EANET/IG28/7/P/REV

AGENDA ITEM 7
Consideration of the Fifth Periodic Report on the State of Atmospheric Environment in East Asia (PRSAE5)

The Twenty-eighth Session of the Intergovernmental Meeting (IG28)
on the Acid Deposition Monitoring Network in East Asia (EANET)
24-26 November 2026, Niigata, Japan (Hybrid)

Introduction

Establishment of the Drafting Committee (DC)

- **At SAC24, based on the document EANET/SAC24/8/REV1, "the process for the development of the Fifth Periodic Report on the State of Acid Deposition in East Asia (PRSAD5)" was endorsed (EANET/SAC24/15 Report of the Session).**
- **At IG26, following Recommendations from SAC24 to IG26 were reported for PRSAD5:**

> III. **On the Process for the Development of the Fifth Periodic Report on the State of Acid Deposition in East Asia (PRSAD5)**, the SAC24 recommends to IG26 to:
>
> a. Endorse the establishment of the Drafting Committee (DC) of the Fifth Periodic Report, with nomination of the members by NFPs to be conducted after the IG26.
> b. Endorse the draft schedule of the DC and Lead Authors meetings and draft implementation plan and task the Network Center to organize the first DC meeting in April 2025.
> c. Endorse the proposed change of the title of the Fifth Periodic Report to be decided by SAC.

- **In the Report of the session of IG26, the Session acted on the Recommendations of SAC24 for PRSAD5 as follows:**

> - Agreed to initiate the preparation of the Fifth Periodic Report on the State of Acid Deposition in East Asia (PRSAD5) in 2025, with the process to be approved by PCs by email in the first quarter of 2025.

- **The process of the preparation of PRSAD5 proposed by the Network Center for the EANET (NC) was reviewed and approved by PCs on 7 February 2025 by email.**
- **The DC of the PRSAD5 has been established.**

DC members for the PRSAE5

Country	Name
Cambodia	Mr. Chhay Por Ing
China	Dr. Yang Xiaoyang
Indonesia	Ms. Nevy Rinda Nugraini
Japan	Dr. Kazuhide Matsuda
Lao PDR	Mr. Sitthideth Nonthaxay
Malaysia	Mr. Mohan Kumar Sammathuria
Mongolia	Mr. Barkhasragchaa Baldorj
Myanmar	Dr. Kyu Kyu Sein
Philippines	Prof. Wilfredo M. Carandang
Republic of Korea	Prof. Taehyoung Lee (Chairperson)
Russia	Dr. Sergey Gromov
Thailand	Assoc. Prof. Dr. Sarawut Thepanondh
Vietnam	Dr. Le Ngoc Cau

Decisions of the IG27

II. On the Process for the Development of the Fifth Periodic Report on the State of Acid Deposition in East Asia (PRSAD5)

a. Approve the updated title, "**The Fifth Periodic Report on the State of Atmospheric Environment in East Asia (PRSAE5)**" endorsed by SAC25.

b. Approve the structure of chapters and contents of the PRSAE5 endorsed by SAC25.

c. Adopt the following recommendations by SAC25:

- Regional Assessment (Part I) is, in principle, prepared based on the EANET data. Other monitoring data and literature such as peer reviewed paper can be used for reference purpose (not for direct evaluation).

d. Approve the implementation plan of the PRSAE5 endorsed by SAC25 and task the Network Center to organize the first Lead Authors Meeting in December 2025.

Format of the Periodic Report

Executive Summary

- Summary for Policymakers
- Summary of Part I Regional Assessment

Part I: Regional Assessment

- The main activities of EANET and an assessment of the state of acid deposition and air pollution focusing on the special distribution, trend analysis, and possibly, impact assessment of acid deposition and air pollution in the region.

Part II: National Assessment

- National assessments from each participating country of EANET describing monitoring activities, air quality assessments, and control measures implemented at the national levels.

Regional Assessment: Structure of the Chapter

Chapter 1: Introduction

Chapter 2: Monitoring Data Quality

Box 1. Observational studies for sustainable monitoring in the EANET region

Chapter 3: Gas and Aerosol Concentration in East Asia

Box 2. Impacts of meteorological conditions on air pollution

Chapter 4: Wet and Dry Deposition in East Asia

Box 3. Nitrogen flow and management

Chapter 5: Impacts on Ecosystems in East Asia

Chapter 6: Summary and Recommendations for Future Activities

Annex: Introduction of EANET Project and related information

The LAs and CAs of the Regional Assessment for the PRSAE5

Chapters	Lead Authors (LAs)	Contributing Authors (CAs) Note: Omit the title of all LAs and CAs
1. Introduction	**Fan Meng (NC)**	DC: Chhay Por Ing NC: Junichi Kurokawa, Ken Yamashita and Meihua Zhu
2. Monitoring Data Quality	**Sergey Gromov (DC)**	DC: Kyu Kyu Sein NC: Kumiko Nakamura, Hiroyuki Sasaki, Azusa Sakaue, Hiroyuki Sase, and Junichi Kurokawa
3. Gas and Aerosol Concentration in East Asia	**Sarawut Thepanondh and Mohan Kumar Sammathuria (DC)**	DC: Le Ngoc Cau, Taehyoung Lee, Nevy Rinda Nugraini, and Barkhasragchaa Baldorj Expert: Ji Dongsheng NC: Yusuke Kiriyama, Keiichi Sato, Satomi Sugahara, and Akie Yuba
4. Wet and Dry Deposition in East Asia	**Kazuhide Matsuda (DC)**	DC: Sergey Gromov and Sitthideth Nonthaxay Expert: Satomi Ban, Syuichi Itahashi, and Naoyuki Yamashita NC: Mari Futami, Mingqun Huo, Hiroyuki Sasaki, and Junichi Kurokawa
5. Impacts on Ecosystems in East Asia	**Atsushi Kume (Expert)**	DC: Wilfredo M. Carandang, Expert: Sammy L. Ayatona, Roger C. Evangelista Jr., Masami Koshikawa, Ma. Fatima Anneglo R. Molina, Rieko Urakawa, V. Jeyanny A/P Vijayanathan, and Ekaterina Zhigacheva, NC: Yusuke Kiriyama, Masayuki Morohashi, Azusa Sakaue, and Hiroyuki Sase
6. Summary and Recommendations for Future Activities	**Toshimasa Ohara and Siwaporn Rungsiyanon (NC)**	DC: Xiaoyang Yang Expert: Duan Kuiquan NC: Junichi Kurokawa, Hiroyuki Sase, Keiichi Sato, Ken Yamashita, and Meihua Zhu
Annex. Introduction of EANET Project and related information	**Junichi Kurokawa (NC)**	Network Center for the EANET (All members)
Box	**No. 1 Keiichi Sato (NC)** **No. 2 Junichi Kurokawa (NC)** **No. 3 Hiroyuki Sase (NC)**	DC: Le Ngoc Cau (No. 2)

National Assessment: Contents*

Chapter 1. Basic Information on National Monitoring Activities
- 1.1. Outline of the activities on acid deposition and air pollution in National Monitoring Plan
- 1.2. Monitoring program
- 1.3. Monitoring stations
- 1.4. Sampling and measurements

Chapter 2. Acid Deposition and Air Pollution in Each Participating Country and Their Environmental Impacts
- 2.1 State of acid deposition and air pollution
- 2.2 State of inland aquatic environment
- 2.3 State of soil and vegetation
- 2.4 State of catchment monitoring
- 2.5 Overall analysis

Chapter 3. Review of National Air Quality Management including Acid Deposition

Chapter 4. Conclusion or Summary

*The structure can be modified by each PC

Executive Summary: Contents

- **Summary for Policy Makers**
  - **Summary of Key Points**
    - ✓ About the PRSAE5
    - ✓ Current status of EANET monitoring activities
    - ✓ Data quality
    - ✓ Overview of the analysis of monitoring results
  - **Summary of State of Atmospheric Environment**
    - ✓ Gas and Aerosol Concentration in East Asia
    - ✓ Wet and Dry Deposition of atmospheric substances
    - ✓ Impact of Ecosystems in East Asia
  - **Key Message to Policy Maker**
    - ✓ Protecting and Strengthening EANET's Scientific Foundation
    - ✓ Supporting Alternative Monitoring Technologies and Closing Dat Gaps
    - ✓ Bridging Scientific Data with Policy Making
    - ✓ Moving from Regional Data to Regional Strategies and Measures
    - ✓ Building a Stronger Regional Platform for the Future
    - ✓ Conclusion
- **Summary of each Chapter of Reginal Assessment**

Implementation Plan for the PRSAE5 after the DC3/LAM3

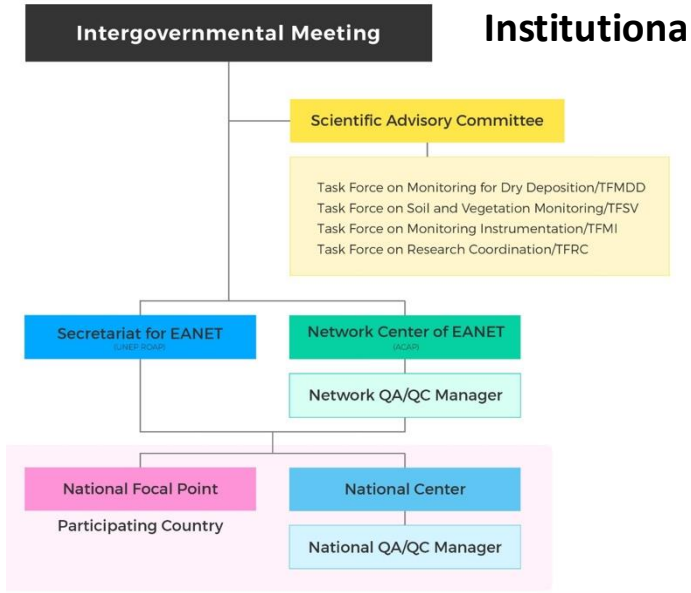
Year	Month	Activities/Events	Deliverables
2026	29 JUL	The DC3/LAM3	Comments from the DC3/LAM3
	SEP	Circulation of the final draft of the PRSAE5 to the DC, SAC, and NFP members	The final draft of the PRSAE5
	OCT	The SAC26 Presentation of the final draft of the PRSAE5 by the Chairperson of the DC for adoption by the SAC26	The final draft of the PRSAE5 (adopted with modification on a condition that the drafts are appropriately revised to address the comments from SAC members by the SAC26)
	NOV	Circulation of the revised final draft of the PRSAE5 to the SAC and NFP members	The revised final draft of the PRSAE5 adopted by SAC26 on 17 November
		The IG28 Presentation of the revised final draft of the PRSAE5 by the NC on behalf of the DC and SAC for approval for publication of the PRSAE5 by the IG28	The finalized draft of the PRSAE5 (approval for publication of the PRSAE5 by the IG28)
	DEC	Proofreading of the finalized draft of the PRSAE5	The finalized PRSAE5
2026 2027	DEC -	Printing and distribution of the PRSAE5	Publication of the PRSAE5

Review of the PRSAE5
Part I: Regional Assessment

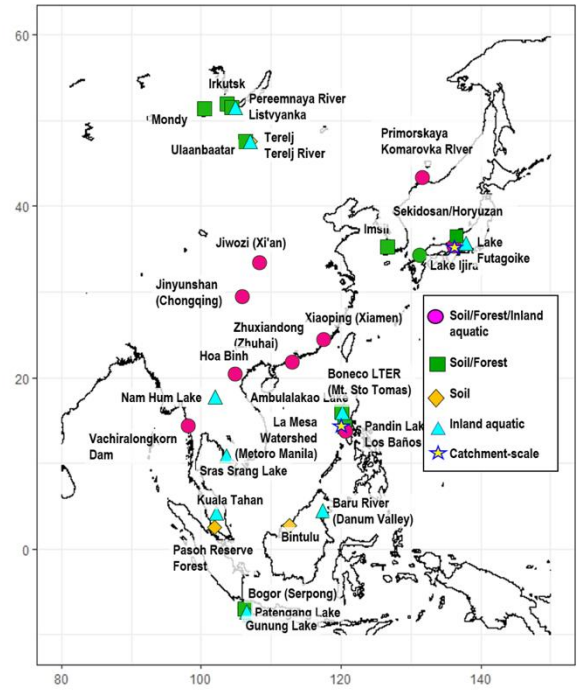
Chater 1: Introduction

1.1 Background
1.1.1 Preparation of the fifth periodic report
1.2 Brief introduction of the EANET
1.3 Objectives
1.4 Institutional arrangement
1.5 EANET activities in 2000-2024
1.5.1 Main activities of the EANET
1.5.2 EANET meetings
1.5.3 Monitoring activities
1.5.4 Current status of monitoring activities as 2024
1.5.5 Research activities
1.5.6 Capacity building activities
1.5.7 Public awareness activities
1.6 References

Institutional Framework for EANET







Locations of air concentration, acid deposition, ecological monitoring sites in 2024.

Chater 2: Monitoring Data Quality

2.1 Introduction

2.2 General procedure of QA/QC

- 2.2.1 Preparation of National Monitoring Plan
- 2.2.2 Siting
- 2.2.3 Sampling and sample handling
- 2.2.4 Chemical analysis
- 2.2.5 QA/QC procedure prior to the data submission to the national and network center

2.3 Evaluation of the Inter-Laboratory Comparison Projects

- 2.3.1 Wet deposition
- 2.3.2 Dry deposition
- 2.3.3 Soil
- 2.3.4 Inland aquatic environment

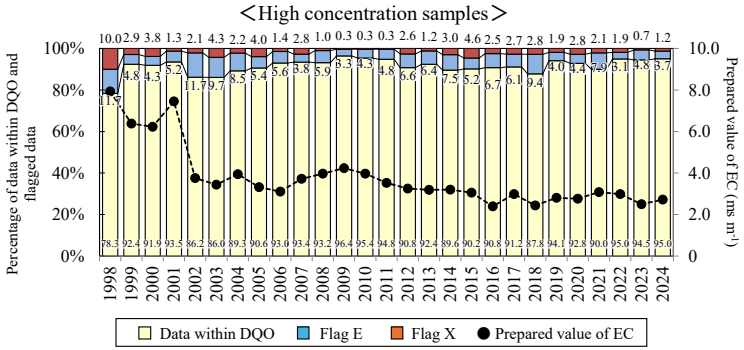
2.4 Evaluation of the regular measurement

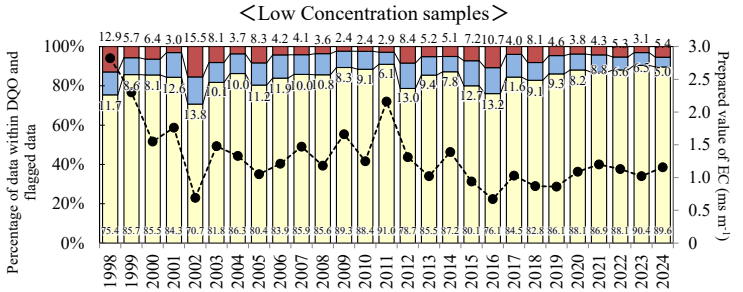
- 2.4.1 Flow for the data reporting and verification
- 2.4.2 Validation of the data for wet deposition
- 2.4.3 Data completeness
- 2.4.4 Site representative ness

2.5 Conclusion and recommendations

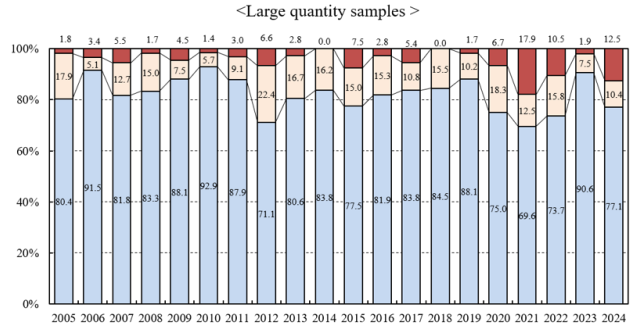
2.6 References

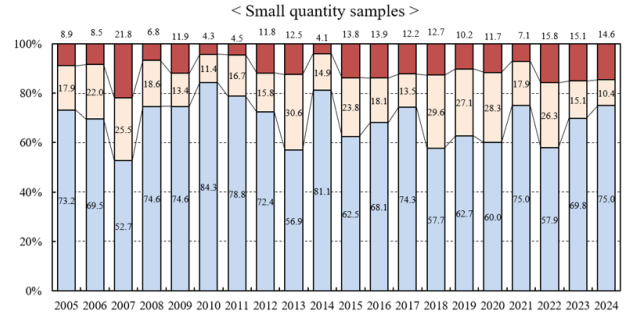
Wet deposition

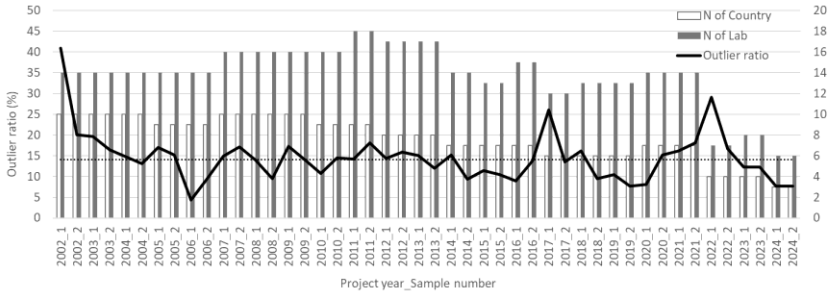




Dry deposition

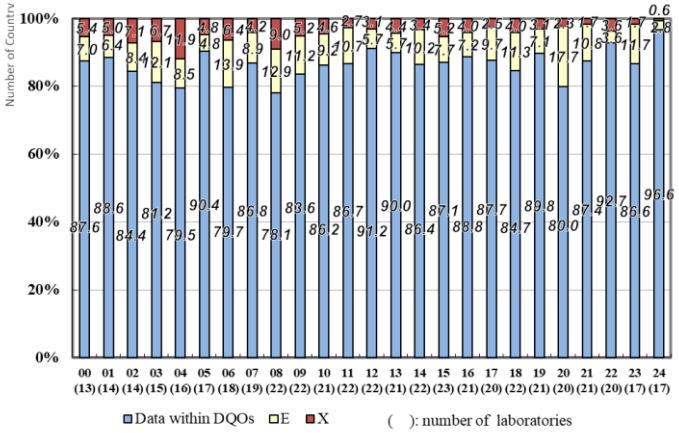






Soil

Inland aquatic environment



Overall comparison of the Inter-Laboratory Comparison Projects

Chater 3: Gas and Aerosol Concentration in East Asia

3.1 Introduction

3.2 Monitoring methodology

3.3 Particulate matter

- 3.3.1 Spatial distribution of particulate matter
- 3.3.2 Temporal trends of particulate matter
- 3.3.3 Particulate components
- 3.3.4 Literature review (2020-2024) of Chemical composition in $PM_{2.5}$

3.4 Ozone (Surface ozone)

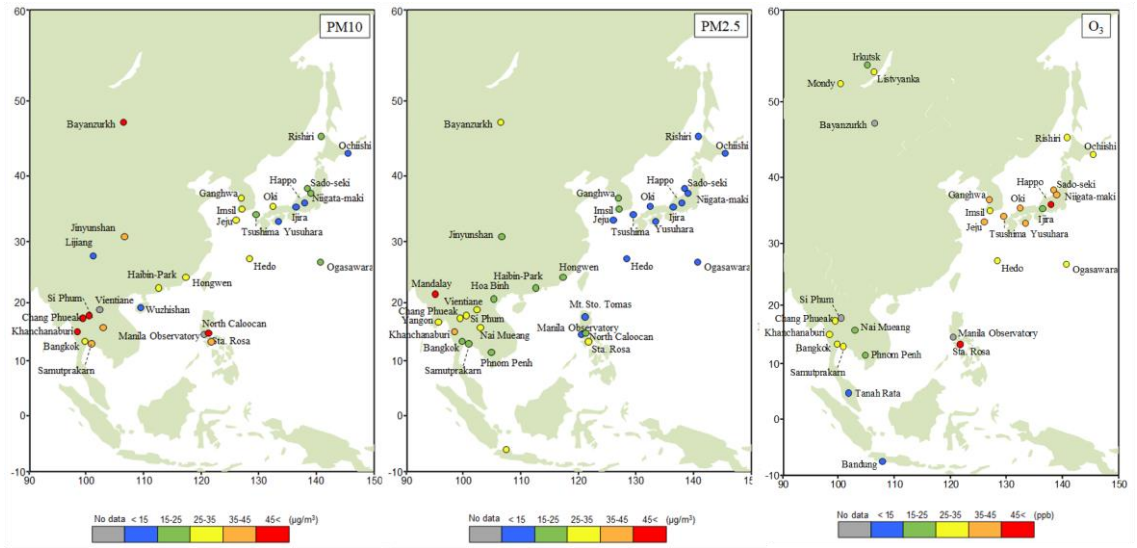
- 3.4.1 Spatial distribution of ozone
- 3.4.2 Temporal trends of ozone

3.5 Other gas species

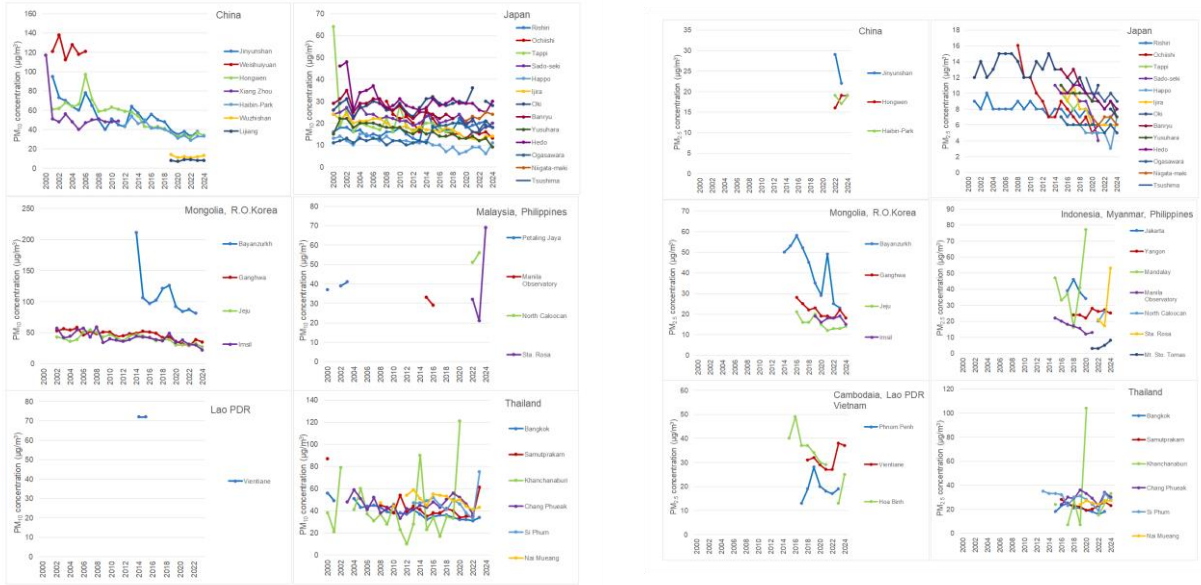
- 3.5.1 SO_2 and NO_2
- 3.5.2 HNO_3, HCl, and NH_3

3.6 Summary and Recommendations

3.7 References



Spatial distribution of PM_{10}, $PM_{2.5}$ and O_3 concentration (2020-204)



Annual concentration of PM_{10} and $PM_{2.5}$ at respective EANET sites

Chater 4: Wet and Dry Deposition in East Asia

4.1 Introduction

4.2 Monitoring methodology

4.3 Sulfur deposition in East Asia

4.3.1 Trend of sulfur deposition

4.3.2 Spatial distribution of sulfur deposition

4.4 Nitrogen deposition in East Asia

4.4.1 Trend of nitrogen deposition

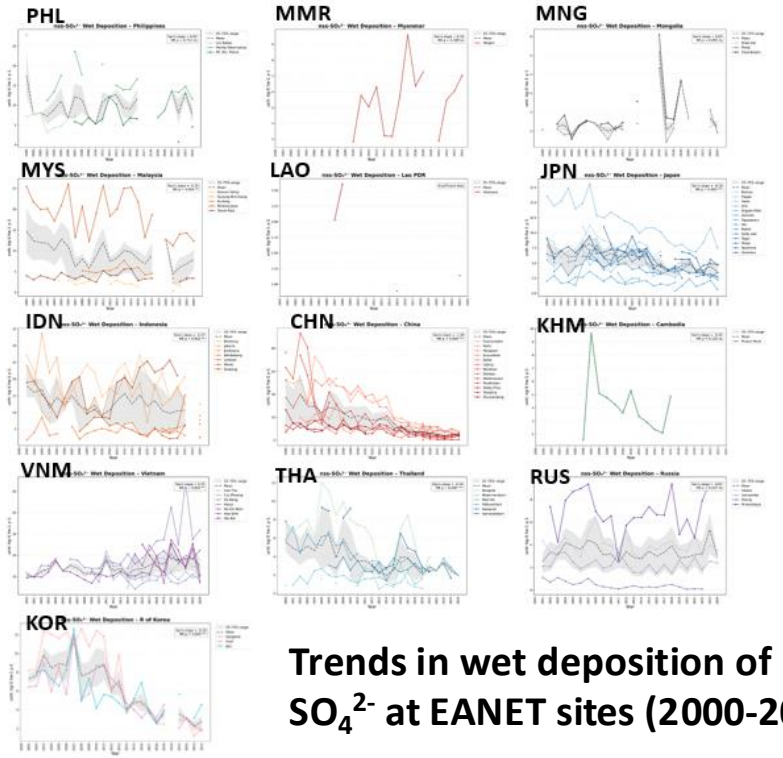
4.4.2 Spatial distribution of nitrogen deposition

4.5 Precipitation chemistry in East Asia

4.6 Comprehensive discussion

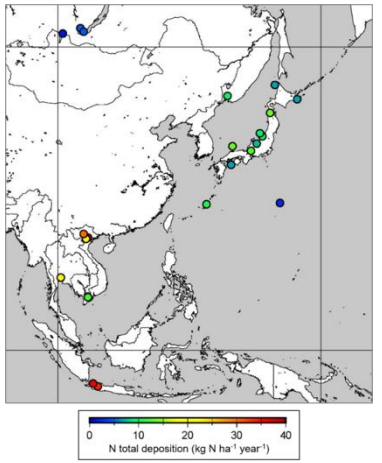
4.7 Summary and recommendations

4.8 References

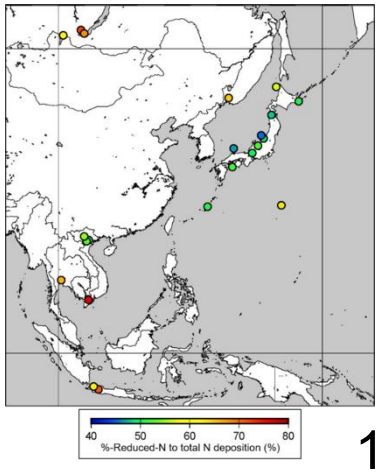


Trends in wet deposition of nss-SO_4^{2-} at EANET sites (2000-2024)

Total N deposition

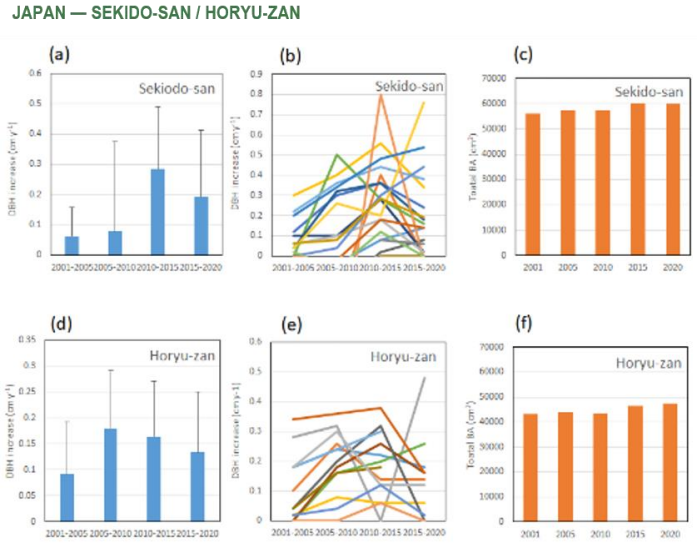


Ratio of reduced N deposition to the total



Chater 5: Impacts on Ecosystems in East Asia

5.1 Introduction
5.2 Monitoring methodology
5.3 Soil chemical properties
5.4 Forest vegetation
5.5 Inland water chemistry
5.6 Catchment-scale analysis
5.7 Conclusions
5.8 References



Changes in DBH increase and total basal area differed greatly among stands and individual trees.

Site name		Duration	pH	EC	Alkalinity	SO_4^{2-}	NO_3^-	Cl^-	NH_4^+	Na^+	K^+	Ca^{2+}	Mg^{2+}
Jinyunshan Lake	C1	2001-2019	-0.70	2.22	4.17	0.40	2.63	-1.20	-2.64	0.06	1.32	3.16	-0.21
		2001-2024	0.40	-0.73	4.79	-3.02	1.22	-4.32	-2.95	-2.44	0.72	0.01	-1.85
Xiaoping Dam	C2	2001-2019	0.08	0.67	5.14	0.86	-0.71	-2.23	-0.82	-2.80	3.22	5.65	0.00
		2001-2024	3.37	1.33	5.23	-0.44	-1.56	-2.72	-2.16	-1.70	4.10	5.70	-0.56
Jiwozi River	C3	2001-2019	-1.69	-1.03	6.68	-2.30	0.61	-1.92	1.56	-0.68	1.55	-2.31	-0.38
		2001-2024	-1.40	-4.63	6.01	-6.10	1.41	-3.35	2.17	-2.61	-1.09	-4.86	-3.61
Zhuxiandong Stream	C4	2004-2019	-3.09	2.62	2.92	-5.45	4.17	-3.74	-3.42	0.52	0.71	0.21	1.58
		2004-2024	-2.15	0.13	0.75	-7.35	4.74	-2.36	-5.97	2.11	0.35	-2.40	-0.96
Ijira Lake	J1	2000-2019	1.51	-5.02	0.22	-1.98	-6.32	-7.05	-6.22	-5.28	-3.38	-4.11	-5.26
		2000-2024	1.53	-6.42	0.80	-3.78	-8.14	-8.61	-6.78	-6.11	-3.76	-4.24	-6.33
Futago Lake oike	J3-1	2019-2019											
		2019-2024	0.83	1.10	2.01	-3.22	1.64	1.61		2.08	0.04	0.68	1.10
Futago Lake meike	J3-2	2019-2019											
		2019-2024	-1.21	-3.22	-0.73	-4.63	-2.05	0.646		0.833	-2.52	-2.62	-3.43
Nam Houm Lake	L1	2009-2019	1.06	-1.33	-1.91	2.04	-1.66	-2.58					
		2009-2024	-1.10	1.10	0.57	0.00	-0.93	-0.34	0.00	2.33	0.00	0.36	-0.54
Baru river	Ma3	2022-2019											
		2022-2024	-1.44	-2.92	-3.45	-2.62	1.71	1.25	2.16	-0.19	-2.62	-3.75	-3.30

Site name		Duration	pH	EC	Alkalinity	SO_4^{2-}	NO_3^-	Cl^-	NH_4^+	Na^+	K^+	Ca^{2+}	Mg^{2+}
Terelj river	Mo1	2002-2019	-2.87	0.02	1.42	4.43	-1.46	-1.89	0.60	-1.50	-0.64	-1.00	-1.96
		2002-2024	-4.05	-2.28	2.20	2.07	-3.28	-1.34	2.13	-1.03	0.15	-0.33	-1.93
Pandin Lake	P1	2004-2019	-0.29	0.66	0.09	3.27	-1.72	0.46	0.05	0.74	-3.64	3.68	-0.28
		2004-2024	0.91	0.69	-0.08	6.77	-3.81	0.43	-1.08	1.26	-3.46	2.08	2.03
Ambulalakaw Lake	P2	2005-2019	1.01	1.17	-0.82	-2.05	-1.80	-0.02	-0.32	2.55	1.00	-0.12	0.91
		2005-2024	1.90	4.59	-1.22	-2.23	-2.13	1.63	-0.77	-0.57	0.38	0.37	0.33
Pereemnaya River	R1	2004-2019	-0.09	1.74	-1.64	3.96	-1.49	-1.31	-5.46	0.52	-1.67	3.78	-1.76
		2004-2024	0.38	2.41	-1.73	4.57	-1.13	-3.38	-6.59	0.50	-0.93	4.38	-1.24
Komarovka River	R2	2005-2019	-4.60	0.47	-2.32	3.20	5.70	0.33	0.68	3.12	3.74	1.33	-1.84
		2005-2024	-2.89	-1.23	1.29	-0.67	0.85	0.36	-0.10	6.50	7.25	3.23	-1.45
Vachiralongkorn Dam 1	T1-1	2000-2019	0.46	0.84	2.33	0.48	1.14	2.21	2.11	3.70	1.35	3.06	2.11
		2000-2024	0.98	2.75	2.70	0.79	1.52	4.42	2.05	4.55	1.39	4.55	2.24
Vachiralongkorn Dam2	T1-2	2000-2019	2.66	0.43	4.49	0.91	2.49	1.78	1.71	2.47	0.34	3.46	1.11
		2000-2024	2.62	3.33	5.33	1.43	2.95	4.24	0.79	3.52	0.83	5.09	2.80
Hoa Binh Reservoir	V1	2000-2019	-0.31	-1.49	-4.14	-0.04	3.66	2.49	-4.17	3.14	0.75	-2.48	-2.15
		2000-2024	-0.50	-2.63	-4.96	-2.79	5.02	1.77	-1.47	2.48	3.55	-1.17	-6.14

	-	+
$p < 0.05$		
$p < 0.01$		
$p < 0.001$		

Note : Value shows Z score, which indicates the increasing trend with positive values or the decreasing trend with negative values. Color shows significant levels.

The analyses point to site-specific processes rather than one consistent regional pattern.

SOIL	Soil pH responses did not necessarily follow trends in atmospheric deposition.
VEGETATION	Long-term monitoring of identified trees is essential for evaluating the effects of air pollution.
INLAND WATER	At C1, C3, C4, and J1, sulfur- and/or nitrogen-related parameters recently decreased in both water and deposition.
CATCHMENT	At IJR, declining atmospheric deposition was accompanied by lower stream-water SO_4^{2-} and DIN.

CONTINUE **Atmospheric deposition and ecosystem monitoring** to evaluate delayed recovery, acidification, and changes in nitrogen retention

Chater 6: Summary and Recommendations for Future Activities

6.1 Summary

6.1.1 Overview of state of atmospheric environment in East Asia

6.1.2-6.1.5 Summary for Chapter 2-5

6.2 Recommendation for future activities

6.2.1 General remarks

- **Overall Direction:** Strengthen O_3 and $PM_{2.5}$ monitoring and analysis to support science-based policymaking.
- **Sustainable Monitoring:** Upgrade monitoring equipment and promote complementary use of emerging technologies.
- **Nitrogen Cycle and Management:** Improve understanding of reactive nitrogen deposition through integrated data analysis.
- **Meteorological Impacts:** Strengthen analysis of meteorological impacts on air pollution and deposition.

6.2.2 Specific topics

6.2.2.1 Monitoring and QA/QC

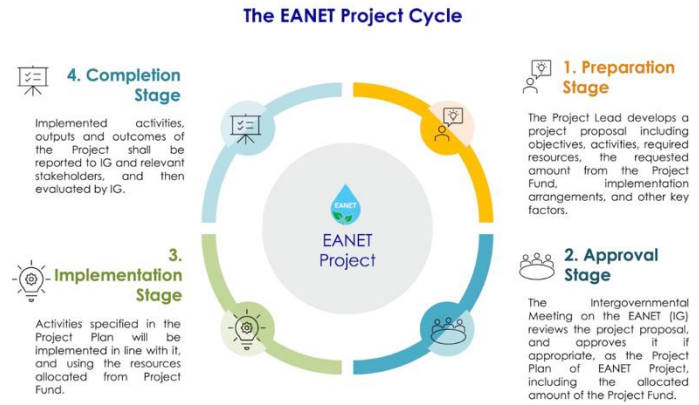
6.2.2.2 Assessing regional atmospheric environment

6.2.2.3 Assessing impacts on ecosystems

6.2.2.4 Other activities

Annex: Introduction of EANET Project and related information

1. EANET Project Fund and Project Guidelines
2. Overview of the EANET Project Activities in 2022-2024
3. Perspectives of EANET Projects in the Fifth Medium-Term Plans of the EANET (2026-2030)



Box 1. Observational studies for sustainable monitoring in the EANET region

1. What observational studies have brought in the EANET region?
2. Key observational focuses under MTP (2026–2030)
3. Ensuring sustainable monitoring during MTP (2026–2030)
4. Towards sustainable monitoring in the EANET region

Box 2. Impacts of meteorological conditions on air pollution

1. How do meteorological conditions affect air quality?
2. Impacts of changing meteorology on air pollution

Box 3. Nitrogen flow and management

1. Necessity of sustainable nitrogen management
2. EANET's potential to contribute to understanding the regional nitrogen flows
3. Enhancement of monitoring and assessment under the new MTP (2026-2030)

Review of the PRSAE5 Executive Summary

Executive Summary: Contents

- **Summary for Policy Makers**
  - **Summary of Key Points**
    - ✓ About the PRSAE5
    - ✓ Current status of EANET monitoring activities
    - ✓ Data quality
    - ✓ Overview of the analysis of monitoring results
  - **Summary of State of Atmospheric Environment**
    - ✓ Gas and Aerosol Concentration in East Asia
    - ✓ Wet and Dry Deposition of atmospheric substances
    - ✓ Impact of Ecosystems in East Asia
  - **Key Message to Policy Maker**
    - ✓ Protecting and Strengthening EANET's Scientific Foundation
    - ✓ Supporting Alternative Monitoring Technologies and Closing Data Gaps
    - ✓ Bridging Scientific Data with Policy Making
    - ✓ Moving from Regional Data to Regional Strategies and Measures
    - ✓ Building a Stronger Regional Platform for the Future
    - ✓ Conclusion
- **Summary of each Chapter of Reginal Assessment**

Summary of Key Points

- **About the PRSAE5**
  - Brief background of periodic report and introduction of the PRSAE5
- **Current status of EANET monitoring activities:**
  - EANET Monitoring Framework, Monitoring Site Classification, Atmospheric Monitoring Network, Ecological Monitoring Network, and Quality Assurance and Quality Control (QA/QC)
- **Data quality**
  - Further improvement of EANET data quality requires refinement of ILC evaluation, regular NMP updates, more effective Technical Missions, and strengthened monitoring and QA/QC practices.
- **Overview of the analysis of monitoring results**
  - EANET observations show decreases in $PM_{2.5}$, SO_2, and NO_x in parts of East Asia, reflecting the benefits of emission reductions.
  - Surface O_3, as well as $PM_{2.5}$ associated with biomass burning, and coal combustion remain concerns, indicating increasingly complex regional air pollution.
  - Sulfur deposition has decreased, while reactive nitrogen is increasingly important for ecosystem risks.
  - Ecosystem responses vary among sites, highlighting the need for continued integrated monitoring.
  - Overall, emerging challenges such as O_3 and reactive nitrogen require strengthened monitoring, assessment, QA/QC, and regional collaboration.

Summary of State of Atmospheric Environment

- **Gas and Aerosol Concentration in East Asia**
  - EANET's long-term monitoring shows declines in $PM_{2.5}$, SO_2 and NO_x at many sites, while biomass burning and coal combustion remain important PM sources. In addition, regional differences in O_3 trends and increasing NH_3 highlighting the growing complexity of air pollution issues in the region.
  - Future priorities include strengthening long-term monitoring of $PM_{2.5}$, O_3, precursors, and reactive nitrogen, source apportionment, integrated modelling, QA/QC, and regional collaboration.
- **Wet and Dry Deposition of atmospheric substances**
  - Sulfur deposition has decreased, particularly in Northeast Asia, while nitrogen deposition remains relatively high, with some regional variations including hotspots in Southeast Asia.
  - Total nitrogen deposition is highest in Southeast Asia, dominated by reduced nitrogen, with critical-load exceedances indicating eutrophication risks.
  - Declining acidity in Northeast Asia contrasts with variable Southeast Asian conditions, highlighting the need for stronger NH_3 monitoring and total deposition assessment.
- **Impacts on Ecosystems in East Asia**
  - Soil and forest growth showed no clear response to declining acid deposition, while inland water chemistry showed partial recovery from reduced sulfur deposition. Catchment-scale analyses suggested incomplete nitrogen retention in ecosystems with relatively high DIN export.
  - Ecosystem responses vary considerably among regions, influenced by meteorological, hydrological, geological, and biogeochemical processes.

Key Message to Policy Maker

- **Protecting and Strengthening EANET's Scientific Foundation**
  - EANET's long-term monitoring data are a valuable regional public good and scientific foundation for environmental policy. Maintaining their continuity, quality, and accessibility while expanding EANET's knowledge base to address emerging air pollution challenges should remain a core priority.
- **Supporting Alternative Monitoring Technologies and Closing Data Gaps**
  - Alternative monitoring technologies such as LCS can complement conventional monitoring and expand spatial coverage, but require appropriate guidance and QA/QC. EANET can support their effective integration to strengthen regional monitoring and address information gaps.
- **Bridging Scientific Data with Policy Making**
  - EANET should strengthen the science–policy interface by translating its scientific findings into clear and practical information for policymakers, building on its trusted regional network to support informed, science-based decision-making.

Key Message to Policy Maker

- **Moving from Regional Data to Regional Strategies and Measures**
  - Air pollution requires regional understanding and cooperation beyond national efforts. EANET can support this by providing scientific evidence on regional trends, common challenges, and information gaps, thereby facilitating discussions on regional strategies and strengthening the link between science and policy making.
- **Building a Stronger Regional Platform for the Future**
  - EANET should further develop as a regional platform connecting science, policy, and countries, making full use of its long-term data, technical expertise, new technologies, and established cooperation to support regional environmental management.
- **Conclusion**
  - Building on its trusted scientific foundation, EANET should integrate diverse data and technologies, strengthen the science–policy interface, and promote regional cooperation to translate scientific knowledge into informed policy and regional action.

Comments on the Second Circulation Version of the PRSAE5 and Responses

Comments from SAC Members on the Revised Final Draft of the Periodic Report on the State of Atmospheric Environment in East Asia (PRSAE5), Distributed on 3 November, and Responses Leading to the Version Adopted by SAC26 on 17 November.

Comments or Responses	Descriptions
Comments from SAC	**Section 3.4.1, Figures 3.4.1 and 3.4.2 of Chapter 3 of Regional Assessment** **The O_3 data provided by China are MDA8, namely daily maximum 8-hour moving averages, whereas the data from other countries are annual means of hourly concentration.** **Because these values are not directly comparable, please delete the following original text:** "as well as at Jinyunshan (China)" "China ranked second at approximately 42 ppbv, with notable within-country variability, individual site values ranging from approximately 20 to 47 ppbv, reflecting the contrasting conditions between rural photochemically active sites and more polluted urban locations subject to NO_x titration."
Responses	**O3 data of China as MDA8 (Maximum Daily 8-Hour Average) were removed from Figures 3.4.1 and 3.4.2.** **The text identified as comparing and evaluating data based on hourly values with data based on MDA8 was deleted.** **------** **In line with the above revisions, the same corrections were made to Figure 3.3 in the Executive Summary, which corresponds to Figure 3.4.1 of Chapter 3 in Regional Assessment.**

Comments or Responses	Descriptions
Comments from SAC	**Section 5.4.3 of Chapter 5 of Regional Assessment.** **The present text attributes changes in wet deposition and forest dynamics to air pollution control measures in China and to transboundary air pollution. However, the source region and transport process are not clearly identified, and the evidence presented in this section is insufficient to support such specific attribution. We therefore suggest to made the following deletions.** **In the first paragraph, delete: "As a result of air pollution control measures in China," So the revised paragraph now reads:** Tree growth is influenced by various environmental factors. These include meteorological conditions (temperature, precipitation, strong winds, and snowfall), CO2 concentration, atmospheric depositions, intra- and inter-specific competition, diseases and pests, and anthropogenic physical disturbance, etc. (Forzieri et al. 2021; Hisano et al. 2020). The load of acid deposition (air pollution) is one such factor. Assessing the effects of air pollution through field monitoring requires appropriate monitoring plans to distinguish the effects of air pollution from other factors. The amount of wet deposition of nss-SO42-, an indicator of the intensity of regional air pollution, has decreased at each survey site since 2007 (Fig. 5.3.5). **In the following paragraph, delete "from the continent", "transboundary" and "also". Then the revised paragraph now reads:** Sekido-san and Horyu-zan are vulnerable to air pollution, and Fagus crenata is a sensitive tree species to ozone stress (Kume et al. 2020). Therefore, a decrease in air pollution might have caused a systematic change in forest dynamics. At Sekido-san, the rate of DBH increase was large around 2010 to 2015, and at Horyu-zan, the rate increased around 2005 to 2010. Furthermore, stand BA increased at both sites from 2010 to 2015 (Figures 5.4.2a, b, c, d, e, f). Changes in meteorological conditions have been confirmed to have an impact on forest dynamics in this region (Ishida et al. 2026). Although no trend was observed in soil pH (Fig. 5.3.5a), the results support the idea that the forest at these sites are changing. **The following sentence appears: "the effects of transboundary air pollution on deciduous beech Fagus crenata and evergreen conifer Cryptomeria japonica differed". We would suggest replacing "transboundary air pollution" with "regional air pollution".**
Responses	**The specified passages were removed from the respective paragraphs.**

Comments or Responses	Descriptions
Comments from NFP	**Whilst reviewing the draft, we noticed a minor discrepancy in Figure 3.9 (of Executive Summary). The caption refers to $PM_{2.5}$ concentration, but the bottom-left graph shows hourly O_3. Could you please check whether this graph was included by mistake, or whether it should be replaced with the corresponding $PM_{2.5}$ graph?**
Responses	**Figure 3.9 of Executive Summary** **The ozone figure was incorrect and has been replaced with the $PM_{2.5}$ figure.** **No revisions were necessary to the text of the Executive Summary.** **------** **The figure pointed out was part of Figure 3.3.6 in Regional Assessment Chapter 3, where the same error was identified. In addition, a description referring to the figure as an ozone figure was identified.** **First, two ozone figures have been replaced with the $PM_{2.5}$ figures.** **Then, the description of the ozone figure was replaced with the description of PM2.5 shown below:** **Ulaanbaatar (Bayanzurkh) displays an $PM_{2.5}$ diurnal cycle with a pronounced morning peak between approximately 10:00–12:00 local time, associated with morning traffic emissions, and a secondary evening rise after 22:00–02:00. Imsil (Republic of Korea) shows a morning peak between approximately 08:00-10:00 in MAM and SON, DJF related with the morning traffic emissions and shallow nocturnal boundary layer conditions.**

Future recommendations from a SAC member

- EANET is an international, large-scale atmospheric monitoring initiative covering East Asia in its entirety. Therefore, it is essential to incorporate analyses that account for atmospheric influences, most notably the monsoon. In the context of atmospheric environmental assessment, considering the long-range transport of pollutants driven by seasonal shifts in pressure patterns is a fundamental scientific principle.
- Furthermore, given the consistent warming trend observed since EANET's inception, it is more appropriate to refer to this as "climate change." The scientific rationale for characterizing it as merely "changes in meteorological conditions" is unclear.
- Consequently, removing all such references strips away the regional specifics unique to EANET’s operations in Asia, resulting in a document that feels unnatural from a scientific standpoint.
- Recommendation for the Future:
  - It is recommended that sufficient time and opportunities should be provided for detailed discussions on comments concerning the scientific content of the PRSAE and how to address them before the SAC meeting.
  - In addition, discussions should be held on how to incorporate internationally recognized scientific findings into the PRSAE.
  - To this end, it is proposed that an appropriate mechanism be established to facilitate such discussions for preparation of the next PRSAE.

Actions Required

The IG28 is invited to review the revised final draft of the PRSAE5 and provide comments and suggestions for necessary revisions to be approved with modification for publication of the PRSAE5.

Thank you



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