The Seventeenth Senior Technical Managers' Meeting
on the Acid Deposition Monitoring Network in East Asia
21-22 September, Listvyanka, Russia

MINUTES OF THE MEETING

I. Introduction

1. The Seventeenth Senior Technical Managers' Meeting (STM17) on the Acid Deposition Monitoring Network in East Asia (EANET) was held in Listvyanka, Russia, on 21-22 September 2016. 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 Russia.

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 Vietnam participated in the Meeting. The representatives of the NC for the EANET attended the Meeting. Experts from Russia 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. Sukjo Lee, Deputy Director General of the Asia Center for Air Pollution Research (ACAP) made the welcome and introductory remarks. He introduced EANET has a plan to publish "the 3rd Periodic Report on the State of Acid Deposition in East Asia" and "EANET Science Bulletin Volume 4" this year and also mentioned it is possible owing to accumulated EANET monitoring data. He pointed out that our activities to improve the data quality have to be continued and many scientists in the world are using EANET data for their studies. Finally, he appreciated cooperation of the participating countries for the STM meeting and Russian colleagues for their efforts on the preparation of the meeting.

4. Dr. Andrey Fedotov, Director General of Limnological Institute, Siberian Branch of the Russian Academy of Science, made a welcome remark. He welcomed the participants to the shore of Lake Baikal, one of the most unique places on the Planet. He pointed out that long-range transport of polluted atmospheric masses could be recorded at Lake Baikal, although it was one of the cleanest aquatic environments in the world. Since 1998, researchers of Limnological Institute headed by Dr. Tamara Khodzher, Head of Laboratory of Hydrochemistry and Atmospheric Chemistry, have been involved in the EANET activities as a Russian National Data Center. This program is important for monitoring of the atmosphere at local, regional and global levels in East Asia. He hoped that the STM17 would be fruitful with interesting discussions and would contribute to elaboration of integrated decision on atmospheric pollution problem.

5. The welcome address was also delivered from Mr. A.M. Nasyrov, Head of "Irkustkoe UGMS (Department of Hydrometeorology and Environmental Monitoring)", Federal State Institution (FGBU), Roshydromet, Russia. He welcomed all the participants of the STM17 meeting. Especially he appreciated representatives of foreign countries who worked on complicated environment pollution problems together with Russian colleagues. He pointed out that cooperation of the countries would be necessary in order to solve pollution problems effectively. He expected fruitful discussion, new ideas and useful exchange of experience of environmental monitoring during the meeting.

III. Election of the Officers (Agenda Item 2)

6. Ms. Alisa Trifonova-Iakovleva, Researcher, Laboratory for Anthropogenic Changes in the Climate System, of Institute of Geography, Russian Academy of Sciences, Institute of Global Climate and Ecology, Roshydromet (Russia), and Mr. Vanhna Phanphongsa, Deputy Director, Environment Quality Monitoring Center, Natural Resources and Environment Institute, Ministry of Natural Resources and Environment (Lao PDR), were elected as Co-chairpersons of the Meeting.

IV. Adoption of the Agenda (Agenda Item 3)

7. The Agenda was adopted as proposed (EANET/STM 17/3/1).

V. Report on Progress of the Acid Deposition Monitoring Network in East Asia (EANET) since the Sixteenth Senior Technical Managers' Meeting (STM16) (Agenda Item 4)

8. The NC made a presentation on progress of the EANET activities since the Sixteenth Senior Technical Managers' Meeting (STM16) (EANET/STM 17/4) from scientific and technical viewpoints. The report included the outcomes of the Fifteenth Session of the Scientific Advisory Committee (SAC15), the Seventeenth Session of the Intergovernmental Meeting (IG17) and the Session of the Working Group on Future Development of the EANET (WGF).

9. Major points of the discussion were:

   i. As for the contribution from the countries, it was clarified that the expected amount was calculated based on the UN rate.
   ii. It was pointed out that the IG17 decided to use the same UN rate to the previous period for voluntary contribution for 2016, according to discussion at the WGF. The new rate will be used from 2017. The NC was requested to confirm the summary table of the voluntary

contributions.

VI. Overview of the Preliminary Draft Data Report 2015 (Agenda Item 5)

10. The NC presented the Preliminary Draft Data Report 2015 (EANET/STM 17/5), 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 2015 and related information submitted by the participating countries. The meeting was invited to discuss and provide comments, as appropriate.

(Wet deposition)

i. As for the data collected at the beginning or end of the year, in the case that sampling period is assigned as longer period of the year, even if precipitation data exists in a short period of time. The data during no rain should be included in the data reporting form.
ii. The NC confirmed the current situations of the data submission from three countries, Lao PDR, Philippines, Republic of Korea one by one. The details are shown as follows.
   - Laos: 2015 data will be submitted to the NC soon.
   - Data were submitted to the NC. But the NC have not received the data because of miscommunication.
   - Republic of Korea: Data were submitted to the NC. But the NC have not received the data because of miscommunication.

(Dry deposition)

i. The NC confirmed the current situations of the data submission from eight countries, China, Indonesia, Lao PDR, Mongolia, Philippines, Republic of Korea, Russia, and Thailand, one by one. The details are shown as follows.
   - China: Filterpack monitoring at Hongwen in 2015 could not be submitted because of the malfunction of the sampler.
   - Indonesia: Submission of passive sampler data will be confirmed after STM16. Ozone data at Jakarta can be included in 2015 data report.
   - Laos: Filterpack monitoring has been conducted since 2015. The data will be submitted to the NC soon.
   - Mongolia: pH, EC and anions data was submitted to the NC. However, the cations data will not be submitted because of the problem of IC column.
   - Philippines: Filterpack monitoring at Mt. St. Tomas has been submitted to the NC. But the data of Metro Manila and Los Banos have not been conducted because lack of arrangement by relevant organizations.
   - Republic of Korea: Data were submitted to the NC. But the NC have not received the data because of miscommunication.

- Russia: Filterpack data at Listrvyanka are need to be reconfirmed. Filterpack data at Mondy, and Primorskaya will be submitted to the NC next week after STM17. Ozone passive sampler data at Listrvyanka will be submitted to the NC by the end of September. The ozone monitor at Mondy was out of order due to broken pump and UV lamp; however, it was started in May 2016 after repairing of necessary parts by LIN scientists.
- Thailand: Filterpack monitoring at Pathumthani after 2012 was suspended due to the limitation of resources. The site will be kept in the National Monitoring Plan. It was clarified that automatic data at Samutprakarn has already been submitted to the NC,

ii. It was clarified that gas concentrations of filterpack are shown in ppb unit. The NC requested each country to submit the data based on this unit. However, when the data of different unit were submitted, the NC will convert to ppb unit by using ambient temperature and pressure.

(Soil and vegetation)

i. The technical manual recommended conducting the basic surveys on soil and forest every 3-5 years. Additionally, the Sub-manual on forest vegetation monitoring recommended conducting observation of tree decline every year. It was suggested that the term, “basic surveys”, might make confusions in the countries whether observation of tree decline was included in “basic surveys” or not. For allocation of the annual budget as appropriate, the terminology should be elaborated. The NC was requested to consider modification/clarification of the terminology.
ii. Several sites for soil and vegetation monitoring have not been surveyed over the decades. It was pointed out that some of the sleeping sites above have already been closed by decision of the countries. It was clarified that the existing monitoring sites and close of the sites should be clearly reflected to revision of the National Monitoring Plan.
iii. It was explained that some monitoring information is not clear because some National Monitoring Plans submitted from participating countries are not well organized. To solve these problems, the NC will introduce the new format of the National Monitoring Plan in the Agenda 8.

(Inland aquatic environment)

No comment

(Catchment scale monitoring)

i. Stream water in Lake Ijira appeared to be recovered from acidification over the last decade, showing increase of the pH with declining of NO_3^- and SO_4^{2-} concentrations. It was suggested that wet deposition amounts of nitrogen and sulfur have been also declining. This appeared to be reflected to the stream water chemistry. Moreover, it was pointed out that improvement of emissions from diesel trucks and sulfur concentrations in the fuels appeared

to be reflected to the deposition data.

11. 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 2015 data were requested to submit the data as soon as possible and no later than 7 October, 2016, so as to complete the Data Report 2015 for adoption at the SAC16.

VII. Evaluation for the Results of the Inter-laboratory Comparison (ILC) Projects 2015 (Agenda Item 6)

12. The NC presented the preliminary draft Report on the Inter-laboratory Comparison Projects in 2015 for wet deposition, dry deposition (filter pack method), soil and inland aquatic environment (EANET/STM 17/6). 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 2015 ILC data were requested to submit the data as soon as possible, so as to complete the ILC Project Report 2015 for adoption at the SAC16. The meeting was invited to discuss and provide comments, as appropriate.

13. Major discussion on this agenda included the following:

(Wet deposition)

i. It was pointed that flagged data appeared to be caused by many factors, such as, conditions of equipment, experience of the staff, miss-operation of the staff.
ii. It was clarified that transportation of the inter-laboratory samples did not make serious effects on the data quality according to the experience in Japanese laboratories.
iii. Currently, the submitted data has been evaluated using the prepared values. It was suggested that this might affect the evaluation. The NC informed that other methods, such as using Z scores calculated from standard deviations, would be tested for the evaluation of the inter-laboratory data.

(Dry deposition).

No comment

(Soil)

i. The plan for the inter-laboratory comparison project 2016 was introduced in the presentation. In some countries, it takes a time to obtain the import permit of soil samples, and it is too difficult to submit the data by the due date some times. The NC informed that the data could be received before STM, even if it could not meet the due date.

(Inland aquatic environment)

No comment

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)

14. The representatives of the participating countries made presentations on their NMPs including current capacities and future plan for improvement of the monitoring activities in their countries, and on the current activities for EANET monitoring including technical problems encountered throughout the monitoring activities (EANET/STM 17/7). The NC also made a presentation on a summary of the EANET activities:

i Cambodia

- It was pointed out coordinates and altitude should be confirmed for the respective monitoring sites.

ii China

- The NC informed that Table 2.2 in the preliminary draft Data Report 2015 showed the coordinate (latitude, longitude) of the respective monitoring sites up to the second unit. The participating countries were requested to check the table and inform the NC with the actual coordinates of the respective monitoring sites.

iii Indonesia

- It was informed that the annual meeting, which was attended by all the relevant agencies, would be held in October/November.
- The rainwater pH in Serpong site shows a large variation, from 4.5 to 7. It was pointed out that the main cause of such a large variation should be discussed.

iv Japan

- In some Japanese sites, the PM monitor is installed inside the station, while the air is collected from the inlet on the rooftop of the station. It was pointed out that temperature difference between the inside and outside might affect the data. It was requested that the experience in Japan should be shared with other countries to improve the data quality of the network.
- The quality check of $PM_{2.5}$ should be conducted in tropical region where is high humidity and temperature.
- National center calculates the dry deposition fluxes basically. However, the NC may calculate the dry deposition fluxes on behalf of the national centers, if the detailed

meteorological data is available.

v Lao PDR

- It was informed that the national emission inventory would be prepared in consultation with PCD in Thailand. The major emission sources of air pollutant in Laos are domestic activity and traffic sources.

vi Malaysia

- The new site, Bachok, has been registered in the WMO/GAW. It was suggested that the site would be registered as the EANET site also in the near future.
- For Pasoh Reserve Forest site and UPMKB site for soil and vegetation monitoring, the nearest deposition monitoring sites were not clearly described in the National Monitoring Plan. It was suggested that the name of the nearest deposition monitoring site would be described in the revised National Monitoring Plan.
- It was informed that sampling at Semenyih Dam is difficult to continue due to availability of staffs. The alternative site is under consideration.

vii Mongolia

- The pH in Terelj site has been declining over the last decade. It was pointed out that cause of the trend should be checked with the trend of ion concentrations.
- It was pointed out that the precise coordinates of the site location up to the second unit should be obtained for each site. The participating countries are requested to check the coordinates shown in Table 2.2 of the preliminary draft Data Report 2015.

viii Myanmar

- It was confirmed that the $PM_{2.5}$ monitor in Mandalay has been working currently, although the data was missing from September 2015 to March 2016.
- It was requested that the individual training course would be longer. It is recommended that this request will be expressed at the IG meeting.

ix Philippines

- The data of inland aquatic environmental monitoring in Pandin Lake and Ambulalakaw Lake have not been included in the preliminary draft Data Report 2015. It was clarified that the data had been submitted to the NC before STM17 and would be included in the draft Data Report 2015.
- It was informed that monitoring of the stream water has started as the regular catchment monitoring in La Mesa Watershed. Measurement of the stream water discharge will also start soon in consultation with the expert. The details of the survey plan will be described in the revised National Monitoring Plan. It was expected that the data in 2016 would be submitted to the NC in the next year.

- The pH of Ambulalakaw Lake is significantly lower than that of Pandin Lake. It was pointed out that Ambulalakaw Lake and Pandin Lake were in different conditions, locating in a mountainous area and a rural area relatively close to cities, respectively.
- Ozone concentration in Metro Manila is low because titration of nitrogen oxides. However, Ozone concentration increases occasionally during photochemical production.
- It is suggested that automatic monitors at Metro Manila and catchment monitoring at La Mesa should be included in the revised NMP.

x Republic of Korea

- It was clarified that interpolation of the data (kriging method) was used to draw spatial distribution of deposition amounts.
- It was clarified that no big emission source could be found within a radius of 30 km in Kanghwa site. It was suggested that combustion of fossil fuels in winter season might be one of the possible sources. No information on ship emissions has been obtained.
- It was clarified that the national air quality standard was set for NO_2.
- It was clarified that dry deposition velocities, Vds, were calculated using the method of NIER. It was suggested that parameterization for the calculation might be slightly different from that in the technical manual.
- It was suggested that the maps of dry deposition fluxes and total deposition fluxes would be included in the national assessment report of the Third Periodic Report of the State of Acid Deposition (PRSAD3).
- It was clarified that no official standard was decided for classification of acid rain.
- Standard method of PM2.5 monitoring in Republic of Korea is gravimetric method and beta-ray method.

xi Russia

- It is noted that increase trend of SO_2 and particulate sulfate concentration was identified, but correspondent changes in emission sources of SO2 is not clear identified.
- It was informed that the soil survey was implemented in Mondy site in 2014. However, the data was not included in the Data Report 2014 due to some communication mistake. The data will be submitted to the NC soon to be included in the Data Report 2015.

xii Thailand

- Wet deposition amounts of nss-SO_4^{2-} and NO_3^- were quite different between Samutprakan (TMD) and Bangkok (PCD) sites, even though both sites were located within the city of Bangkok. It was suggested that possible causes including difference in precipitation amounts should be checked carefully.
- Thailand is considering to use direct and continuous monitoring method of ambient NO2. The method has already been approved by USEPA as equivalent method.
- It was suggested that measurement of carbonaceous components and/or PAHs in PM

samples would be informative.

- It was informed that new monitoring facility is considered depending of the national budget plan.

xiii Vietnam

- The acid rain monitor of KIMOTO, which monitors pH and EC for every 1 mm precipitations automatically, is installed in Cuc Phuong and Da Nang sites. The monitor collects daily samples. It was clarified that the weekly-composite samples were prepared from the daily samples for chemical analysis. It was also suggested that a small portion of the precipitation samples might be used for auto-measurement of pH and EC.
- There are 7 sites to collect wet samples by daily sampler.
- It was pointed that composition of daily samples may not be conducted accurately when some portions are measured for pH and EC.
- It was clarified that wet samplers at some sites were broken, and those will be repaired soon.

xiii Network Center

- It was informed that the new MTP format will be sent to the countries soon.

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VIII. Progress of the draft "QA/QC Guideline for the EANET monitoring" (Agenda 8)

15. The NC presented progress of the draft "QA/QC Guideline for the EANET Monitoring" (EANET/STM 17/8).

16. The major points of the discussion are:

i. The senior technical managers were requested to review the draft QA/QC Guidebook and sent comments/suggestions to the NC hopefully by 30 September, at the latest by 7 October 2016. The revised draft will be submitted to SAC16 for adoption.
ii. It was pointed out that SOP would not be just a copy of the manual but include procedures specified to the laboratories.
iii. It was pointed out that preparation of SOP and possible contents of SOP have already recommended in the previous QA/QC programs, which were adopted in 2000. Most of the laboratories may have already prepared their own SOPs. It was clarified that the QA/QC Guidebook would show the updated information above and could be informative for the rest of the laboratories, which have not prepared their SOPs.
iv. It was clarified that the QA/QC Guidebook would basically be consistent to ISO, although some specific descriptions to the EANET monitoring might be included.

IX. Progress of the draft "Third Periodic Report on the State of Acid Deposition in East Asia"

(Agenda 9)

17. The NC presented progress of the draft "Third Periodic Report on the State of Acid Deposition in East Asia" (EANET/STM 17/9).

18. The major points of the discussion are:

i. It was informed that full contents of PRSAD3 would be uploaded on the website in December 2016 before printing.

X. Other Issues (Agenda Item 10)

19. Dr. Sergey Gromov made a presentation on "National System of Air Quality and Environmental Monitoring in Russian Federation" (EANET/STM 17/10), as a Russian resource person. He introduced the national authorities responsible for environmental monitoring including Roshydromet, scientific research institutes under Roshydromet, respective national networks of environmental pollution monitoring and results of data analysis. It was highlighted that urban air pollution monitoring is regularly conducted at 638 sampling measuring sites of 249 cities, while regional and background monitoring is performed by 4 EMEP stations, 3 EANET sites, 6 IBMoN (Integrated Background Monitoring Network) stations and 7-8 WMO regional station (of precipitation chemistry measurements).

20. The major points of the discussion are:

i. Russia participates in several regional atmospheric monitoring networks, which include EMEP, national precipitation chemistry (PC) network, regional and global WMO-GAW, IBMoN, CLRTAP ICP-IM, and EANET. It was clarified that the official representative of Russia was not updated to ICP-Forests and ICP-Waters under CLRTAP.
ii. It was pointed out that no exceedance of atmospheric deposition critical values was found in the previous critical loads calculation over European Russia. According to the official request signed by WGE (Working Group of Effect) the critical loads will be updated according to the new calculation cell grid with application method proposed by ICP M&M under CLRTAP.
iii. Data of many EANET sites show decreasing trend of SO_2 concentration and increasing trend of sulfate concentrations, however, presentation shows opposite situation for Russia. It is important to clarify the reason by research with additional data.
iv. It was clarified that regularly used IAP (integrated index of atmospheric pollution) for urban air quality assessment was calculated based on the sum of annual average concentrations of several harmful compounds taking into account the class (degree) of their potential harmful risk.
v. There are different considerations on importance of Short Lived Climate Pollutants (SLCP) between scientists and the government. It was noted that significant effect (visual and modeled) of black carbon seems to be observed in western Arctic region of Russia.

vi. In accordance with published data the NO_X emissions have been reducing by 30% from 2007 to 2012. It was suggested that emission has been slightly underestimated and need to be evaluated for different part of Russia..

XI. Closing of the Meeting (Agenda Item 11)

21 The Co-chairperson expressed their deep appreciation to all the participants for their active contribution and cooperation. He also thanked the Co-chair for the productive managing of the meeting. On behalf of participants the grateful greetings were expressed to the Limnological Institute of SB RAS (local organizer) and ACAP (the meeting secretariat) for the excellent preparation and arrangement of the STM 17 meeting. Then, the Meeting was officially closed.

Annex

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