25 Years of Achievements of EANET and ACAP and Its Future Direction

Function of ACAP

Network Center of EANET
(Acid Deposition Monitoring Network in East Asia)

- Monitoring
- Data Analysis and Assessment
- Research
- Capacity Building
- Public Awareness
- Intergovernmental Dialog and Information Exchange

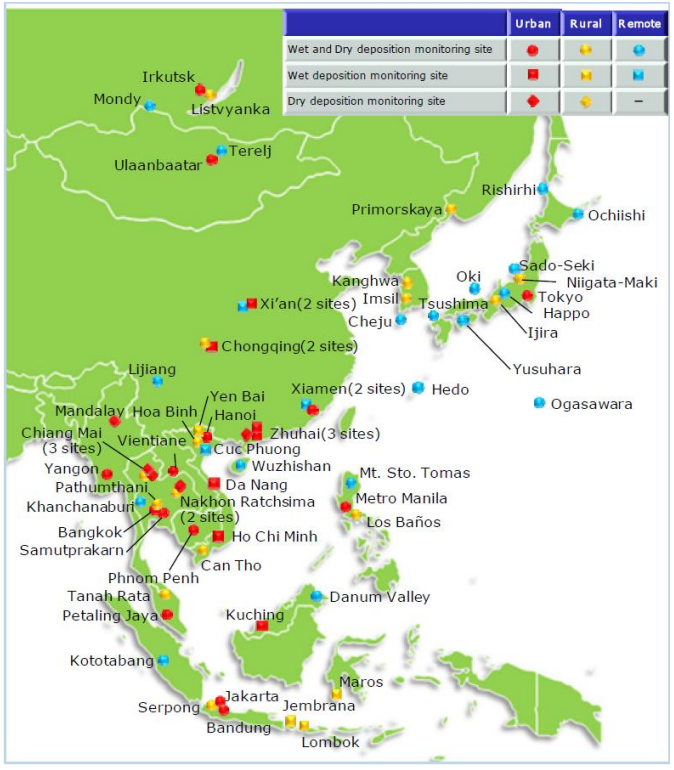
Independent Research Institute
on Various Environmental Issues

- **Research**
  - Emission inventory
  - Modeling
  - PM2.5 source identification
  - Ecosystem impacts
  - Health impacts
- **Public awareness**

EANET Achievement 1: Hight Quality and Opened Data

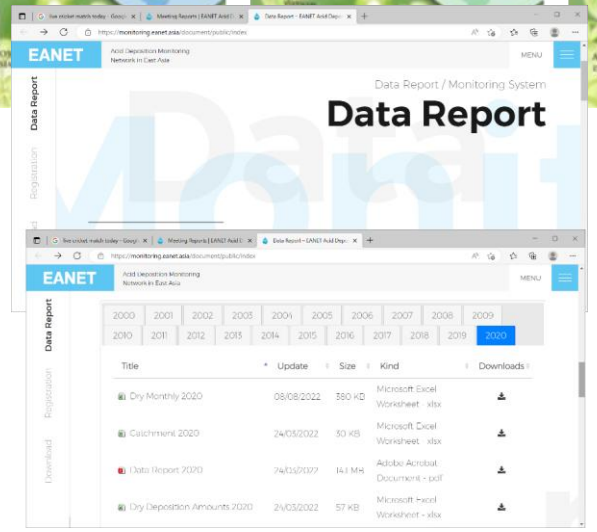
Coordinated Monitoring Network and Data with QA/QC

EANET Monitoring Sites

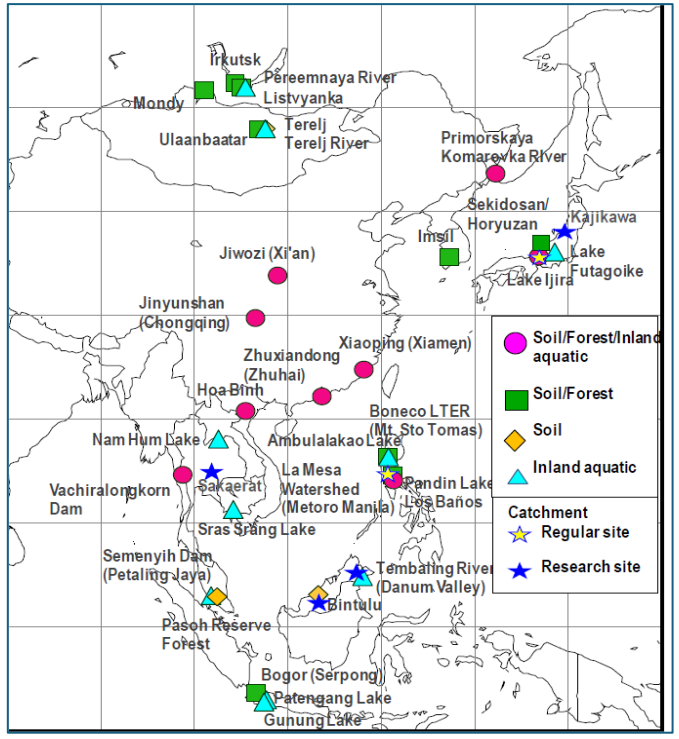


- **Wet deposition: 61 sites**
- **Dry deposition: 54 sites**

Successfully established and operating monitoring network in the region for 25 years



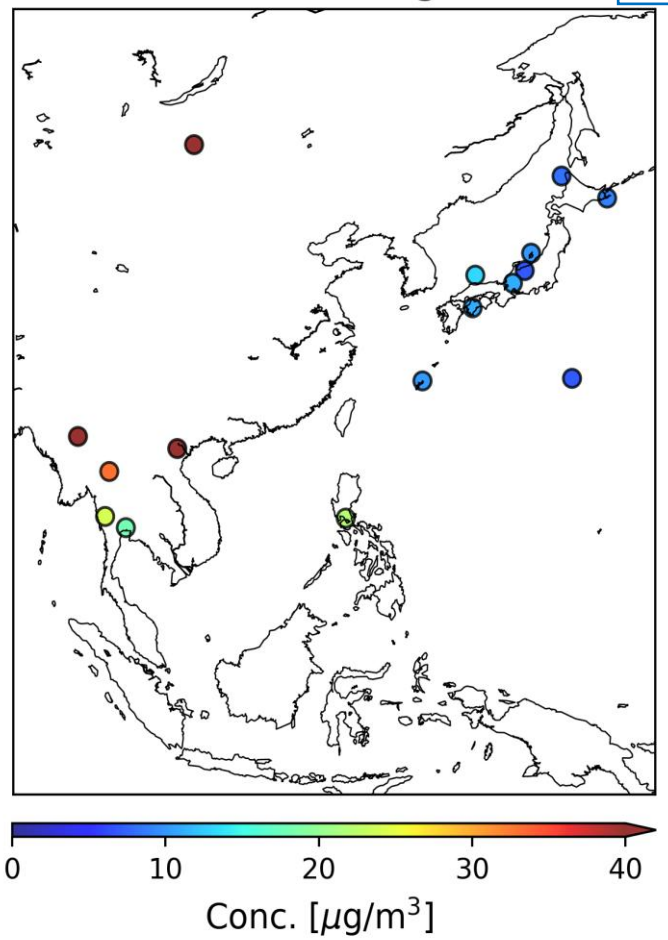
Ecological Impacts Monitoring Sites



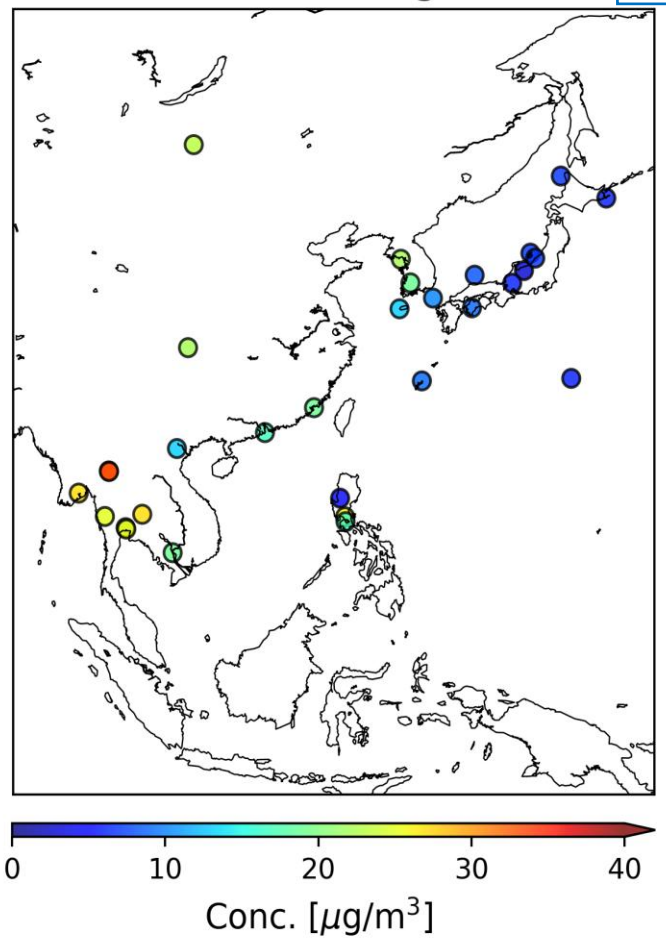
- **Soil and vegetation monitoring: 20 areas**
- **Inland aquatic environment: 19 lakes/rivers**
- **Catchment: 2 sites**

PM2.5 concentration in East Asia from EANET Data

EANET PM2.5 Monitoring result in 2015



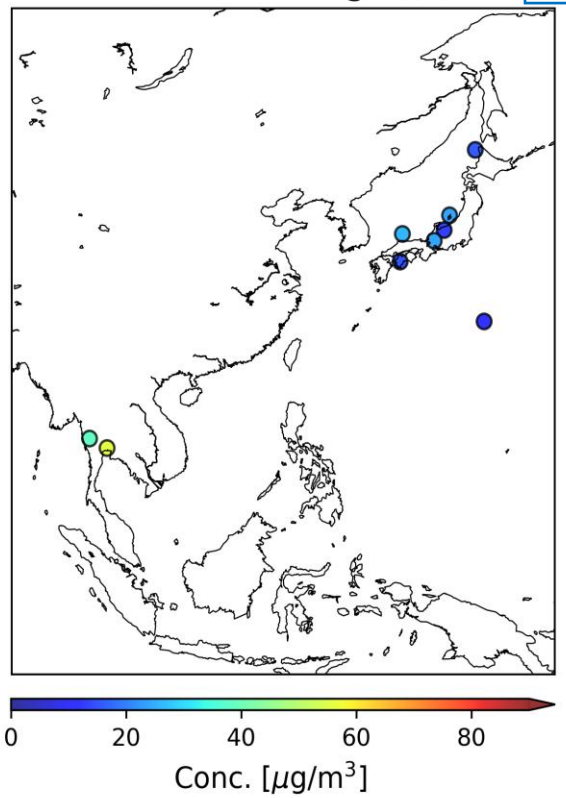
EANET PM2.5 Monitoring result in 2023



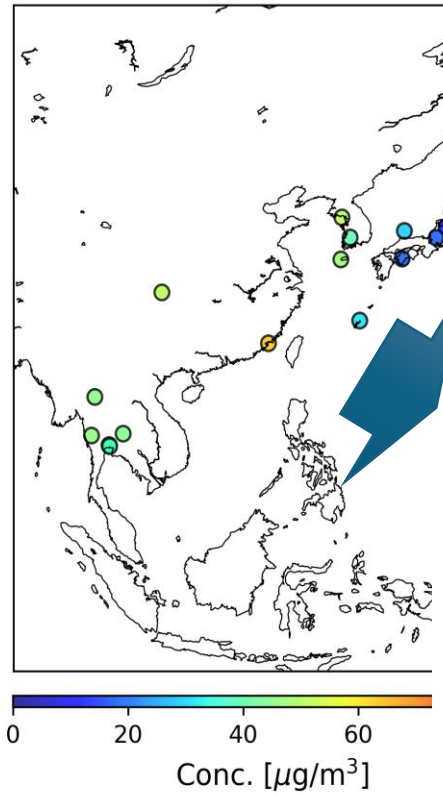
- PM2.5 data in Asia region has been accumulated for 2014.
- PM2.5 concentration is obviously decreased in EANET region.
- PM2.5 Monitoring sites are increased and still keep increasing in the EANET region

PM10 concentration in East Asia from EANET Data

EANET PM10 Monitoring result in 2000

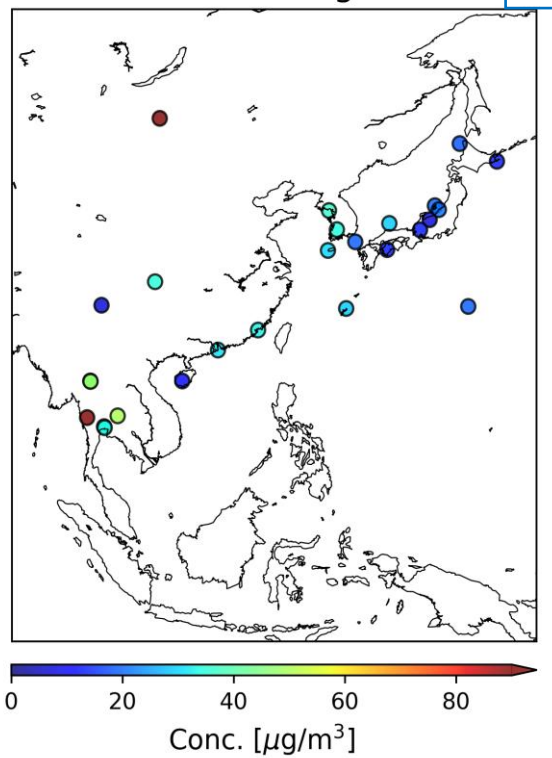


EANET PM10 Monitoring result in 2010

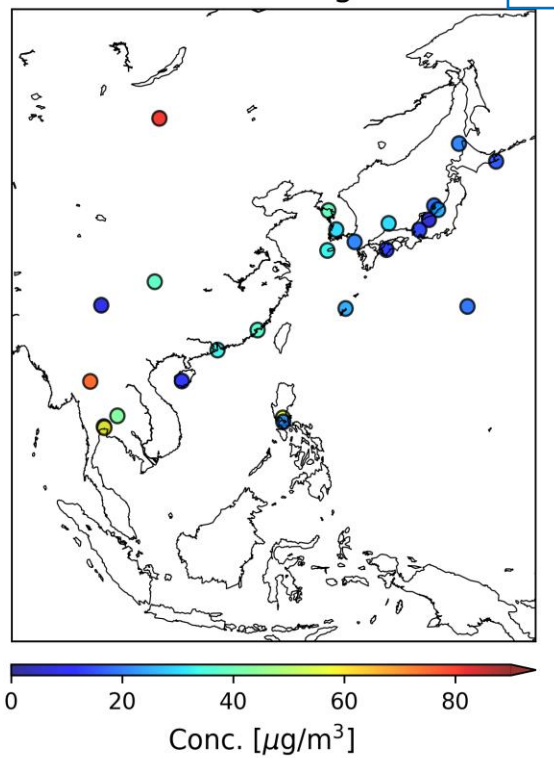


- PM10 data in Asia region has been accumulated for 2000.
- PM10 Monitoring sites has significantly increased in the EANET region.

EANET PM10 Monitoring result in 2020



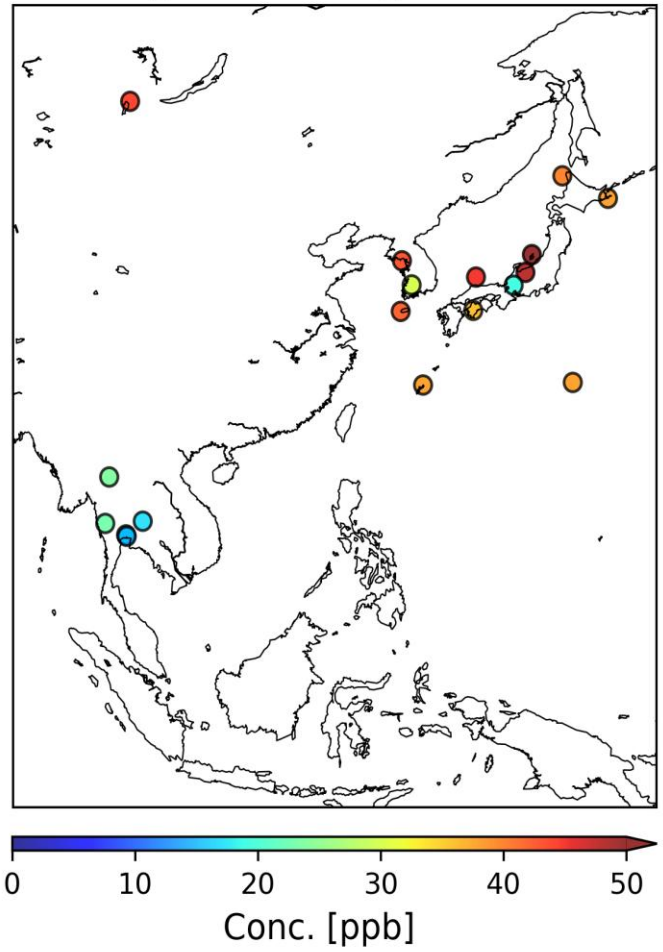
EANET PM10 Monitoring result in 2023



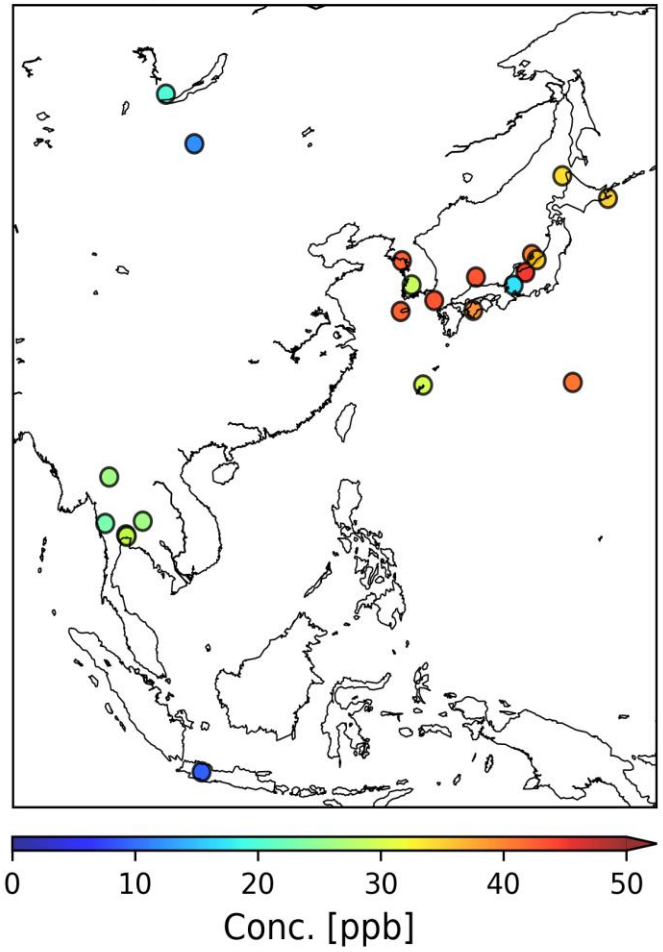
- PM10 concentrations in Japan, China, and R. of Korea are relatively low in the EANET region.
- PM10 concentrations in Mongolia and some Southeast Asian countries remain high.

Ozone Concentration in East Asia from EANET Data

EANET O_3 Monitoring result in 2010



EANET O_3 Monitoring result in 2020



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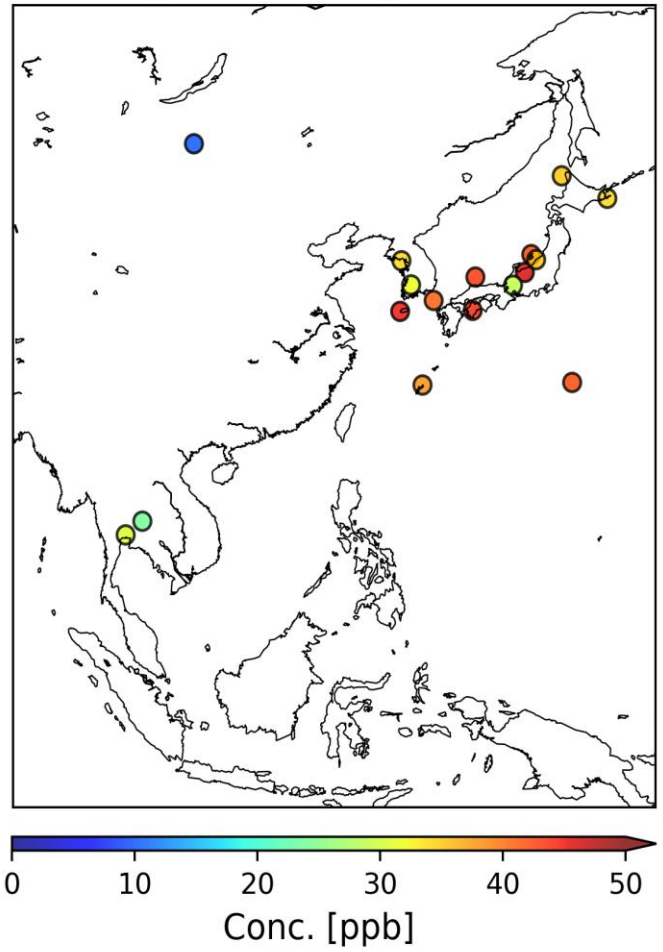


Source: ENET Data reports for the year of 2020, 2020, 2023

Achievement 2: Capacity Buildings

- Provided individual training for **250 people** on monitoring and measurement.
- Accepted research fellowship around **40 people** on various subjects.
- **Dozens** of on sites technical mission on monitoring and measurement in EANET PCs
- Installation of **ten** PM2.5 and Ozone monitors in EANET PCs

	Country	City	Institution	Produced by	Installation
PM2.5	Vietnam	HoaBinh	CENRE/ IMHEM	Environment S.A.	2015/2
	Myanmar	Mandalay	ECD	Environnment S.A.	2015/5
	Mongolia	Ulannbaater	NAMEM	Environnment S.A.	2015/10
	Indonesia	Jakarta	BMKG	Thermo	2016/7
	Cambodia	Phnom Penh	MOE	DKK-TOA	2017/4
	Philippines	Metro Manilla	EMB	DKK-TOA	2017/10
	Myanmar	Yangon	DMH	DKK-TOA	2018/3
	LAO PDR	Vientiane	NRERI	DKK-TOA	2018/11
Ozone	Cambodia	Phnom Penh	MOE GDEP	Dylec	2019/8

Future Direction: Next Mid-term Plan of EANET (2026-2030)

Expand EANET's scope from acid deposion to air pollution in 2021, and its related issues (cobenefit of air pollution and climate change)

IMPACT

Adverse impacts on the environment caused by air pollution and atmospheric deposition are prevented or reduced.

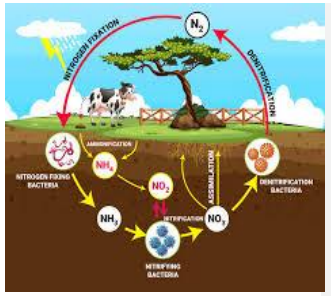
OUTCOMES

Especially focusing on $PM_{2.5}$ and its components, O_3, NOx, and NH_3

1. Understanding state of air pollution and atmospheric deposition is built through strengthened monitoring [focus on $PM_{2.5}$ and its components (e.g., inorganic ions), O_3, No_x, NH_3]
2. Decision-makers have increased access to evidence-based policy relevant information focusing on $PM_{2.5}$ O_3, No_x, NH_3
3. Cooperation on the issues related to air pollution and atmospheric deposition in the region is increased

NC proposed three pillars for the next EANET MTP

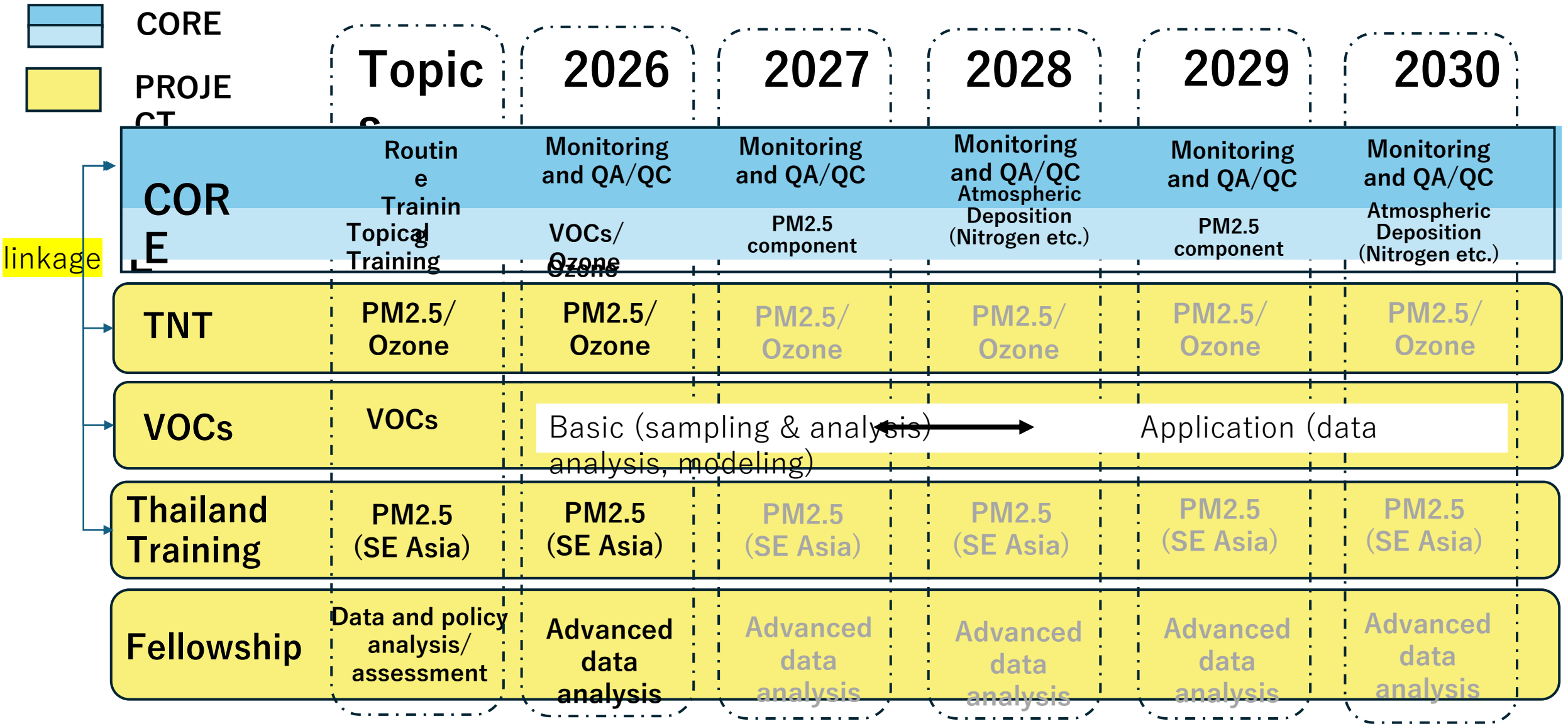
Sustainable Monitoring System



Nitrogen Flow and Nitrogen management

Co-benefits of Air pollution and Climate change countermeasures

Topics of Technical Training and Schedules in the Medium-Term Plan for the EANET (2026-2030)

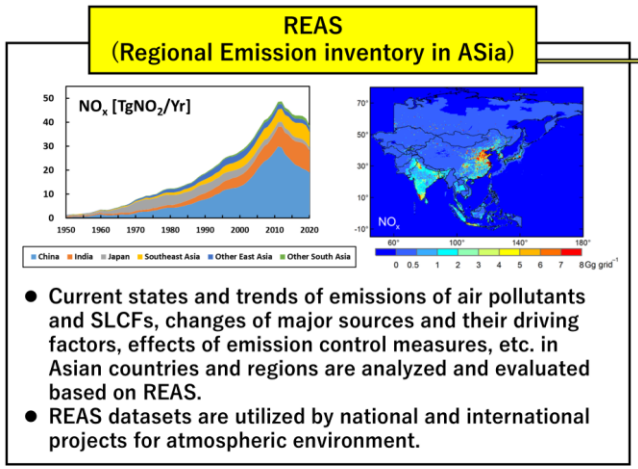


Introduction of ACAP, as Independent Research Institute

- **Research**
  - ➢ Emission inventory
  - ➢ Modeling
  - ➢ PM2.5 source identification
  - ➢ Ecosystem impacts
  - ➢ Health impacts
- **Public awareness**

J. Kurokawa and T. Ohara are Lead Authors of 2027 IPCC Methodology Report on Inventories for Short-lived Climate Forcers

Study on Emission Inventory of
Air Pollutants and Short-Lived Climate Forcers (SLCFs) in Asia



- Current states and trends of emissions of air pollutants and SLCFs, changes of major sources and their driving factors, effects of emission control measures, etc. in Asian countries and regions are analyzed and evaluated based on REAS.
- REAS datasets are utilized by national and international projects for atmospheric environment.

Contributions to mosaic emission inventories such as for TF-HTAP (The Task Force on Hemispheric Transport of Air Pollution) and Model Inter-Comparison Study for Asia (MICS-Asia)

Regional Emission inventory in ASia (REAS) Data Download Site

https://www.nies.go.jp/REAS/
Kurokawa and Ohara, Atmos. Chem. Phys., 2020.
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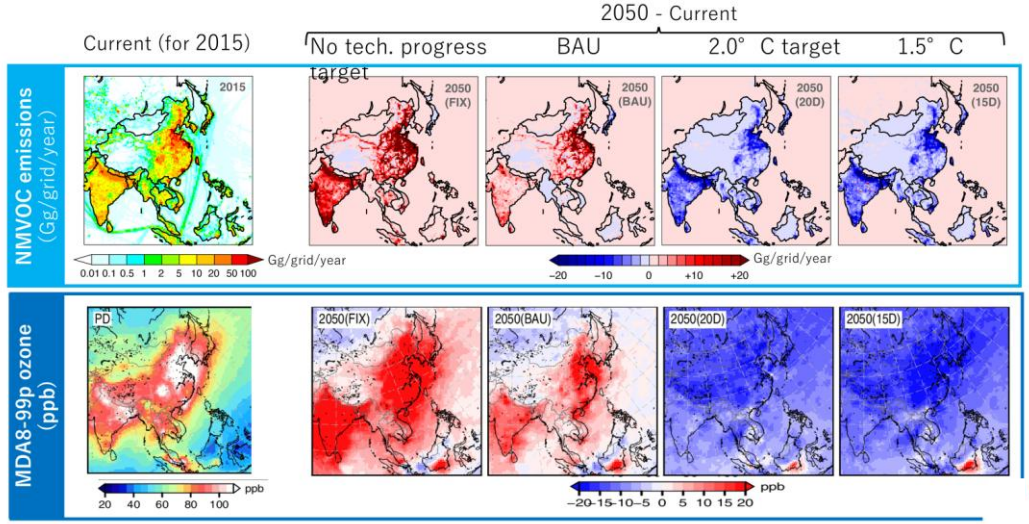

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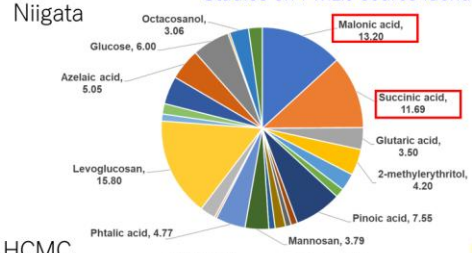
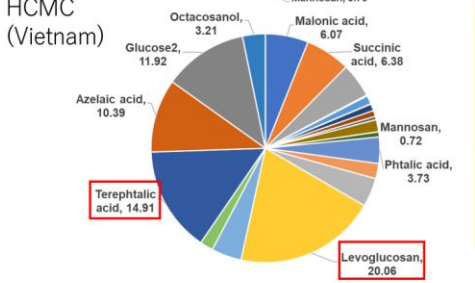
Studies on PM2.5 source identification in Niigata and SE Asian countries





Niigata-Maki monitoring station (9km Southwest From ACAP)

- Niigata has a higher ratio of dicarboxylic acids such as malonic acid and succinic acid than HCMC, and is considered to have a relatively high source contribution of secondary organic aerosol (SOA).
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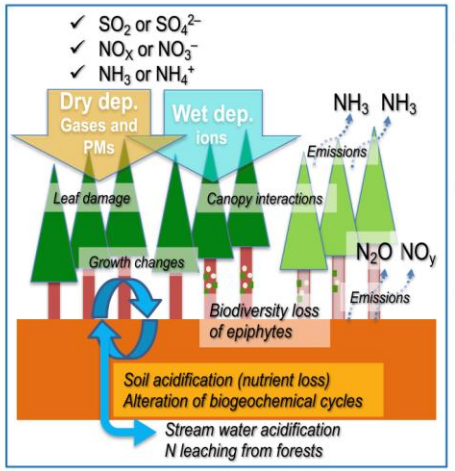
Studies on effects of atmospheric deposition on biogeochemical cycles in forest



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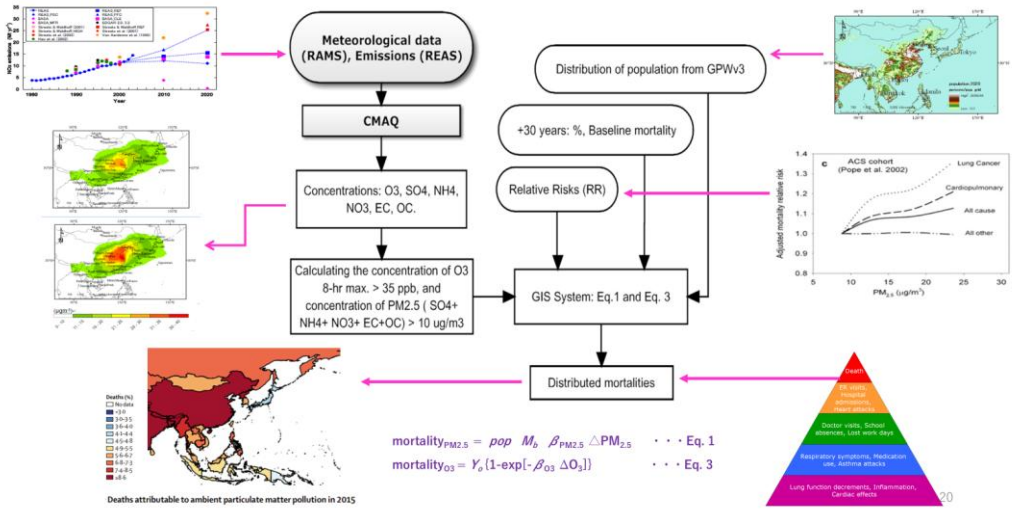
Premature mortality estimation as of health risk



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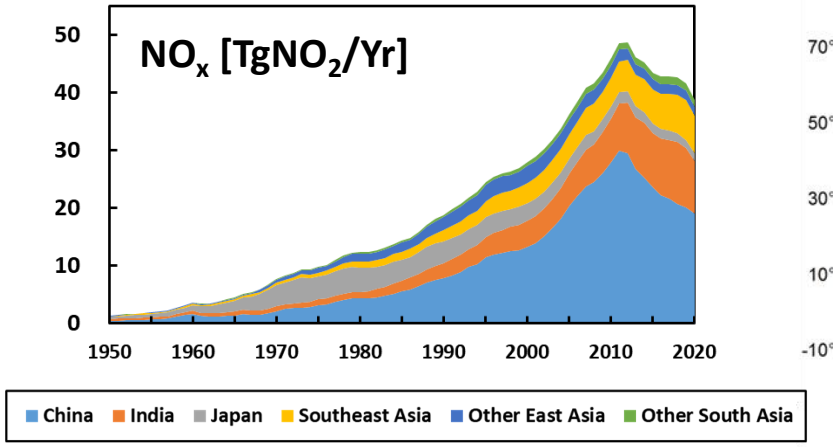

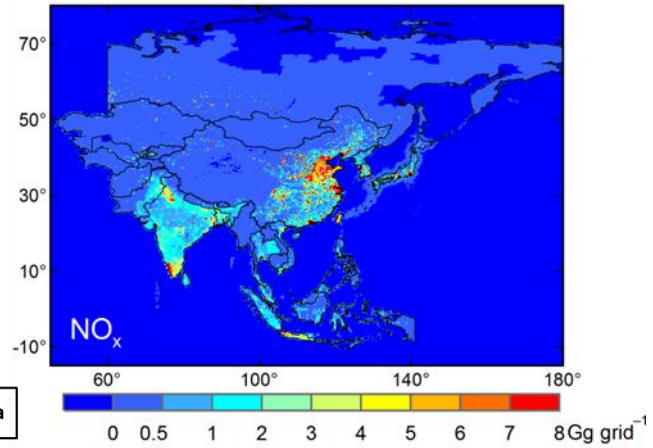

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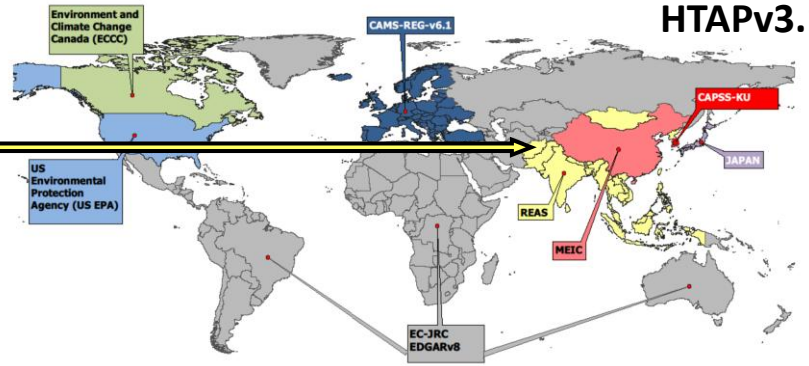
HTAPv3.1



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2027 IPCC Methodology Report on Inventories for Short-lived Climate Forcers

Lead Authors From ACAP

J. Kurokawa and T. Ohara

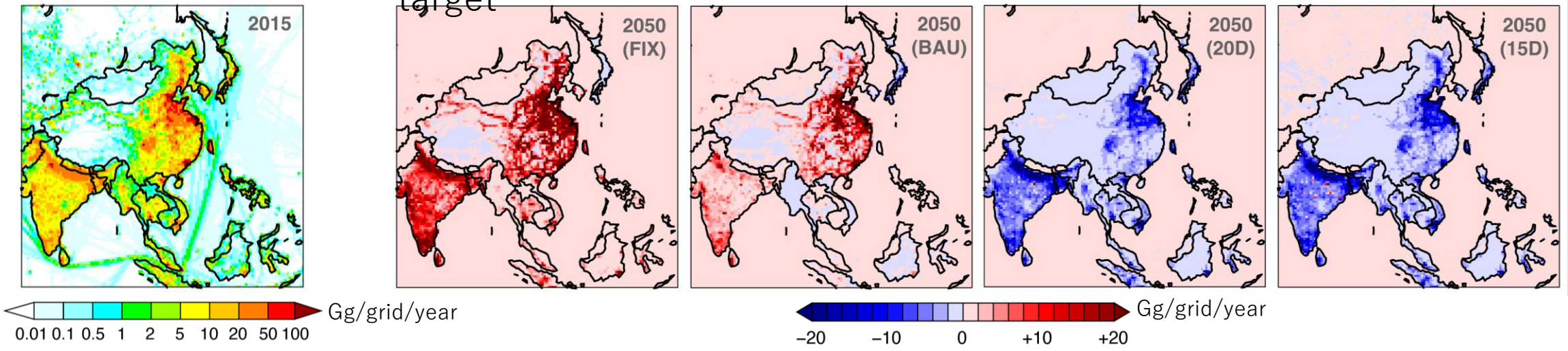
1st Lead Author Meeting (LAM1) for Zero Order Draft: 24-26 MAR 2025

Future projections of surface ozone based on 2050 scenarios

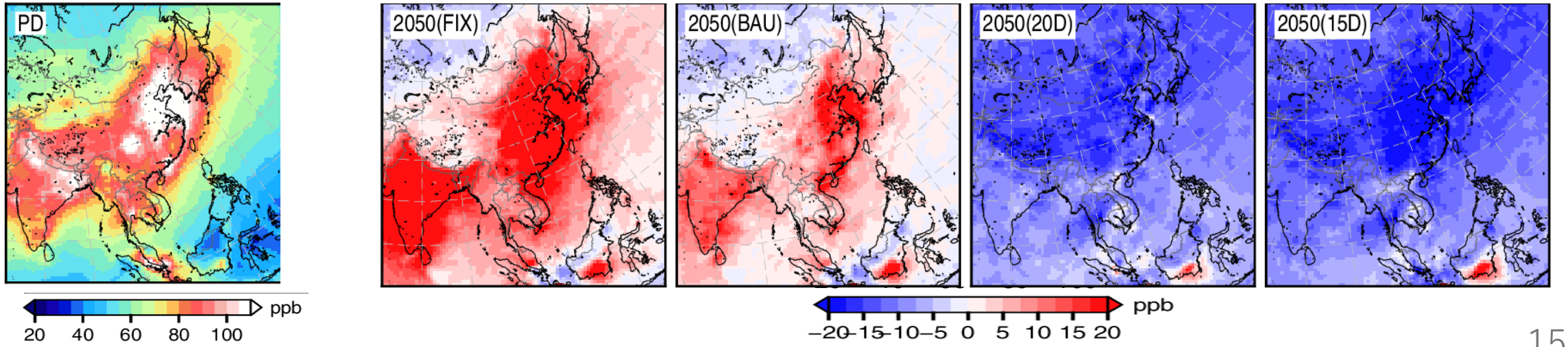
2050 - Current

Current (for 2015) | No tech. progress | BAU | 2.0° C target | 1.5° C target

NMVOC emissions (Gg/grid/year)



MDA8-99p ozone (ppb)



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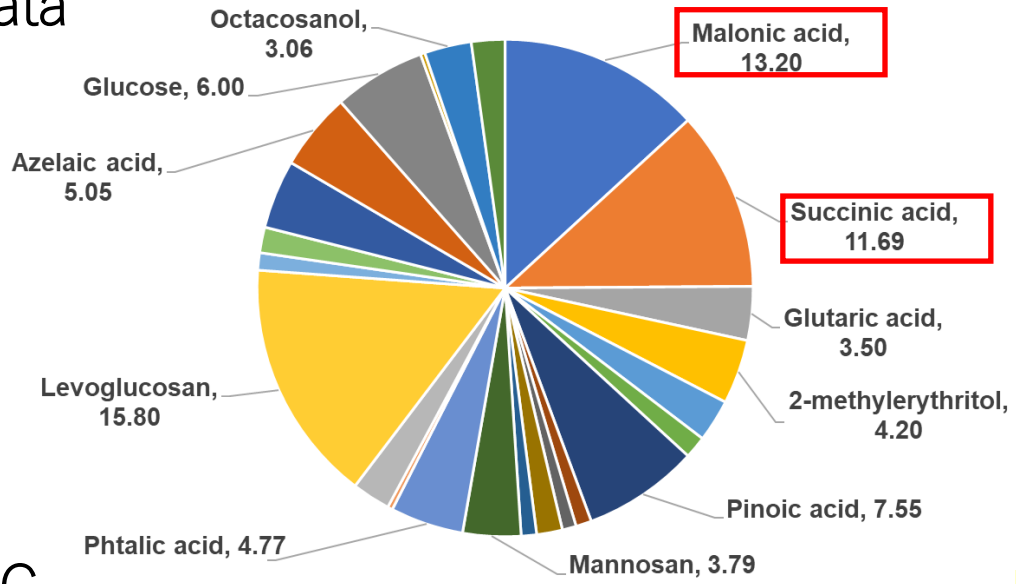
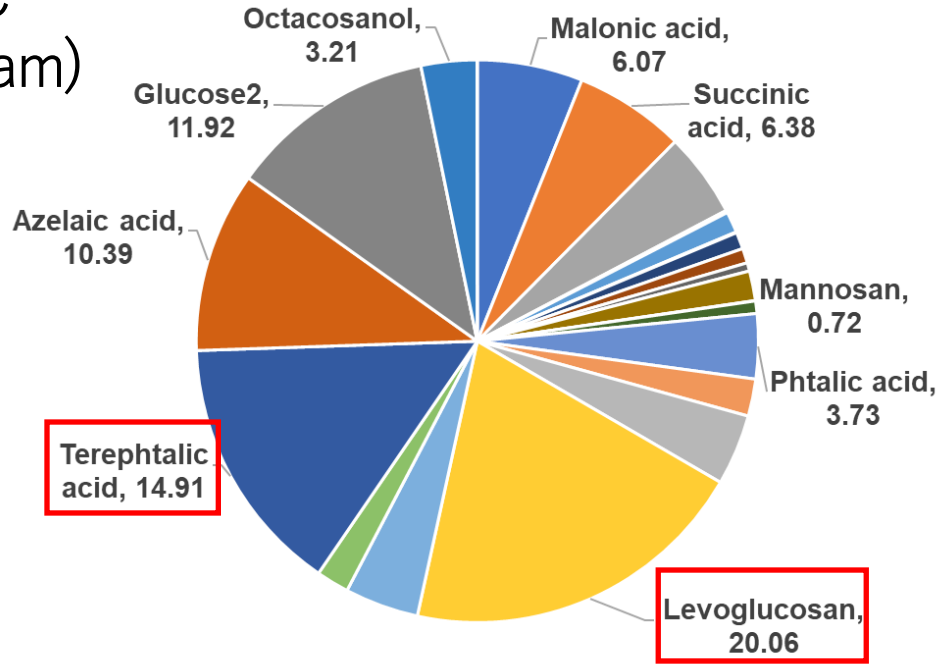
Niigata



HCMC (Vietnam)



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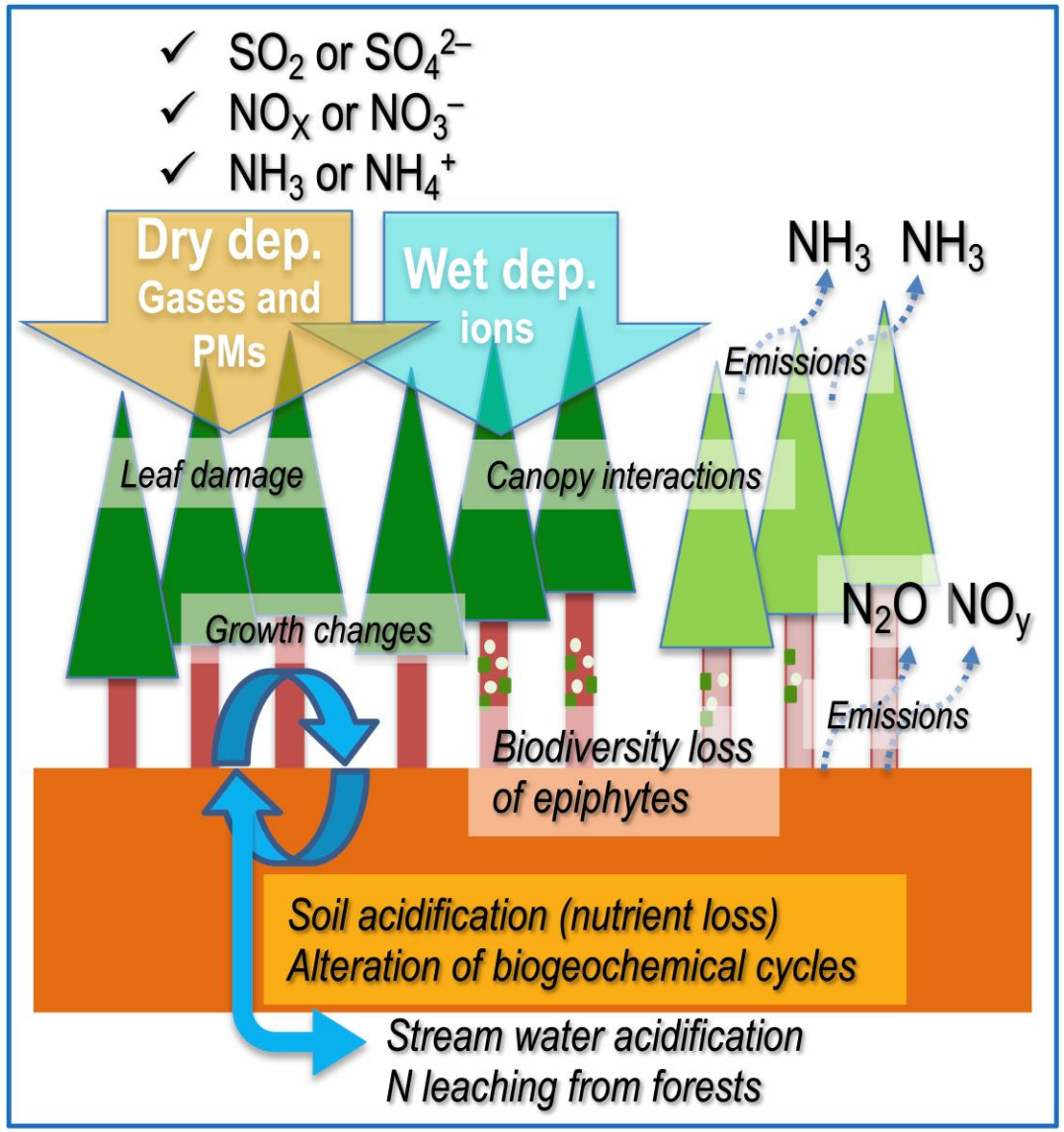

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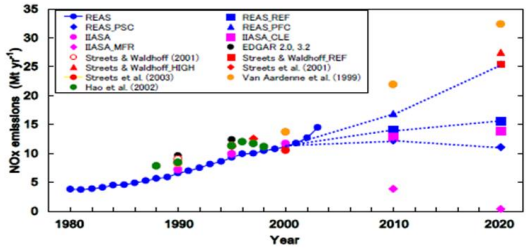


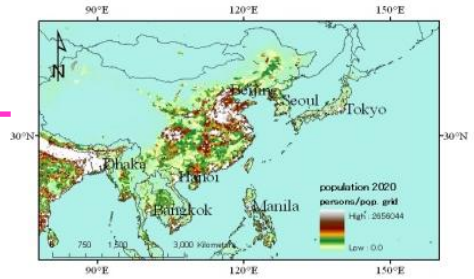
Meteorological data (RAMS), Emissions (REAS)

CMAQ

Concentrations: O3, SO4, NH4, NO3, EC, OC.

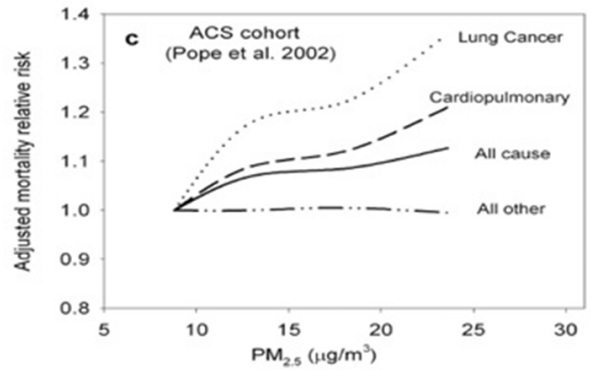
Calculating the concentration of O3 8-hr max. > 35 ppb, and concentration of PM2.5 (SO4+ NH4+ NO3+ EC+OC) > 10 ug/m3

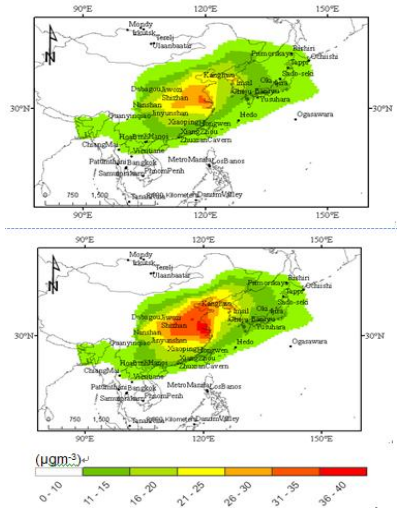
Distribution of population from GPWv3



+30 years: %, Baseline mortality

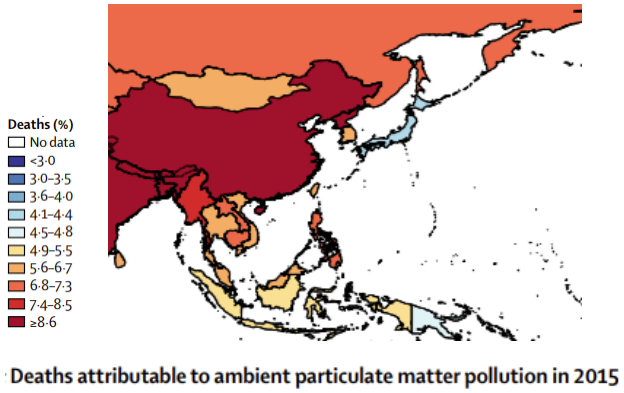
Relative Risks (RR)





GIS System: Eq.1 and Eq. 3

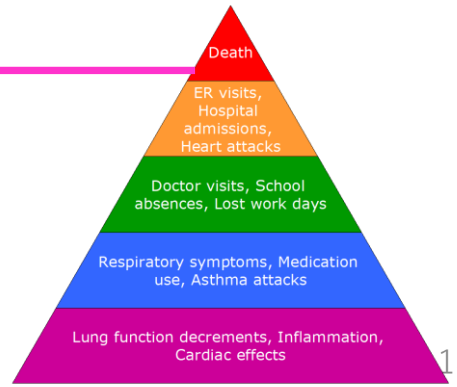
Distributed mortalities



Deaths attributable to ambient particulate matter pollution in 2015

$mortality_{PM2.5} = pop \ M_b \ \beta_{PM2.5} \triangle PM_{2.5}$ ・・・Eq. 1

$mortality_{O3} = Y_o\{1\text{-}exp[-\beta_{O3} \ \Delta O_3]\}$ ・・・Eq. 3



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