

The Fourteenth Senior Technical Managers' Meeting
on the Acid Deposition Monitoring Network in East Asia
26-28 August 2013, Tokyo, Japan

MINUTES OF THE MEETING

I. Introduction

1. The Fourteenth Senior Technical Managers' Meeting (STM14) on the Acid Deposition Monitoring Network in East Asia (EANET) was held in Tokyo, Japan on 26-28 August 2013. The Meeting was organized by the Network Center (NC) for the EANET in collaboration with the Secretariat for the EANET.
2. Senior technical officials involved in the EANET monitoring activities from Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Mongolia, Myanmar, the Philippines, Russia, Thailand and Vietnam participated in the Meeting. The representatives of the Secretariat and the NC for the EANET attended the Meeting. An expert from Japan also attended. The List of Participants is attached as Annex.

II. Opening of the Meeting (Agenda Item 1)

3. The meeting was opened by Dr. Supat Wangwongwatana, Coordinator of the Secretariat for the EANET, Regional Resource Center for Asia and the Pacific (RRC.AP) at the Asian Institute of Technology (AIT). He welcomed the participants from the EANET participating countries and expressed his appreciation to support, efforts and cooperation of all participating countries which has led to the success of the EANET. He introduced the Third Report for Policy Makers (RPM3) on the Acid Deposition Monitoring Network in East Asia (EANET) to be published after endorsement at the Fifteenth Session of the Intergovernmental Meeting (IG15) on the EANET in December 2013. He also introduced discussion on expansion of the scope of the EANET including preparation of the Report of the Review on the State of Air Pollution in East Asia (RSAP), and the plan of preparation of the Next Medium Term Plan (MTP) for the EANET (2016-2020).
4. Dr. Hajime Akimoto, Director General of the Asia Center for Air Pollution Research (ACAP) made the welcome and introductory remarks. He introduced the closed Ashio Copper Mine where the participants visited as an excursion on the second day of the STM14 including the history and characteristics of the air pollution and acid deposition in the Ashio areas.

III. Election of the Officers (Agenda Item 2)

5. Ms. Teresita A. Peralta, Engineer IV, Environmental Quality Division, Environmental Management Bureau, Department of Environment and Natural Resources, the Philippines and Mr. Pichaid Atipakya, Environmentalist, Air Quality and Noise Management Bureau, Pollution Control Department, Thailand were elected as Co-chairpersons of the Meeting.

IV. Adoption of the Agenda (Agenda Item 3)

6. The Agenda was adopted as proposed (EANET/STM 14/3/1).

V. Report on the Progress of the Acid Deposition Monitoring Network in East Asia (EANET) since the Thirteenth Senior Technical Managers' Meeting (STM13) (Agenda Item 4)

7. The Secretariat and the NC made presentations on the "Report on the Progress of the Acid Deposition Monitoring Network in East Asia (EANET) since the Thirteenth Senior Technical Managers' Meeting (STM13)" (EANET/STM 14/4). The presentations also included the results of the Task Force and Expert Group under the SAC and introduction of the new Deputy Director General of the ACAP in charge of the NC.
8. Major points of the discussion were:
 - i. It was informed that compiled data will be shared with the other networks for collaboration each other. It was also clarified that published documents and data including Data Reports and the Periodic Reports are used for such purposes. Raw data is also disclosed to outside of the EANET upon request after one year from disclosure of the Data Report.
 - ii. The participating countries have their own methods for air quality monitoring specified by their national laws and/or regulations.
 - iii. It was explained that the Technical Manual for Air Concentration Monitoring will be developed as the EANET in 2013 in order to harmonize monitoring methodologies in the participation countries. Minimum requirement of the monitoring methodologies will be described in the manual since each participating country already has been monitoring with its own monitoring criteria.
 - iv. It was informed that based on the decision at the Fourteenth Session of the Intergovernmental Meeting (IG14) on the EANET in 2012, all of the EANET meeting

documents (except Task Force and Expert Group Meetings, and some draft documents, such as Draft Data Report and Draft Inter-laboratory Comparison Project Report that final versions are disclosed through the EANET website) have been uploaded on the EANET website. The documents were classified into two categories. The first category (such as documents for publication, Report of the Session, Medium Term Plan, Data Report, Inter-laboratory Comparison Project Report, etc.) has been disclosed outside of the EANET without password and the second category (EANET Meeting documents except for the first category documents and Task Force and Expert Group Meeting documents, etc. described above) will be only for the limited EANET relevant persons. The documents in the second category can be downloaded with an authorized password, which will be informed to the EANET relevant persons directly through e-mail from the Network Center. The password will be changed annually for the security reason. Each relevant person will receive different password by the end of October 2013.

VI. Overview of the Preliminary Draft Data Report 2012 (Agenda Item 5)

9. The NC presented the Preliminary Draft Data Report 2012 (EANET/STM 14/5), which contains wet deposition, dry deposition (air concentration), soil and vegetation, inland aquatic environment and catchment-scale monitoring including a summary of the monitoring data in 2012 and related information submitted by the participating countries. The document was distributed to the participants with a CD. The meeting was invited to discuss and provide comments, as appropriate.

(Wet deposition)

- i. It was clarified that the molar conductivities used for calculation of the R2 on wet deposition samples were revised in the new technical manual. It was clarified that the new manual adopted the values were cited from the international reference, CRC (Chemical Rubber Company) Handbook for Chemistry and Physics, though the previous manual adopted those from Japanese literature. It was suggested that the difference might be negligible since the values were almost same except for the case of the PO_4^{3-} that are normally lower than detection limit. The NC was requested to send the new calculation formats to the participating countries.
- ii. It was informed that the new format will be distributed to the National Centers and the National QA/QC Managers when the internal checking of the data format is completed.

(Dry deposition)

- i. The NC requested the participating countries unsubmitted data to submit as soon as possible. Some countries have not been analyzed the samples because of failure of the ion chromatography. In this case, the data will be submitted when the instrumental problems

are solved.

- ii. The annual trends were evaluated based on appearance of the graphs. The reason of increasing trends in Mongolia and Russia can be explained by the local emissions. It was informed that emission of the SO₂ in Russia is dependent on weather condition in winter.

(Soil and vegetation)

- i. Mongolia informed that the soil pH data in Bogdkhan Mountain and Terelj sites could be submitted though other parameters such as exchangeable acidity have not been measured yet.
- ii. It was clarified that survey for tree decline should be done once a year to identify actual causes of the decline symptoms, since the region is strongly affected by meteorological events, such as typhoon.
- iii. The PRSAD2 described the number of trees at the sites in the Philippines decreased because climate disaster was happened. The importance of annual observation of tree decline was emphasized.

(Inland aquatic environment)

- i. Some monitoring lakes/rivers are located in remote area, where no meteorological stations were located nearby. It was suggested that the meteorological data in the nearest station or its availability should be informed, even if the nearest station is located more than 100 km far from the monitoring site. Such basic information on the sites should be compiled to understand actual situations of the monitoring sites
- ii. It was informed that the new technical manual was already released.

(Catchment scale monitoring)

- i. The Philippines is going to start catchment-scale monitoring in La Mesa Watershed, Metro Manila. It was suggested that an appropriate small catchment area should be selected based on preliminary surveys for water quality of streams, topography, etc.

10. According to the agreed procedures, the participating countries are requested to submit their data and information to the NC before the deadline, by the end of June every year, after they have been compiled, checked, stored and analyzed. Specifically, the participating countries which have not submitted the 2012 data were requested to submit the data as soon as possible, so as to complete the Data Report 2012 for adoption at the Thirteenth Session of the Scientific Advisory Committee (SAC13) to be held on 25-27 September 2013 in Xiamen, China.

VII. Evaluation for the Results of the Inter-laboratory Comparison (ILC) Projects 2012
(Agenda Item 6)

11. The NC presented the preliminary draft Report on the ILC Projects in 2012 for wet deposition, dry deposition (filter pack method), soil and inland aquatic environment (EANET/STM 14/6). The participating countries were requested to submit the results of the ILC Projects by the deadline, the end of February every year. The meeting was invited to discuss and provide comments, as appropriate.

12. Major discussion on this agenda included the following:

(Wet deposition)

- i. The samples should be analyzed nine times for each. It was suggested that precision of the nine data for each sample should be checked carefully in each laboratory to improve the ILC result.
- ii. It was informed that the inter-laboratory precision increased with decrease of the concentrations. The samples with lower concentration levels showed the lower precision. However, since the concentration level is decided based on average concentrations of actual the EANET data, efforts should be made to meet the Data Quality Objective (DQO) for the ILC Projects samples.

(Dry deposition)

- i. It was informed that some data for SO_4^{2-} and Cl^- were highly deviated from the setting value (more than 50%).
- ii. It was pointed out that high blank values will cause the bad performance.

(Soil)

- i. The Cochran method used for statistical analysis (examination of the evenness of within-laboratory precision) could detect outliers very sensitively. It was suggested that each data should be checked carefully whether the data detected as outlier is really problematic or not for practical use.
- ii. It was clarified that the meaning of the flag for “c” is based on the analytical method. It does not affect analytical assurance.

(Inland aquatic environment)

- i. Parallel measurement by spectrophotometer and ion chromatography (IC) should be considered to crosscheck the data on NH_4^+ . It was explained that indophenols method is sensitive to NH_4^+ measurement. This method can be used for checking the results of the IC.
- ii. The number of the flagged data by X was clearly reduced for NH_4^+ for the last several ILC

attempts, although the number of the total flagged data was not changed. It was suggested that accuracy of NH_4^+ has been improved gradually.

VIII. Consideration of the National Monitoring Plans (NMPs), Current Monitoring Activities for the EANET and overall air concentration monitoring status of the Participating Countries (Agenda Item 7)

13. The representatives of the participating countries made presentations on their EANET activities, national monitoring plans and non-EANET monitoring activities. Major comments and discussions were as follows:

i Cambodia

- Monitoring at Siem Reap was stopped because limitation of accessibility and electricity. If the office is relocated, it may be resumed.
- The new Ministry of Environment (MOE) building will be constructed in a few years. It was recommended that the parallel monitoring should be implemented in Phnom Penh when the present MOE office is moved to the new building.
- For other than the EANET monitoring, passive sampler monitoring at some sites in Phnom Penh has been conducted.
- Monitoring on inland aquatic environment has just been started in Kirirom Lake and the water was collected twice in wet and dry seasons. However, since the basic information on site, such as lake size, water depth, etc., has not been enough complied yet, the data has not been submitted to the NC. It was suggested that the monitoring data should be submitted to the NC as soon as possible in order that the data could be included in the Data Report 2012.
- The water sample was collected not at the center of the Kirirom Lake but at the lake shore, since the lake was located in remote area and the boat was not able to be used for sampling. It was suggested that the footnote on the sampling condition should be included in the data table when the data is submitted. Latitude and Longitude of Kirirom site should be checked.

ii China

- The NC introduced the presentation file for China.
- Technical mission will be dispatched this year. The possibility of increasing the EANET monitoring sites will be discussed during this mission.
- The NC asked to increase monitoring sites in China because of lack of regional coverage. The Ministry of Environmental Protection (MEP), China is in charge of this issue.
- Air quality monitoring stations are managed by the local governments. The increase of

the EANET sites depends on monitoring capabilities and willingness of the local governments.

iii Indonesia

- It was informed that monitoring ozone is implemented by the BMKG.
- One filter pack (FP) unit has been placed at Lapan, and another one has placed in the Environmental Management Center (EMC). When the NC visits Indonesia as the technical mission, the NC will support to start FP monitoring.
- Monitoring of the total suspended particles (TSP) is conducted at 53 sites, and passive sampler monitoring is conducted at 7 non-EANET sites.
- The reasons of the high EC values at Serpong and Bandung sites are under consideration.

iv Japan

- Historically air quality monitoring sites are managed by the local governments. The Ministry of the Environment provides monitoring direction including monitoring methods and environmental standards, and budgetary support to them.
- It was informed that the national monitoring plan in Japan was prepared and compiled by the ACAP as the National Center of Japan.

v Lao PDR

- It was informed that air concentration monitoring station was installed based on cooperation between the governments of Thailand and Lao PDR. Training program for operation of the instruments will be conducted in Vientiane.
- Thai government donates an air quality monitoring unit in Vientiane. Agreement was made in early August 2013 and monitoring will start in next January 2014.
- Thai government will support for one year period, and then Lao PDR will continue to operate permanently.
- When the NC provided a new suppressor, analysis operation worked well. After that there is malfunction of the controlling personal computer (PC). Engineer in Thailand will visit to repair within this year.

vi Malaysia

- The pH of rainwater at Petaling Jaya monitoring site showed significantly lower values than those in other sites. Since the site is located in urban area and close to busy highways, the local emissions may affect the rainwater chemistry.
- It was informed that the high precipitation may be one of the reasons of contribution to the large deposition of the NO_3^- in Petaling Jaya.
- The number of sites for $\text{PM}_{2.5}$ should be collected from the Department of Environment,

Ministry of Natural Resources and Environment, Malaysia.

- Submission of the monitoring results from the university would require the internal discussion.
- Pasoh and Sungai Lalang Forest Reserves have been listed as monitoring sites for soil and vegetation. However, the official data have not been submitted to the NC in the last ten years. Malaysian representatives explained that such monitoring sites might be reviewed and reconsidered by the national committee whether the sites would be listed in the updated monitoring plan or not.

vii Mongolia

- It was informed that the National Focal Point (NFP) and the Scientific Advisory Committee (SAC) members of Mongolia were changed this year.
- As for soil data, pH and EC should be reported and data of the heavy metals have been reported as additional information.
- It was informed that minimum time resolution of air concentration monitoring in Mongolia is 20 or 15 minutes as well as in Russia.
- It was clarified that only the pH was measured for soil monitoring in 2012, although exchangeable acidity is included as a potential parameters in the national monitoring plan. It was pointed out that exchangeable Al and H could be measured with exchangeable acidity by the titration method. Moreover, it was recommended that possibility of the using Atomic Absorption Spectrometer (AAS) should be considered for measurement of exchangeable base cations.

viii Myanmar

- Although distilled water generation system has been malfunction recently, pure water can be obtained by the Ministry of Health, Myanmar.
- It was informed that NO₂ and SO₂ gases are monitored by wet chemical reaction method and PM concentration is measured by gravimetric method.
- It was informed that comprehensive laboratory facility is installed in the Ministry of Sciences and Technology.
- It was noticed that capacity building of the air quality monitoring is necessary for establishing air quality monitoring network in the country.

ix the Philippines

- It was clarified that Differential Optical Absorption Spectroscopy (DOAS) monitors are installed in 7 sites out of the 11 total sites in the Philippines.
- The major advantage of DOAS is that it does not require traceable calibration gases. Maintenance of DOAS includes replacement of light source, sensitivity check and cleaning detection parts, etc.

- Relocation of the air quality monitoring sites is considered. The siting criteria basically follow the United States Environmental Protection Agency (USEPA) criteria.
 - It was informed that time resolution of the DOAS is 1 minute and, detection limit of the SO₂ by DOAS is 0.03 µg/m³. The cost of an air quality monitoring station and a DOAS monitor are approximately 450,000 USD and 80,000 USD, respectively.
 - It's better to discuss in the country siting criteria of the Mt. Sto. Tomas site if it's matched with the EANET Guideline as a remote site due to some pollution sources. The major sources around the site should be described in the National Monitoring Plan.
 - It was informed that the path length of the DOAS is normally 500 meters and limitation of the DOAS is heavy rain conditions and haze events which may interfere the light absorption of the DOAS.
- x Russia
- It was clarified that the wet and dry deposition monitoring will be firstly implemented at the candidate monitoring site in Primorsky Krai. Then, inland aquatic environment and catchment monitoring will be considered.
 - The wet chemical measurement method is used for SO₂ and NO_x monitoring in Russia. The frequency is 2-4 times per day.
 - It was informed that the Global Atmosphere Watch (GAW) observatory in Tiksi is not satisfied the requirement of the GAW network. It will take a long time to establish comprehensive facilities.
- xi Thailand
- The possibility of compilation of the air quality monitoring data from all of relevant organizations except the Pollution Control Department (PCD) would be difficult. One option is that the PCD is collaborating with the Industrial Estate Authority of Thailand for continuous monitoring. The industrial complex data can be shared.
 - It was informed that the DOAS system was installed in some sites operated by the Industrial Estate Authority of Thailand. PCD also operated the DOAS system around 5 years ago.
 - It was informed that there is budgetary limitation to establish new monitoring sites in Thailand.
 - Air quality index is established in Thailand and real time index values are disclosed at the PCD website.
- xii Vietnam
- The NC introduced the presentation file for Vietnam.
 - It was informed that the monitoring sites at Ho Chi Minh city, Can Tho city, and Sapa have been operated since 2013 and these data will be submitted for the EANET in

2014.

- Non-EANET air quality monitoring has been operated by the local governments and Ministry of Natural Resources and Environment (MoNRE). These monitoring is implemented based on the legal requirement.

xiii Network Center

- It was requested to some participating countries that in accordance with the revised template, the NMP should be submitted as soon as possible based on the distributed example of the NMP from one country as a reference.
- It was clarified that location and scale of major emission sources could be described in the site information tables and maps as minimum requirement.
- It was also suggested that the template should be simplified as possible according to feedback from participating countries.
- The current status of preparation of the NMP will be reported at the SAC13.
- As for the monitoring activities, following issues were discussed after the presentations by the participating countries:
 - Some countries supposed that it is tough to prepare the whole set of the monitoring plan within the limited time since local governments/institutions are operating the national monitoring networks.
 - Since the workloads might be limited, it's only necessary for the participating countries just to review the plan annually if the whole plan is once compiled completely and submitted to the NC. It was clarified that revision of the national monitoring plan will not require much work though preparation of the whole set of the monitoring plan needs a lot of work.

IX. Other Issues (Agenda Item 8)

14. The NC presented the activities of the Expert Group on Preparation of the Technical Manual for Air Concentration, Status of the Monitoring and QA/QC System of Ozone in the EANET and Reviewing Committee on the status of Air Pollution in East Asia.

15. Major discussions regarding presentations by the NC included as following:

- i Expert Group (EG) on Preparation of the Technical Manual for Air Concentration
 - It was informed that the 3rd meeting of the EG will be held on September 4-5 and the draft will be finalized in the meeting. The final draft technical manual will be submitted to the SAC13 and the IG15 in 2013 for possible adoption and endorsement respectively.
 - The NC will welcome any feedbacks and comments from the participating countries in

order to improve and make more understandable for operators.

- It was suggested that the reason to use hourly data should be clarified. The description of 8 hour average should be added.
- It was also suggested that automatic monitor should be used for permanent monitoring and the manual monitoring should be considered for screening of the air pollution if some species (e.g. SO₂) are measured by both methods.

ii Status of Monitoring and QA/QC System of Ozone in the EANET

- Calibration and parallel monitoring was implemented in Thailand, 2012 and in Malaysia, 2013. It is planned that the mission for ozone calibration and parallel monitoring in Indonesia will be dispatched in February 2014.
- It was clarified the serial number of the National Institute of Standards and Technology (NIST) on Standard Reference Photometer (SRP) for Ozone is numbered in order to the production.

iii Reviewing Committee on the status of the Air Pollution in East Asia

- It was informed that the preliminary draft will be submitted to the Sixth Meeting of the Task Force on Research Coordination (TFRC6) and the SAC13 for feedbacks and comments.
- Draft Report of the Review on the State of Air Pollution in East Asia will be compiled by the NC and it will be uploaded on the EANET website for the relevant member persons.

18 Prof. Hiroshi Hara, Member of Science Advisory Group for Precipitation Chemistry, Global Atmosphere Watch, World Meteorological Organization, presented Information System of Monitoring Stations. This presentation shows the case of how the EANET data are used for international networks. It was also clarified that the discussions are made for the QA/QC and data formatting on the global and regional basis.

19 The NC requested the participants to check necessity of the EANET individual training course. It was also informed that the inquiry will be announced to the National Centers and the NFPs of the EANET participating countries.

X. Closing of the Meeting (Agenda Item 9)

20 The Co-chairperson expressed their deep appreciation to all the participants for their active contribution and cooperation. He also thanked his Co-chair, and the Meeting secretariat for their hard works. Then, the Meeting was officially closed.

XI. Excursion to the Ashio Copper Mine (on the 2nd day)

- 21 The participants of the STM14 visited the closed Ashio Copper mine, which is famous for the first serious air pollution of SO₂ in Japan and large scale measures for mitigation and recovering from the damage caused by its environmental pollution have been taken. They visited the past smelting facilities and the rehabilitation area. The staff of Furukawa Co., Ltd. also introduced the history and measures to the environmental pollution in the Ashio area in detail using the power point file. It was informed that the natural view is totally different from that in 40 years ago because vegetation around the mine has been considerably recovered.

List of Participants

Participating countries**CAMBODIA**

Mr. Savuth KONG
Vice-Chief
Laboratory Office, Department of Pollution
Control, Ministry of Environment

INDONESIA

Ms. Novy FARHANI
Head
Reference and Testing Laboratory Division,
Center for Environmental Impact Management -
Ministry of Environment

JAPAN

Mr. Hiroshi FUJITA
Deputy Director
Air Environment Division, Environmental
Management Bureau, Ministry of the
Environment

LAO P.D.R

Mr. Vanhna PHANPHONGSA
Deputy Director
Environment Quality Monitoring Center
(EQMC), Natural Resources and Environment
Institute, Ministry of Natural Resources and
Environment (MoNRE)

MALAYSIA

Ms. Ying Ying TOH
Assistant Director
Environmental Studies Division, Malaysian
Meteorological Department

Mr. Kok F. WONG
Director
Environmental Health Division, Department of
Chemistry Malaysia

MONGOLIA

Ms. Otgonjargal SUREN
Quality manager, Engineer
Water Quality Monitoring and Acid Deposition
Section, Central Laboratory of Environment and
Metrology

MYANMAR

Ms. Khin Sein KYI
Deputy Superintendent
Department of Meteorology and Hydrology

PHILIPPINES

Ms. Teresita A. PERALTA
Engineer IV
Environmental Quality Division-
Environmental MGMT. Bureau, Department of
Environment and Natural Resources

RUSSIA

Dr. Sergey A. GROMOV
Head of Laboratory
Environmental Pollution
Assessment Department, Institute of Global
Climate and Ecology Roshydromet and RAS

THAILAND

Mr. Pichaid ATIPAKYA
Environmentalist, Professional Level
Air Quality and Noise Management Bureau,
Pollution Control Department, Ministry of
Natural Resources and Environment

VIETNAM

Mr. Quy V. LE
Researcher
Environmental Prediction Division, Center for
Environmental Research, Vietnam Institute of
Meteorology Hydrology and Environment

Resource Person

Prof. Hiroshi HARA
Member
Science Advisory Group for Precipitation
Chemistry, Global Atmosphere Watch, World
Meteorological Organization

Dr. Hiroyuki SASE
Head
Ecological Impact Research Department

Dr. Keiichi SATO
Chief Senior Researcher
Atmospheric Management Department

Mr. Ryuta SHIRAI
Researcher
Data Management Department

Secretariat for the EANET

Dr. Supat WANGWONGWATANA
Coordinator of EANET Secretariat
Regional Resource Centre for Asia and the
Pacific (RRC.AP) 3rd Floor, Outreach Building,
Asian Institute of Technology (AIT)

Network Center for the EANET

Asia Center for Air Pollution Research (ACAP)

Dr. Hajime AKIMOTO
Director General
a

Dr. Jesada LUANGJAME
Deputy Director General

Mr. Makoto HAYASHI
Deputy Director General

Mr. Jiro SATO
Assistant Deputy Director General

Mr. Shiro TODA
Head
Planning and Training Department

Mr. Tomonori TAKEUCHI
Chief Senior Researcher
Planning and Training Department

Ms. Junko FUJITA
Administrative Staff
Planning and Training Department

Dr. Tsuyoshi OHIZUMI
Head
Atmospheric Research Department