

EANET NEWSLETTER



ACID DEPOSITION MONITORING NETWORK IN EAST ASIA



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SHAPING EANET'S FUTURE

In 2021, the EANET continues to implement the decisions of IG22 regarding the expansion of the scope of the EANET Instrument to allow the Network to work on wider air pollution issues.

Subsequently, in April 2021, the Participating Countries convened at the Working Group Meeting in 2021 Session 1 (WG2021-1) to discuss the first draft supplementary document to EANET Instrument and other supporting documents. In the meantime, the Network continues to implement its monitoring activities, research, training, and awareness-raising events as presented in this issue of the EANET Newsletter.

Curious about what took place in the past months? Discover more inside!



By Tomi Haryadi
Coordinator, Secretariat for the EANET

On 5th June, people around the globe celebrated World Environment Day 2021 with the theme "Ecosystem Restoration". This year's celebration was held in more than 150 countries through an online campaign due to the COVID-19 pandemic, aiming to spread awareness on the importance of preserving our nature.

Ecosystem restoration means assisting in the recovery of ecosystems that have been degraded or destroyed and conserving the still intact ones. As a result, healthier ecosystems with richer biodiversity will yield greater benefits such as more fertile soils, bigger yields of timber and fish, and larger stores of greenhouse gases.

This year's theme on ecosystem restoration is closely linked to the EANET's efforts for 20 years concerning acid deposition. Acid deposition happens mostly because of human activities, from burning fossil fuels by coal-burning power plants, factories, and automobiles. When fossil fuels are burnt, sulfur dioxide (SO₂) and nitrogen oxides (NO_x) are released into the atmosphere and react with water, oxygen, and other substances to form mild sulfuric and nitric acid solutions, generally called acid deposition. The substances could be deposited in wet precipitation such as rain, snow, fog, or dry (air) with high levels of nitric and sulfuric acids.

This dangerous precipitation can have some serious consequences on the ecosystem. In particular, it has many ecological effects, particularly on lakes, streams, wetlands, and other aquatic environments. The exposure of acid deposition to water bodies increases its acidity. It causes waters to absorb the aluminium that makes its way from soil into lakes and streams.

The changes in water chemical composition may impact less tolerant aquatic species such as crayfish, clams, fish, and many others. It may also potentially disturb the food chain of non-aquatic species in an interconnected ecosystem, including humans.

For 20 years, the EANET has been successfully developing sound evidence and data related to acid deposition and its impacts in the region. It has helped the policymakers make informed decisions and train the relevant officers to monitor and research this issue. With that in mind, the Participating Countries have expressed their hope for the EANET to contribute more to the region by starting to tackle wider air pollution issues.

Therefore, at the twenty-second session of the Intergovernmental Meeting (IG22) on EANET in November 2020, the Participating Countries agreed to expand the scope of the EANET Instrument to allow the EANET to work on wider air pollution issues. Following the Decisions of IG22, the efforts continue in 2021 to prepare key documents to support the expansion of the scope of the EANET Instrument.

In April 2021, the Participating Countries convened to discuss the draft text of the supplementary document to EANET Instrument during the Working Group Meeting in 2021 Session 1 (WG2021-1). In addition, the WG2021-1 also discussed the draft of the project fund mechanism to support the implementation of non-core activities of EANET in line with the expansion scope.

The discussion continues throughout the year, aiming to prepare final documents for submission to IG23 in November 2021. Once the arrangements of its expansion of scope are finalized, the EANET will begin to tackle wider air pollution issues.



The Working Group Meeting in 2021 Session 1



The Working Group Meeting in 2021 Session 1 for the EANET (WG2021-1) was held virtually from 20-22 April 2021. The meeting made good progress on several key results concerning the EANET's expansion of scope.

Nearly 70 participants, including members from the EANET Participating Countries, joined the WG2021-1 meeting.

At the meeting, the Participating Countries showed their keen interest in exchanging and brainstorming on the possible ways to prepare necessary arrangements for the expansion of the scope of the EANET.

Co-chaired by Thailand and by the Philippines, the session started with Welcome Remarks from Dr. Isabelle Louis, Deputy Regional Director, United Nations Environment Programme for Asia & the Pacific, followed by Opening Remarks by Dr. Shiro Hatakeyama, Director General, Asia Center for Air Pollution Research.

The Working Group Meetings in 2021 Session 1 and 2 were established, following the decision of the IG22, in November 2020, to facilitate the Participating Countries' work on necessary arrangements for the expansion of the scope of the EANET Instrument.

In the meeting, the Participating Countries had the opportunity to share their views on the initial draft text of the Supplementary Document to the EANET Instrument. On the second and third days, the Participating Countries reviewed other key documents, such as the proposed arrangements for the EANET project fund.



The discussions held at this meeting will continue during the WG2021-2 in August 2021 before submitting the final documents to the IG23 in November 2021.

Discover the virtual meeting's pictures on [Flickr](#).

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Second Lead Authors' Meeting and Second Drafting Committee Meeting for the Fourth Periodic Report on the State of Acid Deposition in East Asia



The Second Lead Authors' Meeting (LA2) and the Second Drafting Committee Meeting (DC2) for the Fourth Periodic Report on the State of Acid Deposition in East Asia (PRSAD4) were held on 9 March 2021, virtually.

PRSADs are published every five years as comprehensive scientific assessment reports describing the outcome of EANET's monitoring activities.

The meeting was organized online by the Network Center (NC) for the Acid Deposition Monitoring Network in East Asia (EANET), Niigata, Japan.

Drafting Committee (DC) members from 13 participating countries of the EANET, namely, Cambodia, China, Indonesia, Japan, Lao PDR, Malaysia, Mongolia, Myanmar, Philippines, Republic of Korea, Russia, Thailand, and Viet Nam, participated in the meeting. The NC, the EANET Secretariat, resource persons, and observers also joined the meeting to discuss the PRSAD4 preparation.

Dr. Shiro Hatakeyama, the Director General of the NC, delivered the opening remarks and Prof. Fang Meng, Chinese Research Academy of Environmental Sciences, delivered the opening address as the Chairperson of the Drafting Committee.

The lead authors of the respective chapters, among which Dr. Sergey Gromov (Russia), Prof. Kazuhide Matsuda (Japan), Dr. Park Jin-soo (Republic of Korea), Dr. Keiichi Sato (Japan), Prof. Atsushi Kume (Japan), and Dr. Toshimasa Ohara (Japan), presented and discussed with participants the planned detailed structure and contents of the PRSAD4. Main discussions concerned the usage of data, calculation methods, and the process to follow to submit questions to each lead author and contributor.

The Drafting Committee's Secretariat presented the Consideration on Further Process of Report Preparation, as well as the draft Summary of the Twentieth Anniversary of EANET, and the session discussed their content.

The Third Lead Authors' Meeting (LA3) and the Third Drafting Committee Meeting (DC3) for PRSAD4 will take place virtually on August 4th and 5th 2021.

[Access and read the previous publications of the Periodic Report on the State of Acid Deposition in East Asia since 2006.](#)

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EANET 2021 Individual Training and Research Fellowship Call for Applications



Among EANET's main activities, the promotion of research and studies related to acid deposition and air pollution problems is key. In 2021, the Network Center, based in Niigata, Japan, will host the EANET 2021 Individual Training and Fellowship, virtually.

EANET 2021 Individual Training Webinars

From 4 to 21 November 2021, the Network Center (NC) will hold Individual Training webinars to improve acid deposition monitoring capabilities in the Participating Countries.

National Focal Points (NFPs) from EANET Participating Countries will nominate suitable candidate trainees. The selected trainees are expected to present their organization, attend discussions on the different training subjects and prepare a final presentation gathering the training's results. All meetings will take place via an online platform due to COVID-19 restrictions.

Observers from EANET Participating Countries are also invited to attend the Individual Training and may get in touch with the NC to register for the webinars.

To complete the application, NFPs must submit the Individual Training application form before 16th July 2021 and send it to the Planning and Training Department of the NC.

EANET 2021 Research Fellowship

The annual research fellowship program of the Network Center has been implemented since 2005. Young researchers from the EANET Participating Countries are invited every year for approximately two months at the Asia Center for Air Pollution Research (ACAP) in Niigata, Japan, to carry out the fellowship research related to the objectives of EANET and develop their research papers. This year, the program will be implemented using an online platform due to COVID-19 restrictions.

EANET NFPs, SAC members, Heads of National Centers, and QA/QC Managers are invited to inform their national agencies and/or research institutes of this opportunity and encourage younger and promising researchers working in the field of air pollution, co-benefits, etc. to apply for this program.

To complete the application, NFPs must submit the Fellowship application form to the Planning and Training Department of the NC before 16th July 2021.

[See here the List of Potential Research Themes.](#)

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Joint Projects of the EANET with Participating Countries – Catchment Analysis in Thailand



Scientists from the EANET Participating Countries and the Network Center (located in Niigata, Japan) have been promoting joint research projects related to the EANET. Consequently, the Network Center, in cooperation with the Thai Royal Forest Department, and the Environmental Research and Training Centre (ERTC), Thailand, conducted a joint research project on catchment analysis in Thailand to understand atmospheric deposition and its effects from 2005 to 2015.

Air pollution consists of significant amounts of aerosols (particulate matter) and trace gases (NO_x, SO_x, CO, and others). These air pollutants deposit on the earth's surface through dry depositions and wet depositions (when dissolved in water droplets in clouds).

Wet and dry depositions of air pollutants cause detrimental impacts on the ecosystems and environment, including the acidification of the water bodies, such as rivers and lakes.

The joint research project aimed to study the atmospheric wet deposition of acidic components and other relevant pollutants including elemental carbon, as well as their influence on water chemistry, chemical properties of soil, nutrient fluxes in soil-plant system, and sulfur dynamics in forest ecosystems.

For the catchment analysis, scientists from the Network Center established a study plot in a dry evergreen forest in Sakaerat Silvicultural Research Station, Nakhon Ratchasima Province, northeastern Thailand.

The surveys on-site allowed researchers to accumulate nine full years of data, from October 2005 to December 2014.

Based on these results, several scientific papers were published in international journals focusing mainly on atmospheric deposition, soil and stream water chemistry. Ultimately, these scientific outputs significantly contributed to enhancing the global understanding of atmospheric deposition and its effects on forest ecosystems in the region.

Read the Report of the joint research project on catchment analysis in Thailand in the [EANET Science Bulletin, Vol 5](#).

The authors acknowledged Jesada Luangjame, Thiti Visaratana, and Bopit Kietvuttinon, Royal Forest Department for their great contribution to the Sakaerat project including other colleagues who were involved in the project. The study was supported financially by the Grant-in-Aid for Scientific Research on Innovative Areas (JP20120012) from the Ministry of Education, Culture, Sports, Science, and Technology (MEXT), Japan, the Environment Research and Technology Development Fund (C-052, C-082 and B-0801) from the Ministry of the Environment of Japan, and Asia-Pacific Network for Global Change Research (APN).

Photo credits: Sakaerat forest by Sase H, all rights reserved.

Joint Projects of the EANET with Participating Countries – Development of Emission Inventory Manual for Mongolia



Scientists from the EANET Participating Countries and the Network Center (located in Niigata, Japan) have been promoting joint research projects related to the EANET. In response to Mongolia's request, an Emission Inventory Manual for Mongolia was developed and published in 2018 to provide key scientific data, including estimates of emissions of air pollutants, for policymakers to develop air pollution control measures.

Mongolia is facing serious air pollution problems, especially in the capital, Ulaanbaatar city, where the population density is high. Most emissions of air pollutants result from the use of coal in power plants and domestic cooking. The level of air pollutants is normally high during the winter season when coal is also used for domestic heating. Emissions of air pollutants from road traffic are also quite significant. The major air pollutants detected in Ulaanbaatar city are sulfur dioxides (SO₂), particle matters (TSP, PM₁₀, PM_{2.5}), and nitrogen dioxide (NO₂).

To assist Mongolia in tackling air pollution issues, several international donors and agencies (World Bank, Asian Development Bank, Japan International Cooperation Agency) are developing and implementing projects for air pollution mitigation in Ulaanbaatar City. Since 2016, Clean Air Asia has been working closely with the Ministry of Environment and Tourism of Mongolia (MET) and the National Agency for Meteorology and Environmental Monitoring (NAMEM) on addressing air pollution at a national level.

In response to Mongolia's request, the Asia Center for Air Pollution Research (ACAP), in collaboration with SUURI-KEIKAKU Co., Ltd, has developed an Emission Inventory Manual for Mongolia, as a part of the Integrated Programme for Better Air Quality in Asia (IBAQ Programme) of Clean Air Asia (CAA) with financial support by the Ministry of Environment, Japan (MOEJ).

Available in Mongolian, English, and Japanese, the Emission Inventory Manual will be used for developing Mongolia's national emission inventory of air pollutants and further support the formulation of effective air pollution control measures.

Read the summary of the Emission Inventory Manual in the [EANET Science Bulletin, Vol 5.](#)

The authors appreciated the cooperation and assistance received from the Ministry of Environment and Tourism of Mongolia (MET), the National Agency for Meteorology and Environmental Monitoring (NAMEM), Clean Air Asia (CAA) and the Japan International Cooperation Agency (JICA).

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Scientific & Technological Research Papers from Participating Countries – Airborne Ammonia Concentrations in the Baikal Region



Scientific and Technological Research Papers from Participating Countries are research articles written by scientists from the EANET Participating Countries, in collaboration with the EANET Network Center, in Niigata, Japan. They are published in the EANET Science Bulletin and have required the use of EANET data.

Alisa Trifonova-Yakovleva and Sergey Gromov, from Russia, estimated airborne concentrations of ammonia (NH_3) in the Baikal region by using measurements conducted at two EANET monitoring sites and compared with satellite data (Infrared Atmospheric Sounding Interferometer (IASI)).

Ammonia (NH_3) is an important air pollutant that may eventually fall back to earth by means of wet and dry acid deposition. It is emitted both naturally and from anthropogenic sources such as animal husbandry, the use of nitrogen fertilizers, and biomass burning.

Atmospheric deposition containing NH_3 , aside from acidification impacts through the oxidizing to nitric acids in rain waters or on wet surfaces, cause also other negative effects on ecosystems, such as eutrophication and loss of biodiversity.

In addition, when NH_3 reacts with other atmospheric constituents, it forms particulate matter (e.g. $\text{PM}_{2.5}$) triggering harmful impacts on human health.

For this research study, Alisa Trifonova-Yakovleva and Sergey Gromov used satellite data for better coverage and understanding of the air pollution at a wider regional level and ground-based measurements (filterpack method) at the Russian Litstvyanka and Mondy EANET stations from 2015 to 2017.

The goal of this study was to understand the constant levels of NH_3 concentrations or their higher values of episodic nature in different locations within the Baikal Region, season-to-season.

More precise estimations of the regional airborne NH_3 concentrations are indeed necessary to enhance the understanding of the scales and extension of detrimental impacts of air pollution and acid deposition on the environment and on human health.

Discover the results of the study by reading the full article in [the EANET Science Bulletin, Vol 5.](#)

This study was carried out in the framework of the Research Project AAAA-A20-120013190049-4 “Development of methods and technologies for monitoring of environmental pollution under the influence of transboundary pollutants transport (UNECE: EMEP, ICP IM) and acid deposition in East Asia (EANET)”.

Processing of satellite measurement data was performed as part of the research theme under the Plan of Basic Scientific Research of the State Academies of Sciences No. 0148-2019-0009, AAAA-A19-119022190173-2 “Climate changes and their consequences for the environment and the life of the population in Russia”.

Photo credits: [Baikal ice on sunset, by Sergey Pesterev](#), free of the copyright license.

EANET Research Fellowship Programme – Study on the impacts of air pollution transport and its effects to human health in Cambodia



The Acid Deposition Monitoring Network in East Asia (EANET)'s fellowship programme aims at funding researchers from the EANET's Participating Countries to carry out research pertaining to acid deposition at the Network Center in Japan.

Kong Savuth, from Cambodia, was awarded the EANET fellowship in 2018. Mr. Savuth's research described human health effects of exposure to air pollutants, namely, ozone (O₃) and particulate matter (PM_{2.5}) in reference to the WHO Air quality guidelines (2005).

PM_{2.5} can penetrate deep inside the lungs and contribute to increasing the risk of cardiovascular and respiratory diseases including lung cancer. According to recent epidemiological studies, reducing the annual average PM_{2.5} concentrations of 10 µg m⁻³ could result in a significant reduction of premature mortality.

Ground-level O₃ can cause respiratory problems leading to asthma, cough, inflammation of the respiratory tract, chronic bronchitis, and lung damage. A high-level concentration of O₃ also causes premature mortality.

WHO estimates that in 2016, some 58% of outdoor air pollution-related premature deaths were due to ischaemic heart disease and strokes, while 18% of deaths were due to chronic obstructive pulmonary disease and acute lower respiratory infections respectively, and 6% of deaths were due to lung cancer.

The researchers (Savuth and Yamashita) estimated premature mortality caused by the exposure to PM_{2.5} and O₃ in Cambodia by using PM_{2.5} and O₃ data simulated by CMAQ (Community Multiscale Air Quality – a chemical transport model) and Concentration-Response (C-R) functions.

Read the full study and its results, published in the [EANET Science Bulletin, Vol 5](#).

Under the EANET Research Fellowship programme 2018, this study was conducted at the Asia Center for Air Pollution (ACAP), Niigata, Japan. The researcher, Kong Savuth, acknowledged the support and facilities provide by ACAP and by the National Institute for Environmental Studies (NIES), Japan, for performing the research.

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EANET Meetings, Events and Training in 2021



AUGUST

-4 to 5/08: The 3rd Lead Authors' Meeting and the 3rd Drafting Committee Meeting for PRSAD4, virtual meeting.

-18 to 20/08: The Working Group Meeting (Session 2), virtual meeting.

SEPTEMBER

-1 to 2/09: The 22nd Senior Technical Manager's Meeting (STM22), virtual meeting

-early September: EANET Awareness Webinar, virtual event.

OCTOBER

-26-28/10: The 21st Session of the Scientific Advisory Committee (SAC21), virtual meeting.

NOVEMBER

-4 to 21/11: EANET Individual Training, webinar format.

-24 to 25/11: The 23rd Session of the Intergovernmental Meeting (IG23), format to be confirmed.

-23/11: The 20th Anniversary of EANET, format to be confirmed.

-26/11: EANET Science and Policy Dialogue, format to be confirmed.

DECEMBER

-EANET Research Fellowship Programme in 2021, August and December (2 months) 2021, virtual.

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