

The Eighteenth Senior Technical Managers' Meeting
on the Acid Deposition Monitoring Network in East Asia
24-25 August, Ha Long, Viet Nam

MINUTES OF THE MEETING

I. Introduction

1. The Eighteenth Senior Technical Managers' Meeting (STM18) on the Acid Deposition Monitoring Network in East Asia (EANET) was held in Ha Long, Viet Nam, on 24 – 25 August 2017. The Meeting was organized by the Network Center (NC) for the EANET in collaboration with the Secretariat for the EANET and hosted by the Government of Viet Nam.
2. Senior technical officials involved in the EANET monitoring activities from Cambodia, China, Indonesia, Japan, Lao PDR, Malaysia, Mongolia, Myanmar, Philippines, Republic of Korea, Russia, Thailand and Viet Nam participated in the Meeting. The Secretariat and the representatives of the NC attended the Meeting as well as experts from Viet Nam. The List of Participants is attached as Annex.

II. Opening of the Meeting (Agenda Item 1)

3. The Meeting was opened by Dr. Sukjo Lee, Deputy Director General of the Asia Center for Air Pollution Research (ACAP) made the welcome and introductory remarks. He stressed monitoring data are the most important basis for the understanding of current state of acid deposition. And he also introduced “the 3rd Periodic Report on the State of Acid Deposition in East Asia”, which provide important scientific knowledge of the State of Acid Deposition was published last year based on EANET monitoring data. He pointed that we should be concerned on emerging air pollution issues such as PM_{2.5} and its chemical components as one of the most health-damaging particles. Finally, he appreciated cooperation of the participating countries for the STM Meeting and Vietnamese colleagues for their efforts on the preparation of the meeting.
4. Mr Cao Van Chi n, Deputy Director General of Department of Natural Resources and Environment, Quang Ninh Province, made a welcome speech. He welcomed the participants to Ha Long City, the home city of Ha Long Bay a UNESCO World Heritage Site. In his speech, Mr. Chi n appreciated the organizer to bring STM18 meeting to Quang Ninh province, and highlighted the efforts made by the Quang Ninh People's Committee to control environmental pollution, especially air pollution.
5. Dr. Le Ngoc Cau, Director, Center for Environment Research (CENRE), National Institute of Meteorology, Hydrology and Climate Change (IMHEN), Ministry of Natural Resources and Environment (MoNRE), Viet Nam, made a welcome speech. He pointed out that the annual STM

Meeting was an important event of EANET in which fundamental works of EANET, such as data report, inter-laboratory comparison, and the national monitoring plans, would be reported and discussed. He stressed that IMHEN as the National Focal Point of Viet Nam has actively participated in EANET meetings and activities, and been committed to the monitoring and research activities that are beyond the scope of EANET. As an example, the new PM_{2.5} monitoring station in Hoa Binh was introduced. He explained that Quang Ninh province has been conducting a good job in environmental protection, in particular for air pollution control and Ha Long City close to Ha Long Bay was one of the favourite tourist destinations in Viet Nam. Therefore, the city was selected as the venue of the meeting. Finally, he welcomed the participants to Ha Long City again, and wished a fruitful discussion at STM18.

6. Mr. Tomi Haryadi, Coordinator of Secretariat of the EANET, UN Environment, Asia and Pacific Office made a welcome speech. He thanked to the host country, Viet Nam, and the NC for giving an opportunity to visit Ha Long City as well as their hard work to prepare all meeting processes. He introduced progress of the EANET in the last one year, which included the Framework Agreement between UN Environment and EANET for the provision of EANET Secretariat at the Eighteenth Intergovernmental Meeting in November 2016. He stressed that the Secretariat under UN Environment has been fully functional and capable of providing service since then. He pointed out that the new arrangement allowed the EANET to get one step closer to regional and global agenda of the UN such as the Asia Pacific Ministerial Summit on the Environment and the 3rd United Nations Environment Assembly (UNEA3). In this highly connected world, decoupling economic growth from environmental degradation can only be achieved through cooperation. Given this situation, there is a huge opportunity for strong network like the EANET to contribute more in reducing adverse impact of air pollution. Finally, he pointed out that the EANET could continuously contribute to the region and the world.

III. Election of the Officers (Agenda Item 2)

7. Dr. Le Ngoc Cau, Director, Center for Environment Research (CENRE), National Institute of Meteorology, Hydrology and Climate Change (IMHEN), Ministry of Natural Resources and Environment (MoNRE), Viet Nam, and Dr. Patcharawadee Suwanathada, Director, Ambient Air Quality Division, Air Quality and Noise Management Bureau, Pollution Control Department (PCD), Thailand were elected as Co-chairpersons of the Meeting.

IV. Adoption of the Agenda (Agenda Item 3)

8. The Agenda was adopted as proposed (EANET/STM 18/3/1).

V. Report on Progress of the Acid Deposition Monitoring Network in East Asia (EANET) since the Seventeenth Senior Technical Managers' Meeting (STM17) (Agenda Item 4)

9. The Secretariat and the NC reported the EANET activities since the Seventeenth Senior Technical Managers' Meeting (STM17) from scientific and technical viewpoints. The report includes the outcomes of the Sixteenth Session of the Scientific Advisory Committee (SAC16) and the Eighteenth Session of the Intergovernmental Meeting (IG18). The meeting was invited to review and comment on the documents.

10. Major discussion on this agenda included the following:
 - i. The Secretariat is conducting the questionnaire survey regarding expansion of the scope of the EANET for development of the new network center. Almost half of the answers have been obtained. The Secretariat informed that the final results of the survey would be reported to SAC17 and IG19.
 - ii. The question was raised on characteristics of the new network center including its responsibility and the relationship to the current NC. It was clarified that responsibility of the new network center would be totally different from that of the current NC. It was also informed that the report of the feasibility study would provide some potential options on expansion of the scope.
 - iii. It was also pointed out that the EANET has just decided finally to maintain the current contents after long discussion on expansion of the scope.
 - iv. For the individual training course in 2017, 6 trainees were selected from 10 applicants. It was pointed out that application should be submitted repeatedly due to the limited slots for the training.
 - v. It was informed that Viet Nam had already contributed to the NC. NC promised to confirm it.

VI. Overview of the Preliminary Draft Data Report 2016 (Agenda Item 5)

11. The NC presented the Preliminary Draft Data Report 2016 (EANET/STM 18/5), 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 2016 and related information submitted by the participating countries. The meeting was invited to discuss and provide comments, as appropriate.

12. Major discussion on this agenda included the following:

(Wet deposition)

 - i. Some of the data less than 80% on %PCL were excluded for comparison of the annual precipitation amounts.
 - ii. Deposition amounts of SO_4^- and NO_3^- in Petaling Jaya were the highest among the EANET

sites. It was suggested that urban conditions, such as active construction and heavy traffic, might contribute to the high deposition.

- iii. The NC informed the data was not submitted from Cambodia, Lao PDR and Philippines. It was requested to submit the data as early as possible.

(Dry deposition)

- i. It was noted that the sites showing increasing trend of particulate nitrate in a graph make misunderstanding.
- ii. The annual data of ozone is based on hourly average basis. It was pointed that 8 hours average is important parameter for ozone assessment.
- iii. The NC confirmed the current situations of the data submission. The details are shown as follows.
 - Cambodia: Filterpack data at Phnom Penh was not submitted.
 - China: Filterpack monitoring at Hongwen is need to be confirmed.
 - Indonesia: Submitted O₃ data at Bandung need to be checked. PM_{2.5} data at Jakarta have not been submitted.
 - Laos: Filterpack monitoring at Vientiane is need to be confirmed.
 - Mongolia: Filterpack data at Ulaanbaatar and Terelj and automatic data at Ulaanbaatar after June 2016 have not been submitted.
 - Philippines: Automatic data at Metro Manila have not been submitted. Filterpack monitoring at Metro Manila and Los Banos is need to be confirmed.
 - Russia: Filterpack and passive sampler data at Listvyanka need to be checked. Condition of O₃ monitor at Mondy should be confirmed.
 - Thailand: Filterpack monitoring at Pathunthani is need to be confirmed. The station names in Chiang Mai are need to be confirmed.

(Inland aquatic environment)

- i. The Technical Manual recommended to measure pH and EC in the field and the laboratory. It was clarified that the values measured at the laboratory were used as the formal data for evaluation. Since the values may alter after transportation from the sampling point to the laboratory, the field data is also useful as the reference.

13. 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 2016 data were requested to submit the data as soon as possible and no later than 31 August 2017, so as to complete the Data Report 2016 for adoption at the Seventeenth Session of the Scientific Advisory Committee (SAC17).

VII. Evaluation for the Results of the Inter-laboratory Comparison (ILC) Projects 2016 (Agenda

Item 6)

14. The NC presented the preliminary draft Report on the Inter-laboratory Comparison Projects in 2016 for wet deposition, dry deposition (filter pack method), soil and inland aquatic environment (EANET/STM 18/6). The participating countries were requested to submit the results of the Inter-laboratory Comparison (ILC) Projects by the deadline, the end of February every year. Also it was notified that the participating countries which have not submitted the 2016 ILC data were requested to submit the data as soon as possible and no later than 31 August 2017, so as to complete the ILC Project Report 2016 for adoption at the SAC17. The meeting was invited to discuss and provide comments.
15. Major discussion on this agenda included the following:

(Wet deposition)

- i. Percentages of the flagged data were higher in Mg^{2+} and Ca^{2+} .
 - The NC informed that the concentrations of the ILC samples were prepared taking account of the actual rainwater samples in the EANET sites.
 - It was suggested that a new IC column be used as possible.
 - The connecting tube from the auto sampler to the IC columns may be contaminated due to residues of the previous samples. It was suggested that the line be checked, too.
- ii. The period until expiry of the ILC sample is 6 months since the preparation. It was suggested that the quality of the samples might be stable at least for a 1 year and that the samples could be used as the reference.
- iii. The NC was requested to disclose the prepared value as soon as possible, so that the ILC samples could be used as the reference for analysis.

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)

16. All of the participating countries made presentations on their NMPs including current capacities and future plan for the improving of the monitoring activities in their countries, and on the current activities for the EANET monitoring including technical problems encountered throughout the monitoring activities (EANET/STM 18/7). The NC also made a presentation on a summary of the EANET activities. The meeting was invited to review the above issues and to discuss with their experiences and knowledge to solve the problems for their future innovation.
17. Major discussion on this agenda included the following:

- i Cambodia

- It was informed that the newly installed PM_{2.5} monitor has been working well.
- It was clarified that the PM_{2.5} monitor was installed at the rooftop of the building.
- It was clarified that the laboratory conducted the training course for analysis of wastewater as the capacity building. It was informed that JESC and/or JICA might provide the training course for the wastewater.
- The Ministry of Environment in Cambodia held the training workshop on water, soil, and acid deposition for capacity building of environmental analysis. It was clarified that agricultural soil was analyzed.

ii China

- In Zhuhai City, the site name of Xiang Zhou of dry deposition site should be changed to Haibin park.
- It was clarified that air pollution monitoring was conducted at the national and local levels. In addition to the national monitoring sites, many of the local sites have been operated.
- The SO₂ concentration in Jinyunshan has been declining, recently. It was suggested that air pollution control by the local government in Chongqing successfully improved the condition.
- The rainwater pH in Jinyunshan site has started increasing since 2011 probably due to air pollution abatement, although the acidification trend was observed in the past. Simultaneously, the lake water in Jinyunshan Lake started increasing. The lake water quality appeared to react sensitively to changes in the rainwater quality. It was suggested that acidification in the past and ongoing recovery process be carefully investigated. The NC may assist the investigation.

iii Indonesia

- It is recommended to compare automatic monitor data and filter weight data at Jakarta
- It was suggested that biomass burning caused the clear seasonality on PM_{2.5}.

iv Japan

- It was informed that temperature and humidity in the PM_{2.5} monitor were not controlled in the shelter. The temperature and humidity sensor correct to adjust the standard condition. It was pointed that semi volatile components may cause large error of measurement.
- It is hard to maintain continuous monitors of PM_{2.5} components. Acidic gas and collection tape material may affect sampling line and PM component measurement.
- Large discrepancy is sometimes observed between filter measurement and PM_{2.5} automatic monitor. It is recommended to conduct parallel monitoring for longer period.

v Lao PDR

- QA/QC and maintenance of IC measurement is a key issue in the country. It was informed that maintenance and troubleshooting of IC will be included in individual training near

future.

vi Malaysia

- Re-organization of the inland aquatic monitoring in Semenyih Dam is under consideration, as UiTM, the university which conducted the sampling, has stopped collecting it since 2015. It was clarified that MMD staff would be trained to take over the sampling there.
- It was informed that relocation of the Petaling Jaya site is still in progress.

vii Mongolia

- PM_{2.5} installed at Ulaanbaatar site in 2015 should be included in the monitoring plan.
- It was clarified that there are 30 ambient air monitoring stations in Mongolia. Some stations are located in local provinces.
- Regarding the seasonality of air quality, importance of winter sampling was suggested because of high coal combustion. It was informed that air concentration monitoring has been conducted through a year, although wet deposition monitoring has been conducted from May to October. It was clarified that precipitation amount in winter was quite small and the powder snow could not be collected efficiently.

viii Myanmar

- It is planned that the EANET activities will be expanded to include monitoring on inland aquatic environment and soil and vegetation. The NC will assist their efforts.
- It is suggested that dry deposition data in 2016 should be checked and data revision will be reported to the NC if necessary.

ix Philippines

- Sampling of the stream water has already been started since January 2006 for the regular catchment-scale monitoring in La Mesa Watershed, although the data were still under verification by the national center. It is expected that the verified data will be submitted to the EANET in the near future. It was suggested that discussion with the experts from UPLB would be important.
- PM₁₀ and PM_{2.5} are used for calculation of Air Quality Index (AQI) in Philippines.
- SO₂, NO₂ and O₃ at industrial and road side sites are measured by DOAS to identify local sources and to determine ozone formation processes by primary emission from NO₂ and VOCs.

x Republic of Korea

- Some of the wet deposition samples did not satisfy the ion balance. It was suggested that carbonate be measured referring the Technical Manual for Wet Deposition Monitoring.
- PM monitoring results in five sites showed that portion of nitrate in high concentration of PM_{2.5} was higher, whereas the portion of EC showed opposite profile. These results

indicate high contribution of local sources.

xi Russia

- Ozone monitor in Mondy is still working. It was suggested that automatic data be submitted to the EANET, if it is available.

xii Thailand

- A new station was established in the city area of Kanchanaburi in June 2017. It was informed that the automatic monitoring for air concentrations would be conducted there. It was suggested that the name of the station should be changed not to confuse with the site in Vachiralongkorn Dam. It was expected that the data from the new station would be submitted to the EANET in the near future.
- The rainwater pHs in Chonburi and Rayong sites are relatively low among the sites in Thailand. It was pointed out that the site is located in the industrial city, where thousands of factories were located.

xiii Viet Nam

- It was clarified that soil and vegetation monitoring in Cuc Phuong would be started in 2018 and the previous sites around Hoa Binh would be officially closed. It was suggested that relevant experts on soil and forest sciences would be involved in the monitoring in Cuc Phuong.
- High EC in March and April is attributable to low precipitation in dry season.

xiv Network Center

- It was clarified that the template for the NMP including the scale maps would be included in the QA/QC Guidebook.
- Each national QA/QC manager is asked to check the Attachment 1 and 2 of Summary of the National Monitoring Plans in 2017 (EANET/STM 18/7), and then should be reported to the NC if one finds errors and necessary modifications within one week after STM18.
- The summary of NMP in 2017 will be submitted to the SAC17 to be held on 26-28 September, 2017.

IX. QA/QC Guidebook (Agenda Item 8)

18. The NC introduced “QA/QC Guidebook (EANET/STM 18/8)”, which has recently been published after the adoption at SAC16. In particular, preparation of the NMP was focused and explained with some examples.

19. Major discussion on this agenda included the following:

- i. Emission sources, such as industries should be identified in the scale maps around the monitoring site. It was clarified that names of the industries would not necessarily be specified but their sectors, such as power plant, be identified hopefully with their emission amounts.
- ii. The QA/QC Guidebook recommended keeping the sample until the adoption of annual data. It was pointed out that the laboratories might have the difficulty on keeping the samples because of the limited storage. Moreover, it was suggested that the samples might be altered and validity of the samples would be lost during the long storage. It was clarified that the stored sample might be useful just to recheck the data for verification of the data.
- iii. The printed matter will be distributed to the National QA/QC managers and relevant organizations in September 2017. It is important to read and understand the contents by the National QA/QC manager.

X. Reanalysis of Results of Inter-laboratory projects (Agenda Item 9)

20. The NC made a presentation on reanalysis of results of the Inter-laboratory comparison (ILC) projects (EANET/STM 18/9). The ILC projects of EANET have been implemented since 1998, and the results were evaluated based on the “prepared values”. Since there are different methods for evaluation of the results, the NC reanalyzed the results according to ISO13528 and ISO5725-2. The outputs from this study were explained for further discussion.
21. Major discussion on this agenda included the following:
 - i. In previous report of wet deposition survey, evaluation by Z Score is introduced. This is similar to consensus value of ISO13528 and assigned value of ISO5725-2.
 - ii. It was clarified that the results would not be very different from the original evaluation method and the data flagged by X might be identified as outliers also by the new methods.
 - iii. Evaluation of previous year and historical year data would be effective to use Grubbs’ test and Cochran’s C test in addition to use EANET method.

XI. Other Issues (Agenda Item 10)

22. Mr. Nguyen Ngoc Hung, from Center for Environmental Monitoring (CEM), made a presentation on air pollution monitoring in Viet Nam.
23. Major discussion on this agenda included the following:
 - i. Real time data of air concentrations and Air Quality Index at 6 monitoring stations are shown in the Web site of Centre for Environmental Monitoring (<http://cem.gov.vn/en-US/en/Home.aspx>)
 - ii. Regulation of motorcycle in Hanoi and Ho Chi Minh is under consideration.

24. The meeting was invited to discuss and consider other issues or general questions to be raised by the participants, the Secretariat and/or the NC, including, but not limited to, progress report on technical activities of the EANET.

XII. Closing of the Meeting (Agenda Item 11)

25. The Co-chairperson expressed their deep appreciation to all the participants for their active contribution and cooperation. She also thanked the Co-chair for the productive managing of the meeting. On behalf of participants the grateful greetings were expressed to IMHEN and ACAP (the meeting secretariat) for the excellent preparation and arrangement of the STM18 Meeting. Then, the Meeting was officially closed.

List of Participants

Participating Countries

Cambodia

Dr. MEAS Chanthya
Director
Laboratory, Ministry of Environment

China

Ms. MENG Xiaoyan
Senior Engineer,
Ambient air quality monitoring Department,
China National Environmental Monitoring
Center

Dr. XIE Shuyan
Senior Engineer
Ambient Air Quality Monitoring Department,
China National Environmental Monitoring
Center

Indonesia

Ms. BUDIWATI Tuti
Researcher,
Research Laboratory -Center of Atmosphere
Science and Technology, National Institute of
Aeronautics and Space-LAPAN

Lao PDR

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

Malaysia

Ms. Zamuna BINTI ZAINAL
Meteorological Officer
Atmospheric Science & Cloud Seeding Division
Malaysian Meteorological Department

Mongolia

Ms. BOLD Altantuya
QA/QC Manager, Chemist Engineer
Central Laboratory of Environment and
Metrology (CLEM)

Myanmar

Ms. Khin Sein Kyi
Staff Officer
Water Quality Division, Department of
Meteorology & Hydrology Ministry of
Transport and Communication

Philippines

Ms. PERALTA Teresita
Engineer IV
Environmental Quality Management
Division/Environmental Management
Bureau-Dept. of Environment and Nat.
Resources

Republic of Korea

Dr. AHN Joon Young
Senior Researcher
Organization: Air Quality Research Division,
Climate and Air Quality Research Department,
National Institute of Environmental Research
(NIER)

Russia

Ms. GOLOBOKOVA Liudmila
Senior Researcher,
Limnological Institute SB RAS

Thailand

Dr. SUWANATHADA Patcharawadee
Director of Ambient Air Quality Division,
Air Quality and Noise Management Bureau
Pollution Control Department

Mr. ATIPAKYA Pichaid
Environmentalist, Professional level,
Air Quality and Noise Management Bureau
Pollution Control Department

Ms. CHULATHIPYACHAT Thiantawan
Environmentalist, Practitioner Level
Ambient Air Quality Division, Air Quality and
Noise Management Bureau, Pollution Control
Department

Viet Nam

Mr. LE Ngoc Cau
Director
Center of Environmental Research (CENRE),
Vietnam Institute of Meteorology, Hydrology
and Climate change (IMHEN), Ministry of
Natural Resources and Environment of Viet
Nam (MoNRE)

Mr. NGUYỄN Van Hong
Vice Director
Sub-institute of IMHEN in HCMC

Mr. Cao Van Chien
Deputy Director General
Department of Natural Resources and
Environment of Quang Ninh province

Ms. Nguyen Hoang Yen
Department of Natural Resources and
Environment of Quang Ninh province

The Secretariats

Mr. Tomi Haryadi
Coordination officer
UN Environment, Asia and Pacific Office

Secretariat for STM18Secretariat in Viet Nam

Center of Environmental Research (CENRE),
Vietnam Institute of Meteorology, Hydrology
and Climate change

Ms. Nguyen Hằng Nga
Mr. Le Van Quy
Ms. Tran Thi Thu Huyen
Ms. Nguyen Hong Chien

Network Center for EANET

Asia Center for Air Pollution Research (ACAP)

Dr. LEE Suk Jo
Deputy Director General

Mr. MIYATANI Akihiko
Head
Planning and Training Department

Dr. MINOURA Hiroaki
Head
Atmospheric Research Department

Dr. SASE Hiroyuki
Head
Ecological Impact Research Department

Dr. YAMASHITA Ken
Head
Data Management Department

Dr. SATO Keiichi
Chief Senior Researcher
Data Management Department