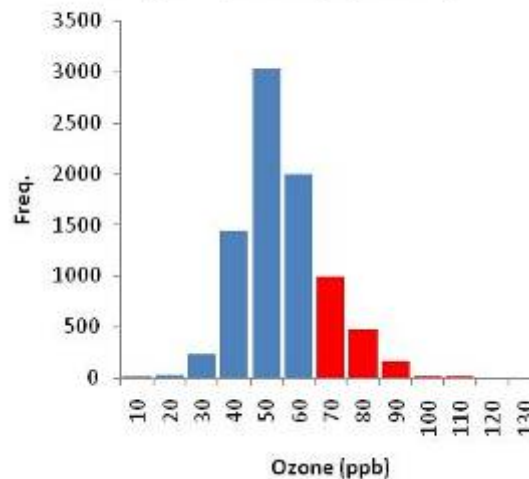
National Standards for Ozone

China (1996)	Class I: 0.06ppm (1-hour value) Class II: 0.08ppm (1-hour value) Class III: 0.10ppm (1-hour value)
R. of Korea	0.06ppm (8-hour value) 0.1ppm (1-hour value)
Thailand	0.10ppm (1-hour value) 0.04ppm (yearly value)
Japan	0.06ppm (1-hour value)

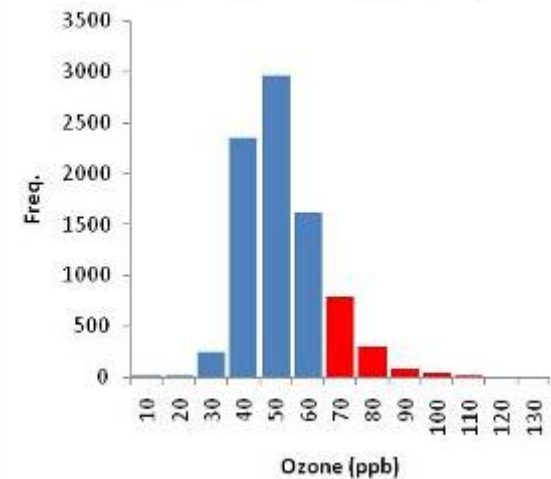
Banryu_Hourly (2008)



Happo_Hourly (2008)



Sado-seki_Hourly (2008)

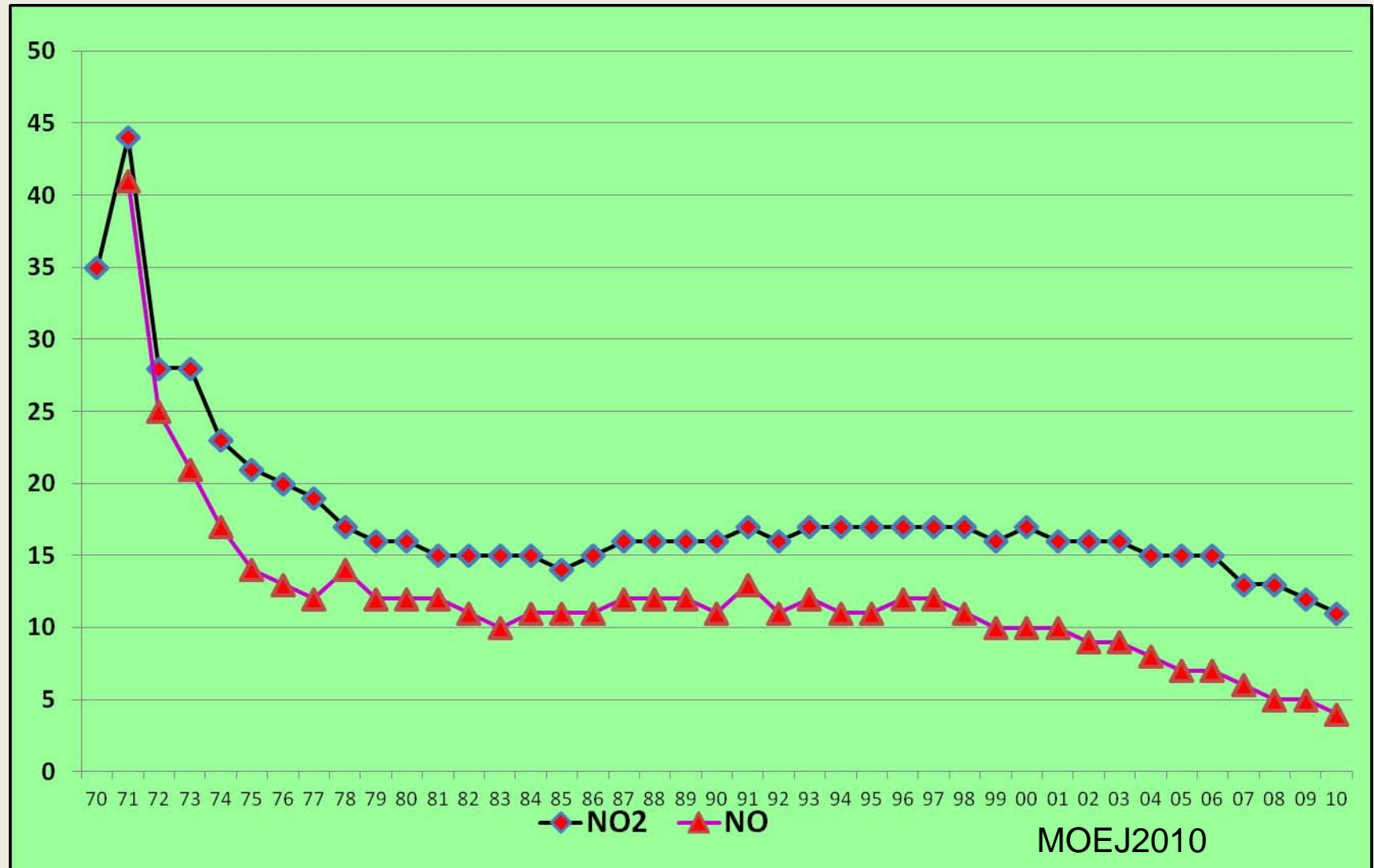


Japan's National Program (8)

Annual trend of average of NO₂/NO in Japan

(Ambient air quality monitoring sites/1332 sites in 2010)

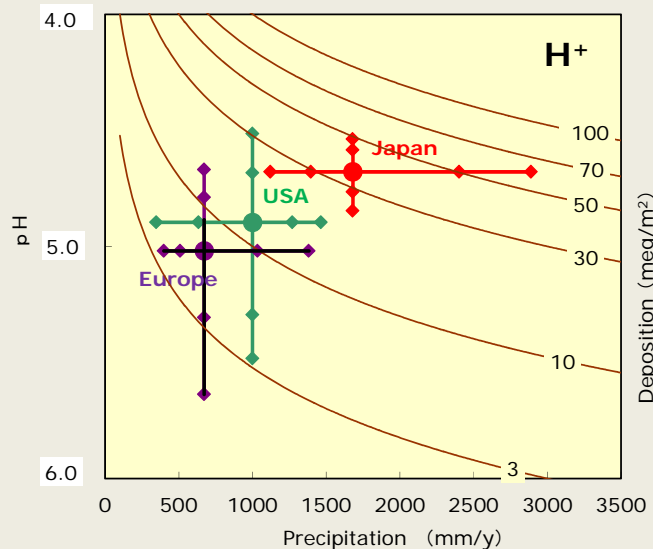
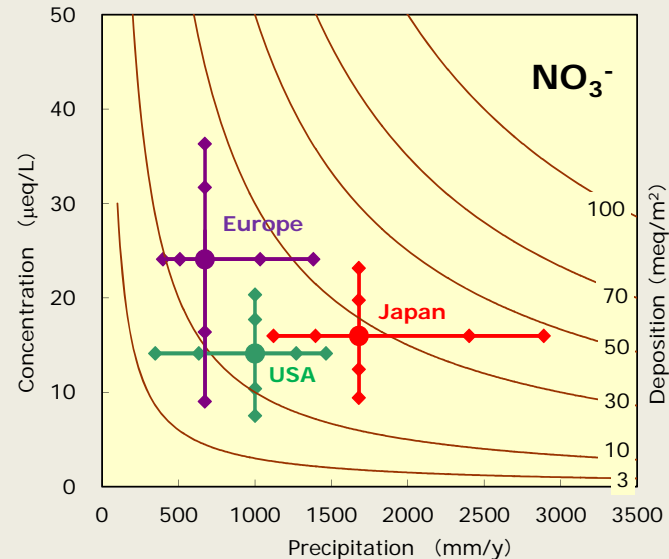
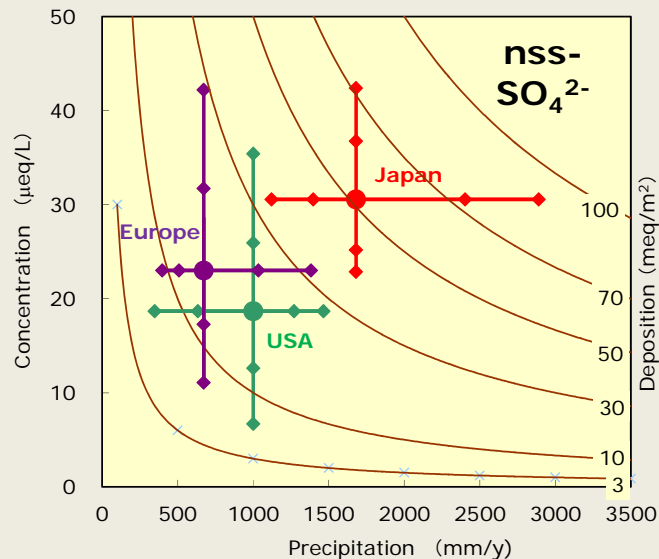
Conc. of NO₂/NO (ppb)



Japan's National Program (9)

Japan and Europe/USA

(Relationship: Precipitation amount-Conc.-Dep. Amount)



1. Japan: MOE¹⁾ + JELA²⁾, n=68, North America: NADP³⁾, n=250, Europe: EMEP⁴⁾, n=97, in 2003-2006
2. Data distributions for Japan, North America, and Europe are presented by 10, 25, 50, 75, and 90 percentile values

- 1) <http://www.env.go.jp/earth/acidrain/acidrain.html>
- 2) Japan Environmental Laboratories Association, Journal of Environmental Laboratories Association, 29-32 (2004-2007).
- 3) <http://nadp.sws.uiuc.edu/data/>
- 4) <http://tarantula.nilu.no/projects/ccc/index.html>

Japan's National Program (7)

Basic direction of national policies:

- For the measures for photochemical oxidants, PM_{2.5} and regional air pollution in East Asia, **it is important to take actions beyond an individual local jurisdiction or country level.**
- It should be noted as important that some **measures to prevent air pollution could also contribute to the mitigation of climate change.**

It is also important:

- Environmentally sustainable city/transportation system
- Promotion of investigation of actual situation and accumulation of scientific findings (government will further establish a continuous monitoring system of PM_{2.5})
- **Promotion of cooperation in East Asian region toward development of a framework for atmospheric environment management based on scientific findings.**
- Review of life style and economic activities

Japan's National Program (8)

Priority issues to be tackled:

[Photochemical oxidants and PM_{2.5}]

Government will apply advanced regional air pollution simulation models to capture the trend of concentration of air pollutants and investigate the formation mechanism, **develop and improve emission inventories, develop a continuous monitoring system with improved quality of the monitoring data. The government will consider and establish effective countermeasures, taking into consideration the influences of regional air pollution.** As for photochemical oxidants, the **government will consider, and endeavor to conclude, appropriate indicators** which show the effect of environmental improvement, apart from the warning numbers that is affected easily by regional air pollution and meteorological condition.

[Regional air pollution in East Asia]

Government will enhance accumulation of scientific findings, and **consider an effective national strategy toward development of a framework on atmospheric environment management in East Asia.**

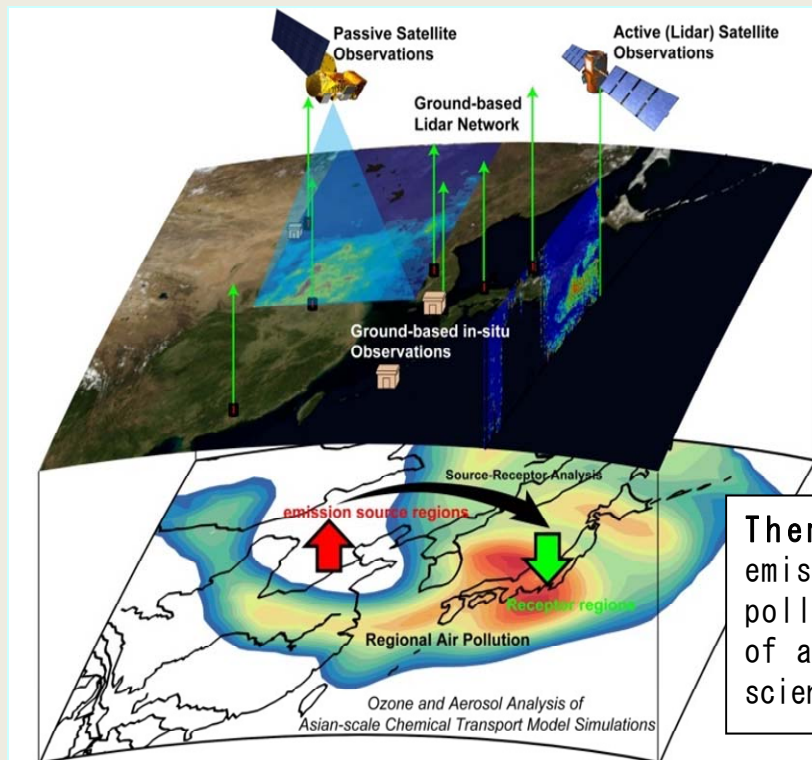
Japan's National Program (9)

2-2. Linkage of Japan's National Plans/Programmes with Activities under Sub-regional/Regional Frameworks

- ◆ Undoubtedly, **photochemical oxidants and PM_{2.5} would be one of the top priorities given the (expected) low attainment ratio of national environmental standards**. The existing regional/sub-regional frameworks associated with these substances include the EANET, which cover these substances as the monitoring targets and the subject of research activities and have the broad geographical scope covering both the Northeast Asia and Southeast Asia, and the Research Cooperation on Photochemical Oxidants under the TEMM, which is aimed to enhance the sub-regional cooperation on photochemical oxidants.
- ◆ In order to strengthen the basis of regional cooperation for atmospheric environment management in East Asia, Japan has long seen the EANET as the platform, and during the discussion on the development of the Instrument, Japan made best efforts to establish a framework type instrument for this purpose. Despite its at-most efforts, the developed Instrument is not a framework type one, as can be seen in **Annex 3**.

Japan's National Program (10)

Outline of “**Scientific Analysis of Regional Air Pollution and Promotion of Air Pollution Management in East Asia Considering Co-benefits**” supported by MOEJ to research regional air pollution and possible options for developing and/or strengthening a regional framework (in 2009-2013).



Synthesis of observations and chemical transport models to analyze trans-boundary air pollution and effects of reducing short-lived climate forcers (SLCFs)

Theme 1 : Elucidation of ozone and aerosol pollution synthesizing numerical model and observation

Theme 2 : Improvement of emission inventories of air pollutants and presentation of air pollutant reduction scenario

Theme 3 : Research on international framework toward promotion of air pollution measures and a co-benefit approach

The first step to solve the problem is international sharing of scientific knowledge on regional air pollution

A grasp of the actual conditions of emissions is necessary for the air pollutant reduction scenario

International framework of trans-boundary air pollution measures is studied considering simultaneous control of global warming

3. Inputs to the formulation of options for a strengthened subregional framework on transboundary air pollution

3-1. Identification of institutional and knowledge gaps in sub-regional/regional frameworks and needs and priorities of a subregional framework in North-East Asia

3-2. Inputs to the formulation of options for a strengthened subregional framework on transboundary air pollution

Inputs to formulation of options (1)

1. Identification of institutional and knowledge gaps in sub-regional/regional frameworks and needs and priorities of a subregional framework in North-East Asia

- ◆ **Need to consider hemispheric transport of air pollution**
- ◆ **Need for integrated air quality management**
- ◆ **Need for simultaneous consideration on local/transboundary air pollution and climate change**

There are many regional/subregional frameworks relevant to atmospheric management in North-East Asia, as described in Chapter B: EANET, TEMM, MICS-Asia, ABC and Joint Forum, to name a few. However, these frameworks would not have corresponded to the global needs as introduced.

With regard to the scope of activities, none of the existing frameworks reviewed in this report have a comprehensive, systematic approach covering air quality monitoring, emission inventories, dispersion modeling, impacts assessment, and emission mitigation measures in North-East Asia. Especially, mitigation technologies and other policy measures have been sidelined in these frameworks,

Inputs to formulation of options (2)

Similarly, air pollution-climate links have not yet been well addressed in any of the existing frameworks, although the importance of co-benefits/co-control approaches is growingly recognized in this subregion.

As a cross-cutting issue, there is **lack of common understanding on the latest scientific knowledge on air quality management among scientists and policy makers in the North-East Asian countries**, which might have hindered strengthening of regional/subregional cooperative actions.

Inputs to formulation of options (3)

2. Inputs to the formulation of options for a strengthened subregional framework on transboundary air pollution

Based on the gaps identified in this report, it is expected to develop a sub-regional/regional framework for international cooperation on atmospheric management, which should meet the national priorities described and have the following functions:

- ◆ **The framework should be able to enhance inter-continental cooperation with European and North American regions.**
- ◆ **The framework should cover all major components of air pollution, covering air quality monitoring, emission inventories, dispersion modeling, impacts on public health and environmental quality, and emission mitigation measures in a comprehensive and systematic manner.**
- ◆ **The framework should address air pollution-climate links, especially SLCFs and co-benefits/co-control approach.**

Inputs to formulation of options (4)

Although ultimately we need to address all of these issues, one network may not need to cover all the functions. **Subregional frameworks may complement each other and serve as subsets which constitute a broader framework as a whole.** The Joint Forum may be able to serve as a platform to discuss the actions taken by subregional frameworks, and as the counterpart of European/North American regions.

In this regard, **it may not be appropriate to hold inter-continental dialogue only through North-East Asian countries, and it would be effective if subregional network(s) can provide adequate input to a regional forum to conduct inter-continental dialogue.** One of the possible areas where North-East Asian countries could strengthen their cooperation at the subregional level would be the information sharing, capacity building, and possibly further steps on mitigation measures, especially in relation to co-benefits/co-control approaches. But in any cases, **it would be essential to carefully consider the roles of subregional frameworks in regional and global contexts.**

Thank you for
your attention

Niigata