

The Eighth Session of the Scientific Advisory Committee
of the Acid Deposition Monitoring Network in East Asia
15-17 October 2008, Hanoi, Viet Nam

Report on the activities of the Expert Group on Revision of Technical Manual on Inland Aquatic Environment Monitoring

Chair of the Expert Group

I. Background

1. The first Guidelines for Monitoring Acid Deposition in the East Asia Region was adopted in 1995 by the Expert Meeting followed by the adoption of the first set of technical documents for wet deposition, soil and vegetation, and inland aquatic environment monitoring for EANET in 1997. The Guidelines and Technical Documents were later reviewed based on the experience gained from the monitoring activities during the preparatory phase from 1998 to 2000 and the latest scientific/technical information. The Second Interim Scientific Advisory Group Meeting of EANET held in March 2000 in Jakarta, Indonesia adopted a revised set of the documents consisting of:
 - Guidelines for Acid Deposition Monitoring
 - Technical Documents for Wet Deposition Monitoring in East Asia
 - Technical Documents for Monitoring on Inland Aquatic Environment in East Asia
 - Technical Documents for Soil and Vegetation Monitoring in East Asia
 - Data Reporting Procedures and Formats for Acid Deposition Monitoring in East Asia
2. Recognizing the need to review and update the Technical Documents in keeping with recent advances in scientific techniques, experiences on acid deposition monitoring accumulated by participating countries and information available from other monitoring networks, the participating countries of EANET decided to include an activity to revise the Technical Manual for Wet Deposition Monitoring and Technical Manual for Inland Aquatic Environment Monitoring in the Strategy on EANET Development (2006-2010) adopted at the Eighth Session of the Intergovernmental Meeting (IG8) of EANET held in November 2007. This activity should be implemented by the Network Centre (NC) of EANET and the Scientific Advisory Committee (SAC) of EANET.
3. The 7th Session of the Scientific Advisory Committee (SAC7) proposed that the establishment of an Expert Group on Revision of Technical Manual on Inland Aquatic Environment Monitoring with Dr. Tamara Khodzher from Russia as the Chairperson of the Expert Group and the NC as the secretariat to review and revise the Technical Document on Inland Aquatic Environment Monitoring of EANET, The Ninth Session of the Intergovernmental Meeting (IG9) held in November 2008 endorsed this proposal.

II. Activities

4. The existing Technical Document for Monitoring on Inland Aquatic Environment in East Asia focuses mainly on sampling and analysis of water samples collected from lakes. Some countries are sampling water from rivers and streams as suitable lakes could not be found. The Expert Group recognized that one of their important tasks is to include new methodologies for sampling water from rivers and streams in the updated Technical Document. In addition, it is necessary to update other parts of the Technical Document in line with the general plan for an integrated approach for monitoring ecological impacts in the EANET region.

II-1. Establishment of the Expert Group

5. In early 2008, the Chair and NC identified appropriate experts from the EANET countries taking their background, current studies on inland aquatic environment and involvement to EANET into consideration. NC as the secretariat of the Expert Group contacted them to ask their participation. A letter from the Chair was sent to each expert for an appointment as a member of the Expert Group after their informal agreement.
6. The first meeting of the Expert Group was held at ADORC, Niigata, Japan from 26 to 27 June 2008. The minutes of the meeting are attached as Annex.

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

7. The Expert Group agreed to recommend the following TOR for the consideration of SAC:
 - Review the current Technical Manual on Inland Aquatic Environment Monitoring
 - Identification of problems on Inland Aquatic Environment Monitoring
 - Preparation of revised Technical Manual on Inland Aquatic Environment Monitoring
 - Identification of future research activities

II-3. Members

8. The Expert Group also agreed on following members of the Expert Group:

Dr. Tamara Khodzher
(Chairperson)

Vice-Director, Limnology Institute of the Siberian Branch of
the Russian Academy of Sciences, Russia

Prof. Senichi Ebise

Professor, Civil and Environmental System Engineering,
Faculty of Engineering, Setsunan University, Japan

Prof. Haruo Fukuhara

Professor, Faculty of Education, Niigata University, Japan

Prof. Tomonori Kawakami	Professor, Department of Environmental Systems Engineering, Toyama Prefectural University, Japan
Prof. Seiichi Ohta	Professor, Forest Science Graduate School of Agriculture, Kyoto University, Japan
Dr. Hiroyuki Sase	Chief Senior Researcher, Acid Deposition and Oxidant Research Center
Dr. Vu Van Tuan	Deputy Director, Institute of Meteo-Hydrology and Environment, Ministry of Natural Resources and Environment, Viet Nam

(Alphabetical order)

9. Two members, Prof. Kawakami and Prof. Ohta, were added in the member list based on decision of the first meeting.

II-4. Major decisions at the first meeting of the Expert Group

10. The major decisions of the meeting are as follows:

- The meeting agreed on the terms of reference and members as shown above. Two new members, Prof. Seiichi Ohta and Prof. Tomonori Kawakami, have been added in the member list based on a proposal of the 1st Meeting.
- Several technical and editorial subjects to be reflected to the revised Technical manual were identified. One of the important subjects was the site selection criteria. The following modification was recommended on this matter.
 - Rivers and streams can be selected as the monitoring site more freely. But modification on sampling frequency and measurement parameters is necessary. In case of rivers and streams, the water should be measured every one month (12 times a year) or every two months (6 times a year) at least.
- As practical actions, revised table of contents and contributors for each chapter or section were decided. The Meeting agreed that contributors should prepare manuscripts of each chapter or section by the end of April 2009.
- The 2nd Meeting will be held in June or July 2009.

II-5. Schedule

11. The schedule of the activities of the Expert Group was also discussed at the first meeting. The Expert Group agreed on the following schedule:

April 2008

Appointment of the membership of the Expert Group

June 26-27, 2008

First meeting of Expert Group. Review of Existing

	Manual
<u>Mid2008 – the end of April2009</u>	Preparation of the first draft of the Technical Manual
<u>June or July 2009</u>	Second meeting of the Expert Group to brush up the draft Technical Manual
<u>At SAC9 (autumn 2009)</u>	Submission of the draft Technical Manual to SAC for comments
<u>Middle of 2010</u>	Third meeting of the Expert Group to finalize the Technical Manual
<u>At SAC10 (autumn 2010)</u>	Submission of the Technical Manual to SAC for adoption

II-6. Follow-up actions from the first meeting

12. NC as the secretariat of the Expert Group contacted Prof. Kawakami and Prof. Ohta to ask their participation based on the decision of the first meeting. The appointment letter by the Chair was sent to them, too.
13. NC as the secretariat of the Expert Group sent a digital file of the current technical manual to the members for their editorial/revising works.

III. Recommendations to SAC8

14. The Eighth Session of the Scientific Advisory Committee (SAC8) is invited to consider the report on the activities of Expert Group on Revision of Technical Manual on Inland Aquatic Environment Monitoring by the Chair of the Expert Group and endorse the following:
 - 1) The TOR of the Expert Group on Revision of Technical Manual on Inland Aquatic Environment Monitoring
 - 2) Membership of the Expert Group on Revision of Technical Manual on Inland Aquatic Environment Monitoring
15. SAC8 is also requested to review and endorse the draft table of contents and contributors of the revised technical manual shown in the Attachment 3 of the minutes (Annex).

ACID DEPOSITION MONITORING NETWORK IN EAST ASIA (EANET)

FIRST MEETING OF THE EXPERT GROUP ON REVISION OF TECHNICAL MANUAL ON INLAND AQUATIC ENVIRONMENT MONITORING SCIENTIFIC ADVISORY COMMITTEE (SAC) OF EANET

(Niigata, 26-27 June 2008)

PROVISIONAL AGENDA

June 26

09:00-09:15

1. Welcome remarks Dr. Ueda

09:15-09:30

2. Introduction Chair

09:30-09:45

3. Overview of the Task Forces/Expert Groups NC

09:45-10:00

4. Draft terms of reference and membership of the Expert Group NC

10:00-10:30 Coffee Break

10:30-11:00

5. Draft terms of reference and membership of the EG Discussion

11:00-11:30

5. Status of EANET inland aquatic environment monitoring NC

11:30-12:00

6. Monitoring methodologies mentioned in the current Technical Manual NC

12:00-14:00 Lunch

14:00-15:00

7. Relevant research activities for the revision of the Technical Manual Members

15:00-15:30 Coffee Break

15:30-18:00

8. Relevant research activities for the revision of the Technical Manual Members
(contd.)

18:00 Departure to hotel

June 27

09:00-10:00

9. Possible contents of the revised Technical Manual NC

10:00-10:30 Coffee Break

10:30-12:00

10. Contents of the revised Technical Manual Discussion

12:00-14:00 Lunch

14:00-14:30

11. Summary of discussions Chair

14:30-16:00

12. Next steps and schedule Discussion

16:00 Close

MEETING MINUTES

I. Agenda

The Meeting followed the issues as listed in the Provisional Agenda.

II. Welcome Remarks

The Director General of ADORC welcomed the members of the Expert Group on Revision of the Technical Manual on Inland Aquatic Monitoring of the EANET Scientific Advisory Committee to ADORC, Niigata, Japan (see the attached List of Participants).

III. Draft terms of reference and membership of the Expert Group

The Secretariat presented the draft terms of reference and membership of the Expert Group.

The Meeting proposed adding an item, "Identification of future research activities", in the terms of reference. As for the membership, the meeting proposed inviting Prof. Seiichi Ohta (Kyoto Univ. Japan), a soil specialist, and Prof. Tomonori Kawakami (Toyama Pref. Univ. Japan), a river monitoring specialist, as additional members of this Expert Group. The Secretariat will contact the additional members to get agreement on their membership.

The Meeting agreed on the revised draft terms of reference and list of members as Attachment 1 and 2.

IV. Status of EANET inland aquatic environment monitoring

The Secretariat presented the current situations on inland aquatic environment monitoring in the participating countries of EANET.

It was pointed out that most of sites did not meet the criteria. One of the reasons may be that the current Technical Manual strongly recommended the selection of lakes as

monitoring sites. More flexibility may be necessary to allow streams and rivers as possible monitoring sites.

It was suggested that information on sensitivity of soil types and geology to acid deposition should be considered in the selection of an appropriate monitoring site in the revised Technical Manual. Soil types and geological features should be submitted with the data as part of the properties of sites.

V. Monitoring methodologies mentioned in the current Technical Manual

The Secretariat presented the monitoring methodologies which were described in the current EANET Technical Manual on Inland Aquatic Environment Monitoring.

It was pointed out that the current Technical Manual was well developed basically. However, some parts are too detailed, while some parts are over simplified. Editorial works may be necessary to make a balance for the descriptions.

It was suggested that background and objectives should be revised, including the latest scientific information of acidification of rivers and lakes in East Asia. Moreover, importance of the catchment/ watersheds should be explained in some appropriate sections.

It was recommended that lakes and/or rivers (streams) could be selected as the monitoring sites in the revised Technical Manual. A description on springs will be deleted to avoid confusion since impression of springs and their conditions were varied depending on countries. It was also pointed out that modification on frequency and parameters might be necessary for rivers and streams.

It was pointed out the analytical method of alkalinity (end point pH 4.8) in the current Technical Manual was not major in ICP Waters in Europe. Other end points or Gran's plots titration should be considered as an alternative method for comparison with the data of other regional networks.

VI. Presentations on relevant research activities for the revision of the Technical Manual

Prof. Haruo Fukuhara

He informed about effects of acid water on aquatic organisms. He presented that in naturally acidified water in Japan, the pH 6 might be a critical (threshold) value for invertebrate species transition in pH range. It was suggested that the information about effects on aquatic organisms should be included as a reference in the revised Technical Manual.

Dr. Vu Van Tuan

He presented on inland aquatic environment monitoring in Viet Nam. He explained difficulties to find an appropriate lake near deposition monitoring sites. It was suggested that new sites should be considered, since the current site, Hoa Binh reservoir, did not meet the criteria.

Prof. Senichi Ebise

He presented on water chemistry of mountainous streams in Yakushima Island. It was pointed out that stream water chemistry might change during storm events. He suggested checking the molar ratio of Na^+/Cl^- in stream water to evaluate effects of direct runoff.

Dr. Hiroyuki Sase

He talked about the long-term trends in river water pH from his assessment of the Public Water Body data. He stressed the relationship between the long-term trends and bedrock geology, showing acidification trends in the area with granite, which might be sensitive to acid deposition.

Dr. Tamara Khodzher

She commented on the analytical techniques described in the current Technical Manual. It was suggested that modern analytical methods, such as ICP-MS and HPLC, should be recommended in the revised one.

VII. Summary of presentations and discussions

Several technical and editorial subjects to be reflected to the revised Technical manual were discussed and clarified as described above. Major subjects can be summarized as the following recommendations.

Recommendations:

- Background and objectives should be described including the latest scientific information of acidification of rivers and lakes in East Asia.
- Importance of the catchment/ watersheds should be explained enough in detail.
- Information on sensitivity of soil types and geology to acid deposition should be summarized to find an appropriate monitoring site.
- A standard format for properties of the monitoring sites should be prepared showing the minimum requirements.
- Rivers and streams can be selected as the monitoring site more freely. But modification on sampling frequency and measurement parameters is necessary. In case of rivers and streams, the water should be measured every one month (12 times a year) or every two months (6 times a year) at least.
- Clearer criteria on selection of lakes and rivers should be described, including size of the catchment, priority among natural lake, rivers/streams, and reservoir/dam, etc.
- Definition and meaning of the parameters should be clarified for surveyors and analysts.
- Parallel measurements by the end-point pH 4.8 method and the Gran's Plots titration method should be carried out for alkalinity.
- The information about effects on aquatic organisms should be included as a reference.
- There are two kind of acidifications; long-term (chronic) and temporary (seasonal) acidifications. Some explanation may be necessary on these phenomena.
- Some mistakes can be found in the current Technical Manual. The mistakes should be corrected as appropriate.

- The Expert Group will focus on revision of the Technical Manual. However, the QA/QC program includes some technical descriptions, which should be fundamentally included in the Technical Manual. Editorial works may be necessary to include all the necessary information related to monitoring in the Technical Manual.

VIII. Possible contents of the revised Technical Manual

NC summarized outcomes from discussions on the 1st Day as the recommendations above, and presented discussion points for possible contents of the revised Technical Manual. As the summary of discussions, the following actions were decided.

Actions:

- The Table of contents will be revised as Attachment 3.
- Contributors of each chapter and section were decided as indicated in the revised Table of contents.
- As for the additional members and an external contributor, the Secretariat will contact them after the Meeting.

IX. Next Steps and Schedule

The Meeting agreed that the next Expert Group meeting will be held in June or July 2009. Therefore the contributors have to prepare the manuscript for the first draft of the revised Technical Manual by the end of April 2009. The Meeting agreed to the Schedule for revision of the Technical Manual as in Attachment 4.

It was agreed that the Secretariat will:

- circulate the minutes of the meeting to all members within 2 weeks.

LIST OF PARTICIPANTS

Dr. Tamara Khodzher
Limnology Institute of the Siberian Branch of the
Russian Academy of Sciences
Russia

Dr. Vu Van Tuan
Institute of Meteorology and Hydrology
Vietnam

Dr. Senichi Ebise
Setsunan University
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Network Center for EANET

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Dr. Hiromasa Ueda
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Secretariat of Expert Group

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Attachment 1

**FIRST MEETING OF THE
EXPERT GROUP ON REVISION OF TECHNICAL MANUAL ON INLAND AQUATIC
ENVIRONMENT MONITORING
SCIENTIFIC ADVISORY COMMITTEE (SAC) OF EANET**

Revised Terms of Reference

1. Terms of Reference of the Expert Group

- Review the current Technical Manual on Inland Aquatic Environment Monitoring
- Identification of problems on Inland Aquatic Environment Monitoring
- Preparation of revised Technical Manual on Inland Aquatic Environment Monitoring
- Identification of future research activities

Attachment 2

**FIRST MEETING OF THE
EXPERT GROUP ON REVISION OF TECHNICAL MANUAL ON INLAND AQUATIC
ENVIRONMENT MONITORING
SCIENTIFIC ADVISORY COMMITTEE (SAC) OF EANET**

(Niigata, 26-27 June 2008)

LIST OF MEMBERS

Dr. Tamara Khodzher(Chair person)
Vice-Director
Limnology Institute of the Siberian Branch of the
Russian Academy of Sciences
Russia

Dr. Vu Van Tuan
Deputy Director
Institute of Meteo-Hydrology and Environment,
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Prof. Haruo Fukuhara
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Attachment 3

**FIRST MEETING OF THE
EXPERT GROUP ON REVISION OF TECHNICAL MANUAL ON INLAND AQUATIC
ENVIRONMENT MONITORING
SCIENTIFIC ADVISORY COMMITTEE (SAC) OF EANET**

(Niigata, 26-27 June 2008)

Revised Technical Manual on Inland Aquatic Environment Monitoring

Table of contents and contributors

1. Background and objectives (by Dr. Khodzher with Dr. Sase, NC)
 - 1.1. Background.....
 - Major modification with the latest scientific information including long-term and short-term acidification of inland water in East Asia
 - Figure 1 will be explained in a little more detail.
 - 1.2. Objectives.....
2. Selection of sites and monitoring parameters
 - 2.1. Selection of monitoring sites (by Dr. Vu with Mr. Kobayashi, NC).....
 - 2.1.1. Classification of sampling site
 - 2.1.2. Criteria of lakes and/or rivers (streams)
 - Lakes and/or rivers (streams) will be selected as the monitoring site.
 - a) Criteria for lakes
 - b) Criteria for rivers (streams)
 - Size of the catchment, soil type, bedrock geology
 - Chemical properties, including alkalinity (0.2 meq/L) or EC (10 mS/m),
 - Harmonic type, excluding high BOD, COD, or TOC area
 - Recommendation for location, such as reserved area, natural vegetation
 - 2.2. Information concerning monitoring site (by Dr. Sase & Mr. Kobayashi, NC).....
 - 2.2.1. Lakes
 - 2.2.2. Rivers (streams)
 - A standard format for minimum requirement for the information on properties
 - Topography, vegetation, Size of the catchment, soil type, bedrock geology
 - Meteorological and hydrological regime including precipitation, temperature,
 - An additional format for the optional information
 - soil chemical properties in the catchment area
 - 2.3. Measurement parameters and frequency of monitoring (by Dr. Khodzher, Dr. Vu with Prof.Fukuhara).....
 - 2.3.1. Lakes .
 - Mandatory parameters, and optional parameters will be clarified.
 - Additional parameters to be discussed, such as, chlorophyll a, Total P, Total N, and DO
 - Al compounds (to be discussed)
 - Pb compounds and Pb and S stable isotopes in the sediment (to be discussed)

- Brief definition and meaning of the parameters (in detail as an annex)
- 4 times a year
- Change of the frequency for transparency and other parameters from “once a year” to “4 times a year”

2.3.2. Rivers (streams)

- Mandatory parameters, and optional parameters will be clarified.
- Additional parameters to be discussed, total P, total N, hydrological flow (if possible), Suspended Solids (SS)
- Al compounds (to be discussed)
- Brief definition and meaning of the parameters (in detail as an annex)
- Every one month or two months

3. On-site measurement and sampling. (by Prof. Ebise with Prof. Fukuhara).

3.1. On-site measurement.....

- pH, EC, water temperature, hydrological flow (in case of rivers)

3.2. Collection of samples.....

3.2.1. Lake water

3.2.2. River (stream) water

3.2.3. Plankton

- Fixation of the samples is necessary on site.

3.2.4. Sediment

4. Transportation and storage of samples (by Dr. Sase & Mr. Kobayashi, NC).

4.1. Water samples

- Some explanation about the storage in cool and dark

4.2. Sediment

4.3. Plankton (diatom)

5. Analysis in laboratory(by Prof. Ebise, Dr. Khodzher, Prof. Fukuhara, Prof. Kawakami, Dr. Koshikawa (NIES) with Dr. Sase, NC)

5.1. Analytical methods

5.1.1. Water

- Additional descriptions about Gran’s plot titration method for alkalinity, SS, and chlorophyll a, total P, total N
- Clarification of the method for Al compounds
- Harmonization with wet deposition monitoring for pH and EC

5.1.2. Plankton

5.1.3. Sediment

- Additional description of ICP MS for Pb and S stable isotopes
- Deletion of turbidimetry and addition of HPLC method for SO_4^{2-}

6. Quality assurance/quality control program (edited by Dr. Sase, NC with Mr. Nakayama, NC)

6.1. Introduction

6.2. Data quality objectives (DQOs)

6.3. Quality control in sampling/chemical analysis organizations

6.3.1. On-site measurement and sampling

6.3.2. Measurement/analysis in laboratory

6.3.3. Cation and anion balance

6.4. Site performance audit and laboratory audit

6.5. External quality assurance program

6.6. Training programs

7. Data control and reporting ...(by Mr. Kobayashi and Dr. Sase, NC)

7.1. Data control

- Data control, data check using R1 and R2

7.2. Data reporting

- Reporting digit and/or decimal places will be clarified.
- Reporting format

8. Future direction

- Bio-indicators including diatoms, invertebrate and fishes (by Prof. Fukuhara)
- Catchment/watersheds analysis (by Dr. Sase, NC)
- Research needs (by Dr. Khodzher with members)

References

Photos

Appendix.....

- Tables showing sensitivity of soil type and geology to acid deposition (by Prof. Ohta)
- An example of site information will be shown (by NC)
- Definition and meaning of the parameters (by Prof. Ebise)
- Comparison data between the pH 4.8 methods and Gran's Plot titration method for Alkalinity (by Prof. Kawakami)
- An example for the data reporting (by NC)

Schedule on the revision of the Technical Manual

Possible schedule

April 2008: Appointment of the membership of the Expert Group

June 2008: First meeting of Expert Group. Review of Existing Manual

Mid2008 – the end of April2009: Preparation of the first draft of the Technical Manual

June or July 2009: Second meeting of the Expert Group to brush up the draft Technical Manual

At SAC9 (autumn 2009): Submission of the draft Technical Manual to SAC for comments

Middle of 2010: Third meeting of the Expert Group to finalize the Technical Manual

At SAC10 (autumn 2010): Submission of the Technical Manual to SAC for adoption