The Eleventh Session of the Scientific Advisory Committee
on Acid Deposition Monitoring Network in East Asia
12-14 October 2011, Ho Chi Minh, Vietnam

Report on the Activities of the Expert Group on Preparation of the Technical Manual for Air Concentration Monitoring

Chair of the Expert Group on the preparation of the Technical Manual for Air Concentration Monitoring

I. Background

1. At the First meeting of the Task Force on Dry Deposition Monitoring (held at Hanoi in October, 2008) reconsideration of the Terms of Reference, membership and name of the Task Force were discussed. On the recommendation of the Eighth Session of Scientific Advisory Committee of the EANET (SAC8), and the Tenth Session of the Intergovernmental Meeting (IG10) in November 2008 agreed to change the name of the Task Force to Task Force on Monitoring for Dry Deposition and agreed to the following new Terms of Reference (TOR) for the Task Force:

   i) To further develop and elaborate the strategy for dry deposition evaluation in the region
   ii) To discuss on future direction of dry deposition evaluation and provide guidance on relevant activities based on the strategy
   iii) To develop the Technical Manuals for Air Concentration Monitoring and Dry Deposition Flux Estimation
   iv) [To review substances to be monitored]

2. In order to fulfill the TOR of the Task Force, the Task Force proposed to establish the Expert Group on Preparation of the Technical Manual for Air Concentration Monitoring. The Ninth Session of the SAC (SAC9) held in October, 2009 agreed to submit the proposal on the establishment of the new Expert Group to the Eleventh Session of the IG (IG11) held in November, 2009, and IG11 endorsed the establishment of the Expert Group. SAC9 also appointed Dr. Duong Hong Son as the chairperson of the expert group and the Network Center (NC) was designated as the secretariat.

3. After the establishment of the Expert Group, the Chair started to nominate the members of the Expert Group with help of the NC. The members have been nominated from the EANET participating countries where both filter pack and automatic monitoring are conducted. The candidate member lists was submitted to the Ninth Session of the SAC (SAC10) in October, 2010, and the proposed membership was endorsed. However, the NFPs will be invited to nominate potential experts to be members of the Expert Group.

II. Activities

II-1. First meeting of the Expert Group

4. In June, 2011, the NC as the secretariat of the Expert Group sent an appointment letter to all the nominated members to confirm their acceptance, according to a suggestion of the Chair. The first meeting of the Expert Group was held at Asia Center for Air Pollution Research (ACAP) from 11 to 12 August 2011. The minutes of the meeting are attached as Attachment 1.

II-2. Terms of reference (TOR) and membership of the Expert Group

5. As shown below, terms of reference and the membership of the Expert Group, which were adopted at SAC10 in 2010, were introduced at the 1st meeting.

(TOR of the Expert Group)

i) Review the current Technical Document for Filter Pack Method in East Asia and the QA/QC Program for the Air Concentration Monitoring in East Asia
ii) Identification of monitoring methods suitable for EANET air concentration monitoring
iii) Preparation of the Technical Manual for Air Concentration Monitoring based on identified monitoring methods

(Membership of the Expert Group)

Dr. Duong Hong Son (Chairperson)	Director, Center for Environmental Research, Vietnam Institute of Meteorology, Hydrology, and Environment,
Prof. Min Hu	Professor, College of Environmental Sciences, Peking University, China
Dr. Masahide Aikawa	Chief Officer, Water and Atmospheric Environment Division, Hyogo Prefectural Government, Japan
Mr. Hajime Mikasa	Managing Director, Japan Environmental Technology Associations, Japan
Dr. Akinori Takami	Chief, Center for Regional Environmental Research, National Institute for Environmental Studies, Japan
Prof. Young Joon Kim	Professor, School of Environmental Science and Engineering, Gwangju Institute of Science and Technology, Republic of Korea
Mr. Phunsak Theramongkol	Director, Ambient. Air Quality Section, Pollution Control. Department, Thailand

II-3. Major discussions at the first meeting of the Expert Group

6. Discussions in the first meeting of the Expert Group were summarized as the meeting minutes (cf. Attachment 1). The major discussions of the first meeting are as follows:

- The meeting reviewed the existing EANET documents regarding air concentration monitoring and the other manuals in EANET participating countries and international networks. It was pointed out that international manuals are useful to develop EANET technical manual and we can cite many description from them, but there are some specific conditions in East Asia.

- The meeting agreed to make recommendations of suitable monitoring methods for EANET air concentration monitoring to the Task Force on Monitoring for Dry Deposition and SAC.

- The meeting adopted the Table of Contents of the Technical Manual for Air Concentration Monitoring and agreed on the lead authors of each chapter (cf. Annex 2 in the Attachment 1). The meeting commented if QA/QC contents are prepared as an independent document it may be more useful for operators, but many parts will be cited from technical manual. The meeting decided to ask for STM/SAC participants if EG should prepare one document including QA/QC matters or separated documents of Technical Manual and QA/QC program.

- The meeting adopted the Table of Contents of the Technical Manual for Air Concentration Monitoring and agreed on the lead authors of each chapter (See Annex 2 in the Attachment 1). The meeting agreed that the first draft of the Technical Manual should be prepared for discussion at the 2nd meeting.

- The 2nd Meeting will be held around June, 2012.

II-4. Schedule

7. The Expert Group agreed to follow the following time schedule for its activities:

June 2011	Appointment of the membership of the Expert Group
August 11 – 12, 2011	First meeting of the Expert Group, Review of existing air concentration monitoring manuals
September, 2011 – May, 2012	Preparation of the first draft of the Technical Manual

June, 2012	Second meeting of the Expert Group to discuss about the first draft of the Technical Manual
At SAC12 (autumn 2012)	Submission of the draft Technical Manual to SAC for comments
Middle of 2013	Third meeting of the Expert Group to finalize the Technical Manual
At SAC13 (autumn 2013)	Submission of the Technical Manual to SAC for adoption

II-5. Follow-up actions from the first meeting

8. The NC sent the format and guidelines for preparation of the "Technical Manual for Air Concentration Monitoring" to the authors in early October 2011. The first draft of the Technical Manual is due on one month before the second meeting. The NC will compile the first draft submitted by the authors for discussion at the second meeting that will be held around June, 2012.

9. The Expert Group meeting and information on the follow-up activities were reported to the Chairperson and members of the Task Force on Monitoring for Dry Deposition.

10. After first draft of manual is made, it will be submitted to Task Force on Monitoring for Dry Deposition and SAC meeting. Because members of the Task Force are nominated from each participating country, sufficient feedback can be expected. Then, the draft will be circulated among participating countries for comments and suggestions.

III. Recommendations to SAC11

11. The Eleventh Session of the Scientific Advisory Committee of the EANET (SAC11) is invited to consider the report on the activities of the Expert Group on Preparation of Technical Manual for Air Concentration Monitoring by the Chair of the Expert Group and endorse the items listed in the Table of Contents of the Technical Manual for Air Concentration Monitoring (See Annex 2 in the Attachment 1).

12. SAC11 is also requested to note:

    i) Manuals should be intended for field and laboratory operators in EANET participating countries.

ii) Monitoring species described in the technical manual should cover EANET priority chemical species.

iii) Monitoring frequency should be one hour for automatic monitoring, and weekly or biweekly for manual monitoring.

iv) Site criteria will basically follow EANET Guideline but some conditions are specific for air concentration monitoring.

v) Monitoring method is classified in two major methods. Manual methods include filter pack, passive sampler, annular denuder, and other gas scrubbers. Automatic methods include SO2 (UVF, DOAS), NOx (CLD, DOAS, CAPS), O3 (UV Abs, DOAS), PM10, PM2.5 (β-ray, TEOM) and meteorological instrument (anemometer, thermometer, hygrometer, solar radiometer, rain gauge).

vi) Before development of the Technical Manual, DQOs and required data accuracy and precision should be identified.

vii) Suitable methods are dependent on current situation of EANET air concentration monitoring. Practical methods and some methods with scientific meaning for EANET air concentration monitoring should be indentified.

Attachment 1

ACID DEPOSITION MONITORING NETWORK IN EAST ASIA (EANET)

FIRST MEETING OF THE EXPERT GROUP ON PREPARATION OF TECHNICAL MANUAL FOR AIR CONCENTRATION MONITORING UNDER THE TASK FORCE MONITORING FOR DRY DEPOSITION SCIENTIFIC ADVISORY COMMITTEE (SAC) OF EANET

(Niigata, 11-12 August 2011)

PROVISIONAL AGENDA

August 11

09:00-09:10

1.	Welcome remarks	Dr. Akimoto (NC)

09:10-09:20

2.	Introduction	Chair

09:20-09:30

3.	Terms of reference and membership of the Expert Group Adoption of the Agenda	Chair

09:30-10:30

4.	Review on the current status of EANET air concentration monitoring	Dr. Sato (NC)

10:30-11:00 Coffee break

11:00-12:30

5.	Review on the Technical Document for Filter Pack Method in East Asia and the QA/QC Program for the Air Concentration Monitoring in East Asia	Dr. Sato (NC)

12:30-14:00 Lunch and Group Photo

14:00-15:30

6.	Review on the existing air concentration monitoring manuals of EANET participating countries	Members

15:30-16:00 Coffee break

16:00-17:30

7.	Review on the existing air concentration monitoring manuals of the other international monitoring networks	Dr. Sato (NC) Dr. Huo (NC)

17:30 Departure to the hotel

August 12

09:00-10:30

8. Summary of the discussions on the 1st day — Discussion
   Discussions on suitable monitoring methods for EANET air concentration monitoring

10:30-11:00 Coffee break

11:00-12:30

9. Discussions on the contents of the Technical Manual and Lead authors — Discussion

12:30-14:00 Lunch

14:00-15:00

10. Next steps and schedule — Discussion

15:00 Close

MEETING MINUTES

I. Welcome Remarks

Dr. Hajime Akimoto, Director General of ACAP welcomed the members of the Expert Group on Preparation of Technical Manual for Air Concentration Monitoring of the EANET Scientific Advisory Committee to ACAP, Niigata, Japan.

He mentioned that EANET came to the second decade from 2011. Preparation of the Technical Manual for Air Concentration Monitoring of the EANET is good start for the second 10 years phase of EANET.

II. Introduction

Dr. Duong Hong Son, the chairperson of the Expert Group, made introductory remarks. The other members of the Expert Group also introduced themselves.

III. Terms of reference and membership of the Expert Group, Adoption of the Agenda

Dr. Son Introduced the terms of reference and the membership of the Expert Group (see Annex 1), which were adopted at SAC10 in 2010. The Meeting adopted the Provisional Agenda.

IV. Review on the current status of EANET air concentration monitoring

The Secretariat presented the current status of EANET air concentration monitoring activities. Major comments were as follows.

- Comparison between different methods is an important matter. Parallel monitoring between FP and denuder/gas scrubber should be implemented.
- The comparison of SO_2 between filter pack and automatic equipment in Japan is generally good at EANET sites, but there is larger difference for NOx and HNO_3 concentrations between filter pack and denuder measurements. For SO_2, the difference between filter pack and automatic instrument was quite obvious in Vietnam. The reason of the large discrepancy may be attributable to imprecise calibration of automatic instrument or some problems in a FP system such as flow rate of pump.
- Another factor affecting on data quality may be skillfulness of laboratory operators. After a skilled staff in some laboratories was changed, the data quality became poorer than before. Since accuracy of filter pack monitoring is dependent on skillfulness of operator, training programs are needed to be developed.
- Because DOAS can measure SO_2, NOx, O_3 simultaneously, it is economical to use DOAS than three instruments of SO_2, NOx, O_3. However, DOAS has limitations on geological and climate conditions.
- Selection of automatic instruments, a denuder and a filterpack at a monitoring site in China depends on an air concentration level.
- Technical Manual on Dry Deposition Flux Estimation (TMDDFE) includes the methodology to estimate dry deposition amounts but not include the detailed requirements of air quality measurements.
- So far Technical Document for Filter Pack Method was published as a EANET manual, but no manual including automatic measurements has been developed.
- New Technical Manual for Air Concentration Monitoring (TMACM) should include necessary QA/QC activities considering current situation of EANET air concentration monitoring and requirement to evaluate long term variation of acid deposition and air quality.
- In line with the time schedule of activity described in the Strategy Paper, development of TMACM and revision of QA/QC Program for Air Concentration Monitoring should be implemented by 2013.

V. Review on the Technical Document for Filter Pack Method in East Asia and the QA/QC Program for the Air Concentration Monitoring in East Asia

The Secretariat presented the Technical Document for Filter Pack Method in East Asia and the QA/QC Program for the Air Concentration Monitoring in East Asia. Major comments were as follows.

- Technical Document for Filter Pack Method in East Asia didn't include QA/QC program, and QA/QC Program for the Air Concentration Monitoring in East Asia didn't include monitoring specifications of filterpack, passive sampler, and denuder.
- Description of the Technical Document for Filter Pack Method should be included in Chapter 3.1 of TMACM.
- Description of QA/QC program should be included mainly Chapter 4 of TMACM.
- Technical Document for Filter Pack Method described that the sampling should be continuously carried out through a year. The non-detected data is considered as half concentration of detection limit in order to calculate the dry deposition flux. Only artifacts caused by chemical reactions in filterpack were described in the Technical Document for Filter Pack Method, and uncertainty of artifact was not determined.
- Standard operating procedures should be prepared by each laboratory according to their conditions. Basic data should be provided on one-hour basis.
- Automatic instruments for gases and aerosol monitoring, and meteorological Measurement are quite simply described in the present QA/QC Program.
- Aluminum bag should be used to transport filterpack to avoid sunlight and contamination.
- Site selection should be unified for filter pack and automatic measurement.
- EG proposed QA/QC matters will be described in separate chapter of TMACM.
- At the STM 12, the Secretariat will ask if EG should prepare one document including QA/QC matters or separated documents of Technical Manual and QA/QC program.
- If filter pack was used for air concentration monitoring, some artifacts should be considered. Some new methods of manual monitoring should be introduced in TMACM.
- TMACM should refer priority chemical species listed in Strategy Paper on Future Direction of Monitoring for Dry Deposition of EANET.

VI. Review on the existing air concentration monitoring manuals of EANET participating countries

China

Prof. Hu made a presentation on air concentration monitoring manuals in China. She introduced 3 documents, namely, Environmental air quality monitoring regulation, Manual methods for ambient monitoring and Automatic methods for ambient monitoring. Major discussions were as follows.

i) SO_2, NO_2, CO, O_3 and PM_{10} are necessary monitoring parameters, and $PM_{2.5}$ is under discussion. Point analyzer and DOAS were included in automatic methods.

ii) DOAS is used in some monitoring sites in China and described in monitoring manual. No description of requirement of DOAS measurement is given in the manual.

iii) QA/QC was described in an independent chapter in the monitoring manual. The regulations for site selection were included in the case of automatic methods and manual methods, respectively. Both suitable monitoring methods and site selection

are dependent on the characteristics of a city and population. According to source emission, four kinds of sites were categorized in monitoring network.

Japan

The Secretariat made a presentation on air concentration monitoring manual in Japan. Manual for Continuous Monitoring of Air Pollution (6th edition, 2010) was introduced. Major discussions were as follows.

i) The manual covers the detailed operational procedure. It can be followed by monitoring station staffs of local governments and commissioned private companies. MOEJ arrange the training program for local governmental staffs according to this manual.
ii) In the manual, cutoff diameter of SPM and PM10 are different.
iii) Site criteria are mainly depended on population.

Republic of Korea

Prof. Kim made a presentation on air concentration monitoring manual in Republic of Korea. He introduced i) Real time monitoring information (Air Korea) and overview of AQM in Korea. Major discussions were as follows.

i) Operation guideline of air quality monitoring network was recently updated in March, 2011.
ii) Monitoring in EANET sites in Korea is followed by Korean domestic manual which is similar to that in US. There is also road side monitoring sites in Korea. All the monitoring data have been disclosed since 2002 via website.
iii) The sampling frequency for filter pack in Korea was one day in a week because $PM_{2.5}$ impactor was installed on the top of filter pack. The automatic instrument is also operated by local office staffs. The QA/QC was described in independent document.

Thailand

Mr. Phunsak made a presentation on air concentration monitoring manual in Thailand. Major discussions were as follows.

i) There are two methods of monitoring guideline. One is government method, and the other is general method.
ii) The general method covers manual sampling such as passive sampler, deposition surface, impinger, etc. The governmental method follows USEPA regulation. Manual for PM monitoring has been published.
iii) The operation equipment in monitoring stations follows the governmental monitoring guideline. Research and intensive campaign can follow the general method. Most monitoring sites were located in polluted and high population cities.

Vietnam

Dr. Son made a presentation on air concentration monitoring manual in Vietnam. Major discussions were as follows.

i) Field observation manuals were published in 1999 following ISO methods in 1995, by Ministry of Science and Technology.
ii) Other ministries develop guidelines for their routine monitoring networks.
iii) For each network, it follows individual monitoring guidelines.

VII. Review on the existing air concentration monitoring manuals of the other international monitoring networks

The Secretariat made a presentation on air concentration monitoring manuals of the other international monitoring networks. Major comments and discussions were as follows.

i) International manuals are useful to develop EANET technical manual and we can cite many description from them, but there are some specific conditions in East Asian countries so we should consider proper application of methods from other international networks to EANET.
ii) EMEP and WMO/GAW manuals are well developed, and those can be used as important references for development of TMACM in view of structure, scientific and technical issues.
iii) Some manuals include wet deposition and QA/QC matter in the same manual. The thickness of manual should also be considered if we include QA/QC contents in the same manual.
iv) Site criteria in the international manuals are dependent on the objective of monitoring.
v) Artifact of filterpack is described in other international manuals.
vi) Common contents of the manuals are objective, siting criteria, field operations, chemical analysis, data handling, and quality assurance. Different features are objective of network and monitoring design, monitoring items, sampling and analytical methods, and QA/QC.

VIII. Summary of the discussions on the 1st day and Discussions on suitable monitoring methods for EANET air concentration monitoring

The Secretariat introduced the summary of the discussions on the 1st day and organized discussions on suitable monitoring methods for EANET air concentration monitoring. Major comments and discussions were as follows.

- Manuals should be intended for field and laboratory operators in EANET participating countries.
- Monitoring species described in TMACM should cover EANET priority chemical species.
- Monitoring frequency should be one hour for automatic monitoring, and weekly or biweekly for manual monitoring.

- Site criteria will basically follow EANET Guideline but some conditions are specific for air concentration monitoring.
- Monitoring method is classified in two major methods. Manual methods include filter pack, passive sampler, annular denuder, and other gas scrubbers. Automatic methods include SO_2 (UVF, DOAS), NOx (CLD, DOAS, CAPS), O_3 (UV Abs, DOAS), PM_{10}, $PM_{2.5}$ (β-ray, TEOM) and meteorological instrument (anemometer, thermometer, hygrometer, solar radiometer, rain gauge).
- Before development of TMACM, DQOs and required data accuracy and precision should be agreed among EG members and NC.
- Suitable methods are dependent on current situation of EANET air concentration monitoring. Practical methods and some methods with scientific meaning for EANET air concentration monitoring will be indentified.
- EANET Low Cost Methodologies for Monitoring Air Concentration project will end in 2011. This project is conducted in China, Thailand, Russia and Japan in aim of SO_2, NOx, O_3, and NH_3 monitoring in different climate conditions. The time resolution of low cost method is too low to meet the request of regular monitoring in EANET. For routine monitoring high time resolution methods should be recommended in this manual. The method of passive sampler may be included in manual but should not be recommended. We should also consider how to improve the filer pack method to reduce the artifact in the manual.
- DQOs and required data accuracy and precision may be different between continuous and intensive monitoring based on scientific researches.

IX. Discussions on the contents of the Technical Manual and Lead authors

The Secretariat presented the draft contents of Technical Manual on Air Concentration Monitoring. Major discussions were as follows:

- Title of the manual was proposed to be "EANET Technical Manual for Air Concentration Monitoring"
- Since the locations of EANET monitoring sites were decided 10 years ago, it's better to reconsider siting for air concentration monitoring. According to the EANET monitoring guideline, we can choose different sites between wet deposition and air concentration monitoring. The EANET wet deposition sites in rural area can be used for air concentration monitoring, but the EANET sites in urban area should be reconsidered. For example, urban sites have to be located on the top of a high building.
- Chapter 4.2 describing calibration gives just general information such as usage of moving standard gases and zero gas. Specific information of calibration will be included in each instrument part. Chapter 4 should identify regulation about units of PM_{10} and $PM_{2.5}$.
- In the introduction of TMACM, relationship between current manual and automatic techniques and future direction should be included. The relationship between manual

measurement methods and automatic monitoring methods should be introduced in chapter 1.4.

- Site facility and instrumentation should be combined to make Chapter 2.2. The site facility includes monitoring site building, electricity supply, and operation racks and so on.
- The contents of QA/QC were included in the EANET wet deposition manual. If QA/QC contents are prepared as an independent document it may be more useful for operators, but many parts will be cited from technical manual. Therefore, QA/QC contents will be prepared in each chapter, independent chapter or independent document. This choice will be decided by STM12 meeting. Training programs should also be included in QA/QC items.
- In case of wet deposition manual, operators can follow the QA/QC described in the wet deposition manual. The separated QA/QC document including inter-laboratory comparison, site audit, data complement and so on, is mainly used by the National Center of each country.
- In Chapter 4, the authors should consider how to introduce DOAS method. DOAS should be described for SO_2, NOx and O_3 measurement, respectively. In Chapter 4.4, not only for NOx, some specified technology for NO_2 monitoring should be also introduced. Some new technologies for NOx monitoring should be introduced in the Future issues.
- This manual should describe optional methods which can be used in EANET participating countries. If the uncertainty of different methods can be determined, data can be compared. The new technology improving current monitoring methodology should be discussed in the future issues.
- It is very difficult to make detailed regulations in the manual, because the monitoring systems are different among different countries. Some parts of the manual should be described general conditions, and the other parts can be described necessary specific conditions.
- Safety management means operation of gas cylinder, the discharge of waste chemical and so on in field station and laboratory.
- The first EG meeting modified the contents of manual and decided lead authors of each chapter.

The meeting adopted the revised Table of Contents and agreed on the lead authors of each chapter (see Annex 2). The Meeting also agreed that:

i) The Technical Manual shall be approximately 100-150 pages;
ii) The 1st draft document of the Technical Manual should be ready for discussion at the 2nd meeting;
iii) The NC shall send the format and guidelines for preparation of the text to all members as well as the minutes of the 1st meeting within one month.

X. Next Steps and Schedule

The Meeting adopted the revised Schedule of Activities (Annex 3). The Meeting also agreed that:

i) The deadline for submission of the first draft to the Secretariat shall be one month before the 2nd meeting.
ii) Before preparing the draft, some tables of specifications should be prepared in the template.
iii) When the manual is prepared, it's better to communicate with local staffs from participating countries about available equipment and current situations.
iv) Before the second EG meeting the first draft will be circulated among members.
v) After first draft of manual is made, it will be submitted to Task Force on Monitoring for Dry Deposition and SAC meeting. Because members of the Task Force are nominated from each participating country we can get sufficient feedback. Then, we will circulate the draft among participating countries for comments and suggestions.

LIST OF PARTICIPANTS

Members of the Expert Group

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(EGACM 1/minutes Annex 1)

FIRST MEETING OF THE EXPERT GROUP ON PREPARATION OF TECHNICAL MANUAL FOR AIR CONCENTRATION MONITORING (Niigata, 11-12 August 2011)

Terms of Reference

1. Review the current Technical Document for Filter Pack Method in East Asia and the QA/QC Program for the Air Concentration Monitoring in East Asia

2. Identification of monitoring methods suitable for EANET air concentration monitoring

3. Preparation of the Technical Manual for Air Concentration Monitoring based on identified monitoring methods

Members

Dr. Duong Hong Son (Chairperson)	Director, Center for Environmental Research, Vietnam Institute of Meteorology, Hydrology, and Environment, Vietnam
Prof. Min Hu	Professor, College of Environmental Sciences, Peking University, China
Dr. Masahide Aikawa	Deputy Department Chief, Atmospheric Department, Hyogo Prefectural Government, Japan
Mr. Hajime Mikasa	Managing Director, Japan Environmental Technology Associations, Japan
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Mr. Phunsak Theramongkol	Director, Ambient. Air Quality Section, Pollution Control. Department, Thailand

(EGACM 1/minutes Annex 2)

FIRST MEETING OF THE EXPERT GROUP ON PREPARATION OF TECHNICAL MANUAL FOR AIR CONCENTRATION MONITORING (Niigata, 11-12 August 2011)

Draft Table of Contents of EANET Technical Manual for Air Concentration Monitoring

5. Maintenance [Mr. Mikasa, Mr. Phunsak and Network Center]
   - 5.1. Standard operating procedures [Network Center]
   - 5.2. Maintenance of manual samplers and analytical instruments [Mr. Phunsak and Network Center]
   - 5.3. Maintenance of automatic monitors [Mr. Mikasa]
   - 5.4. Field record [Network Center]
   - 5.5. Maintenance record [Network Center]
   - 5.6. Safety management [Network Center]

6. Data reporting and validation [Network Center]
   - 6.1. Site specification
   - 6.2. Compilation of raw monitoring data
   - 6.3. Data validation
   - 6.4. Submission of finalized data
   - 6.5. Data storage

7. Quality Control and Quality Assurance [All EG members and Network Center]
   - 7.1. Fundamental matters [Network Center]
   - 7.2. Data Quality Objectives (DQOs) [Network Center]
   - 7.3. Monitoring site(Site audit) [Network Center]
   - 7.4. Field and laboratory operations [Network Center]
   - 7.5. Data management [Network Center]
   - 7.6. Determination of accuracy and detection limit [Prof. Kim for DOAS, Prof. Hu for Point measurement, Dr. Takami for PM, Dr. Aikawa for Manual Monitoring]
   - 7.7. QA/QC implemented by NC [Network Center]
   - 7.8. Training programs [Network Center]

8. Future issues [Dr. Son and Network Center]

   (New monitoring methods of NO_2 (PLD, CRDS, LIF), online aerosol composition monitoring, Intercomparison of different monitoring methods)

(EGACM 1/minutes Annex 3)

FIRST MEETING OF THE EXPERT GROUP ON PREPARATION OF TECHNICAL MANUAL FOR AIR CONCENTRATION MONITORING (Niigata, 11-12 August 2011)

Future plan of activity