



Japan's International Cooperation

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c/c Chemicals Safety Division (mercury, chemicals)
Ministry of the Environment, Japan



MOYAI Initiative

- A Moyai-line linking Minamata and the World -



- Ministry of the Environment of Japan (MOEJ) introduced mercury MOYAI initiative at the diplomatic conference in 2013 where the Convention was adopted.
- MOEJ has been working with countries in need to support the implementation of the Convention.

Supporting Developing Countries

Networking: Building networks of mercury-related activities (e.g. monitoring) and information between Japan and partner countries

Assessment: Accelerating developing countries' efforts by supporting their situation assessments, taking advantage of Japan's experiences

Strengthening: Strengthening developing countries' mercury management by providing Japan's advanced technologies and know-how

Supporting developing countries for the ratification / implementation of the Convention

Leading Voices from Minamata

Awareness about the Convention: Holding Convention-related events and disseminating messages to the world

Technology and Knowledge Sharing: Introducing simple mercury analysis method, and hosting international academic forum on mercury

Environmental Rehabilitation: Supporting Minamata disease patients, promoting 'Moyai-naoshi' activities, and revitalizing society and its economy through environmental means

Disseminating Model Case of Pollution Control and Environmental Rehabilitation

Knotting Economy-Environment Moyai-line

*:Japanese term 'Moyai' literally means a bowline rope mooring boats together. It also refers to the cooperative works in local communities

Capacity Building for Mercury Monitoring

- Lectures/hands-on training of:
 - Manual active sampling
 - Measurement
 - Quality assurance/quality control
 - Use of the data
- Discussions for current/future monitoring



Method of Atmospheric Mercury Monitoring

- **Automated active sampling**

- Detailed temporal resolution
- Speciated mercury monitoring by chemical form
- High-cost instrument
- Skilled personnel is required

- **Passive sampling**

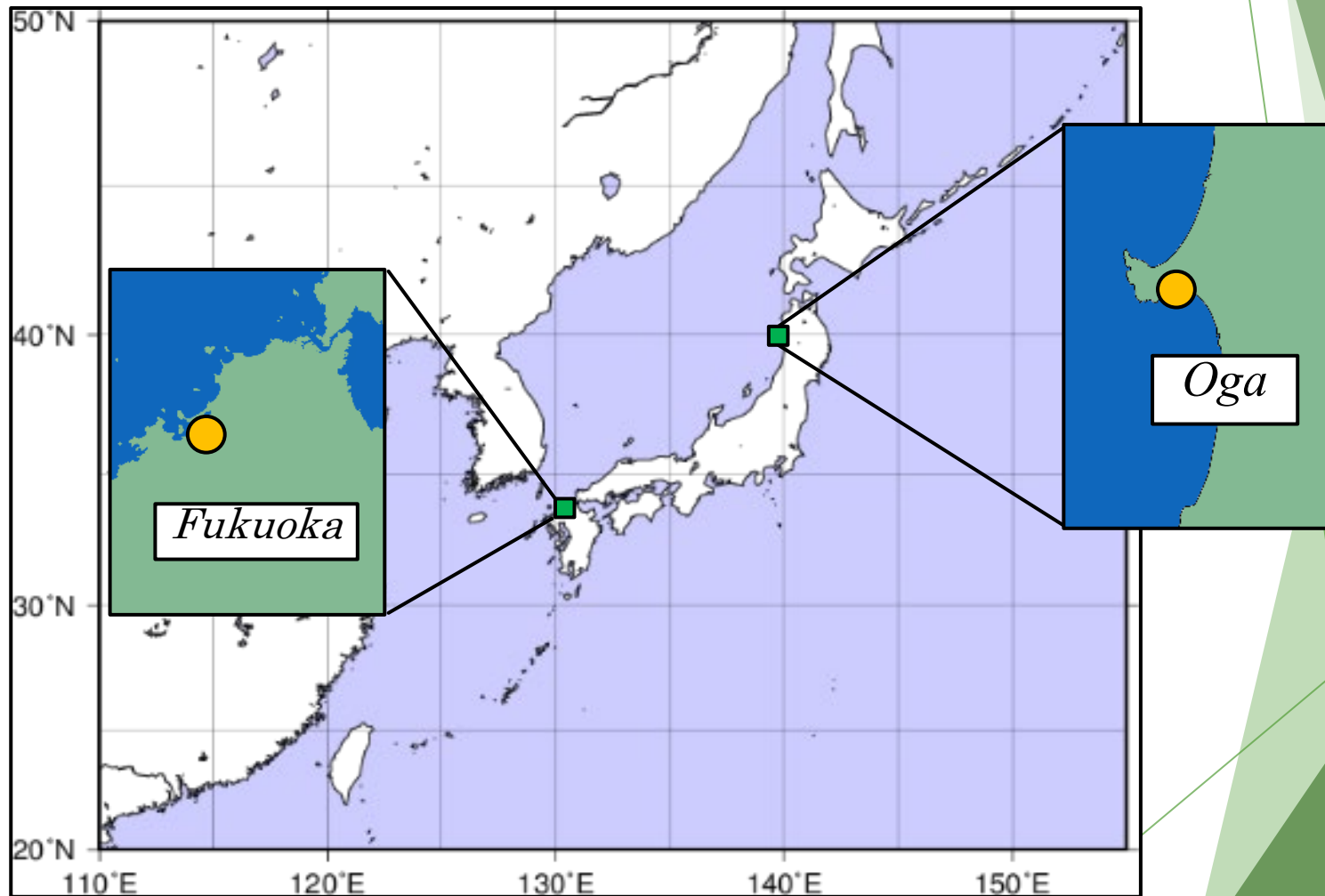
- Many site could be surveyed simultaneously
- Long sampling time (low temporal resolution)
- Economical sampling material

- **Manual active sampling**

- Medium temporal resolution (about 24hrs.)
- Economical instruments /apparatus, easy to carry
- Medium area coverage performance (spatial resolution)

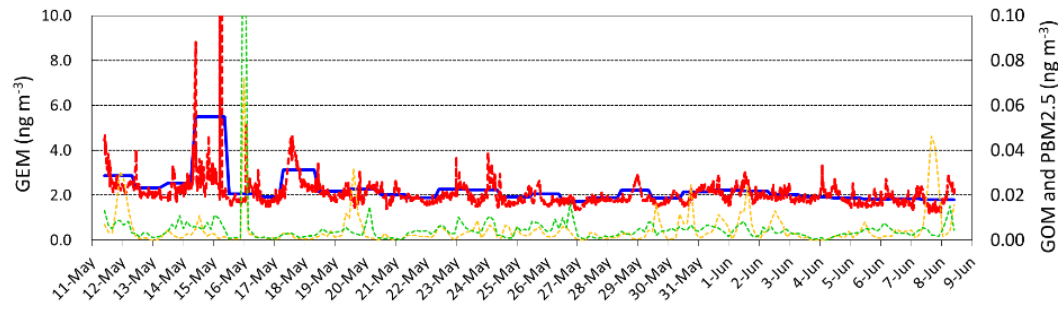


Study Sites

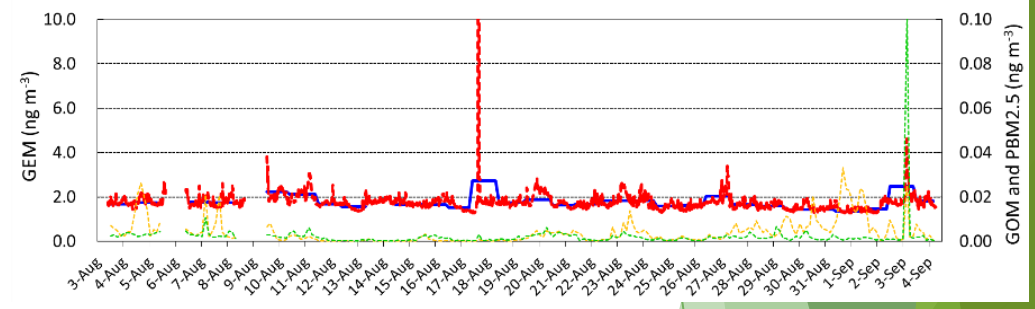


Trend of Atmospheric Mercury (Fukuoka St.)

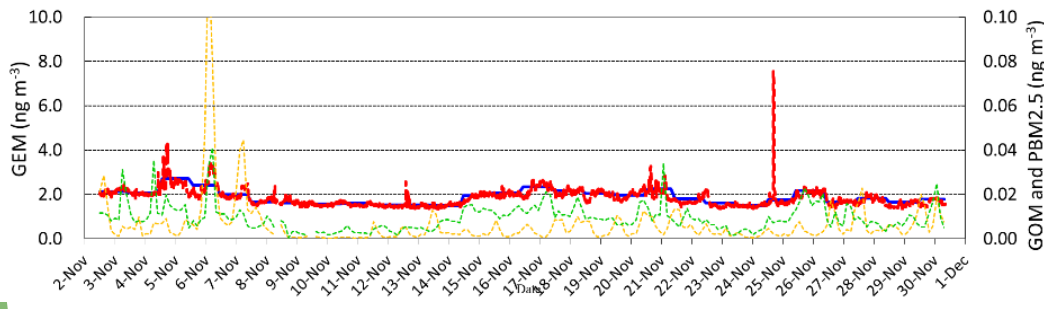
Spring



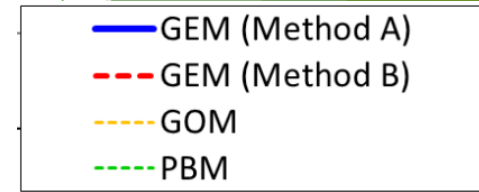
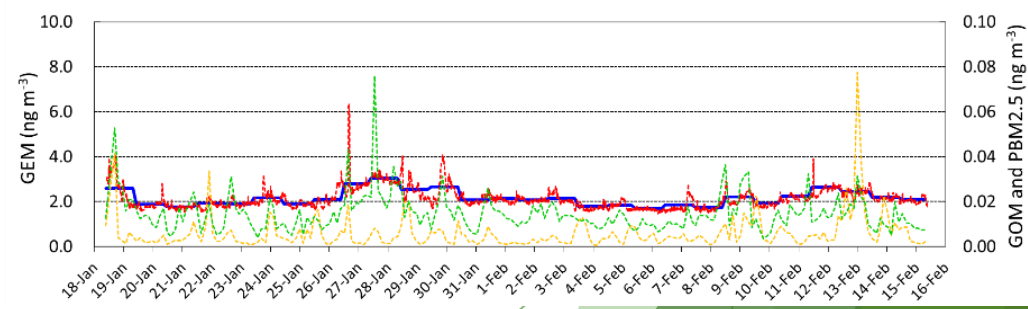
Summer



Fall

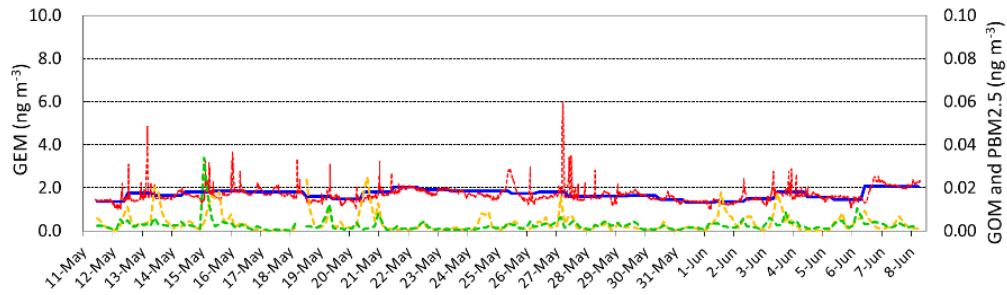


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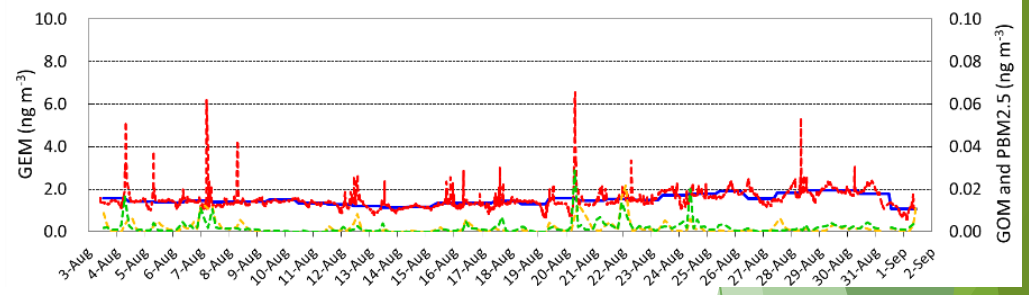


Trend of Atmospheric Mercury (Oga St.)

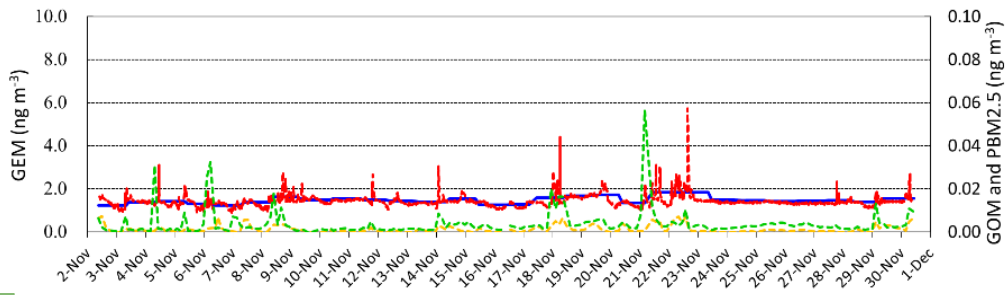
Spring



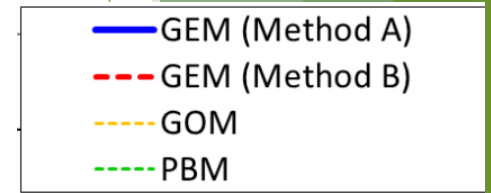
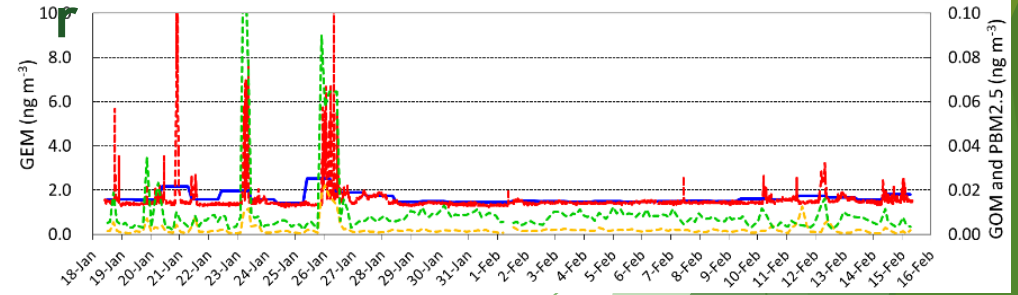
Summer



Fall

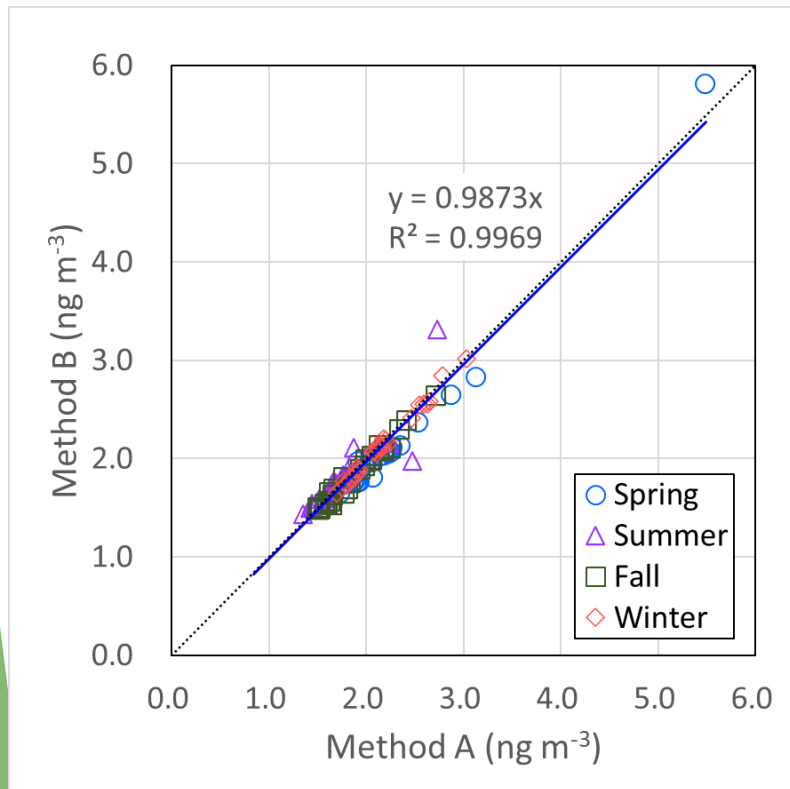


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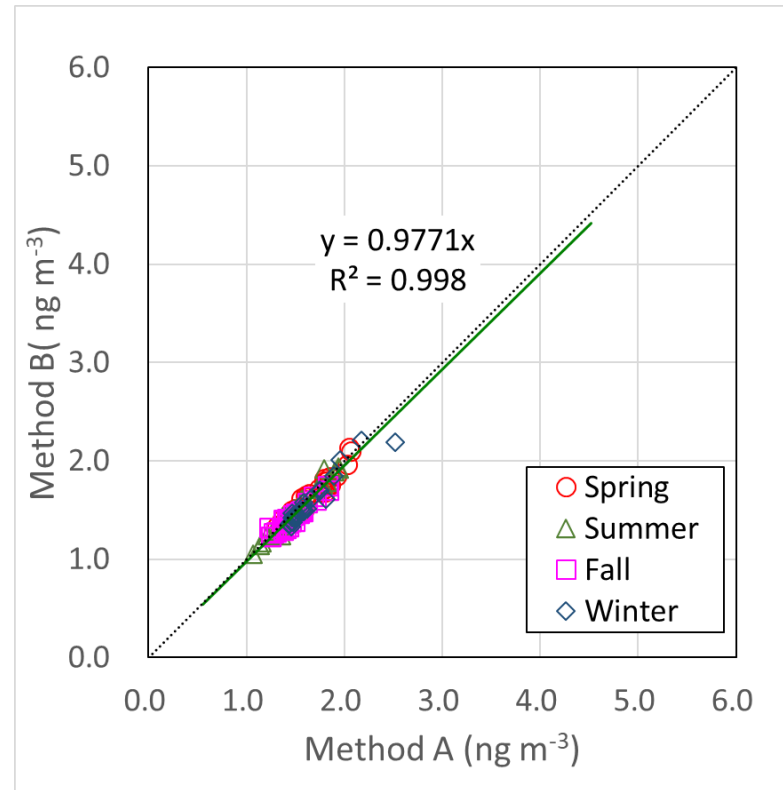


Relation between Method A and Method B (Manual vs Automate)

Fukuoka



Oga



**Very good
correlation
($R > 0.99$)**

Monitoring Comparison in Taoyuan

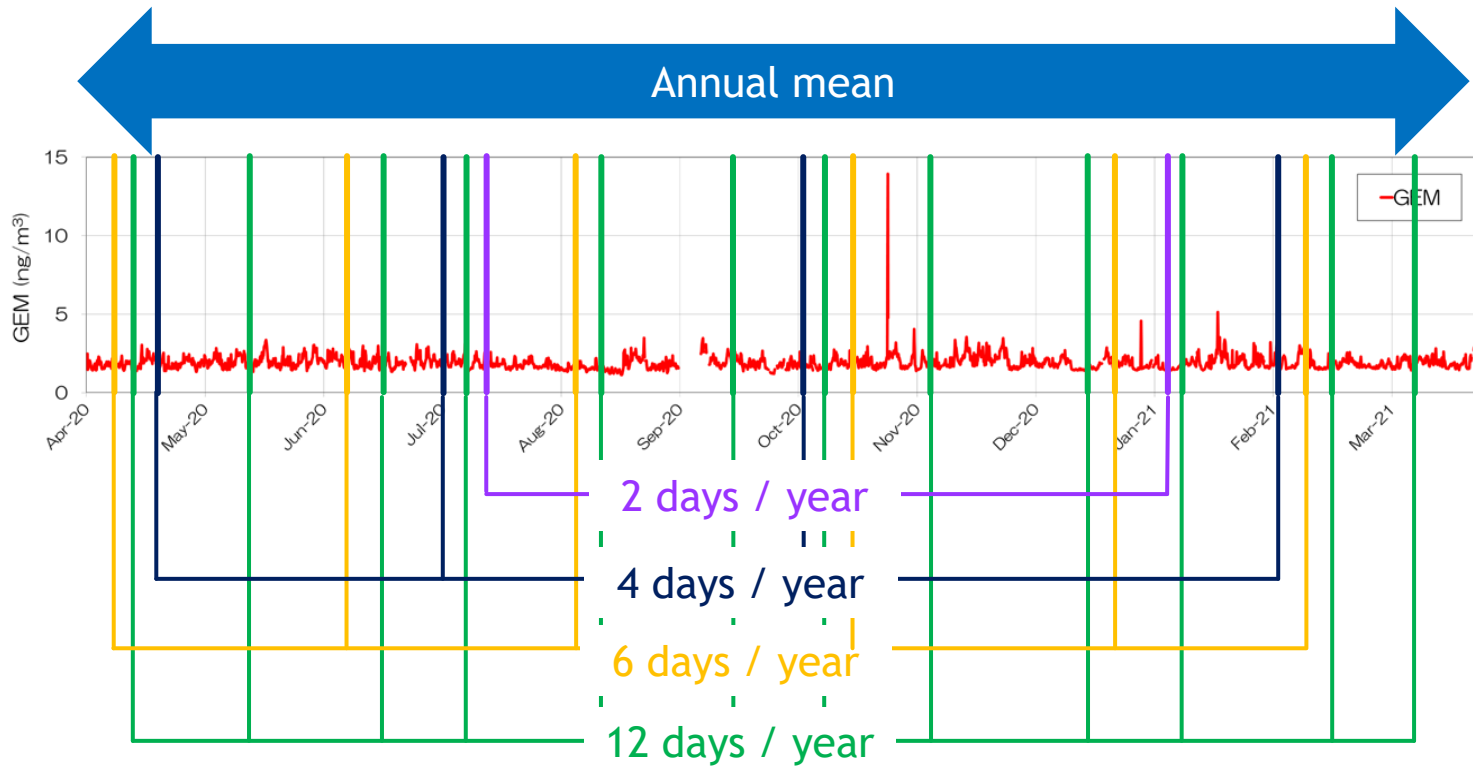
In cooperation with National Central University, **additional comparison study has been launched in Taoyuan, Taiwan.**



- ▶ Subtropical
- ▶ Suburban site
- ▶ Possible anthropogenic mercury emission sources (industry) within 20 km



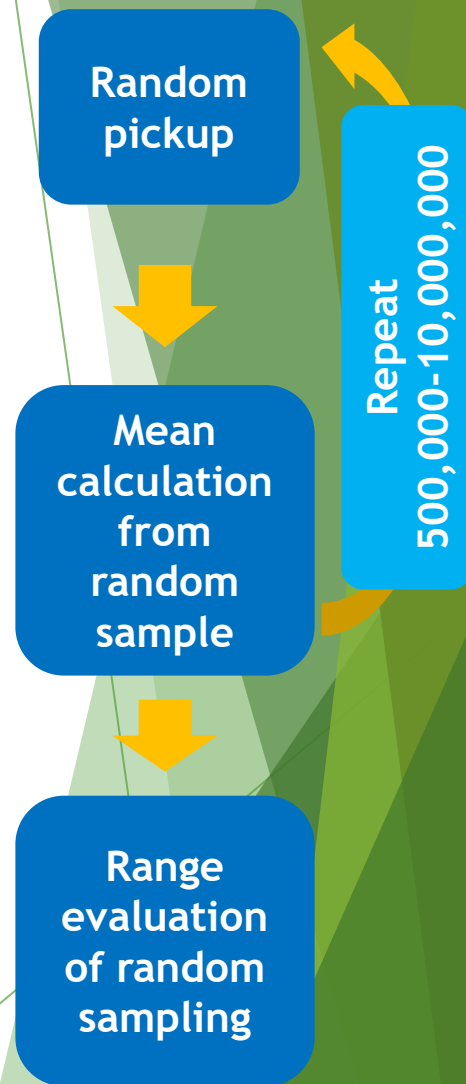
Intermittent Monitoring



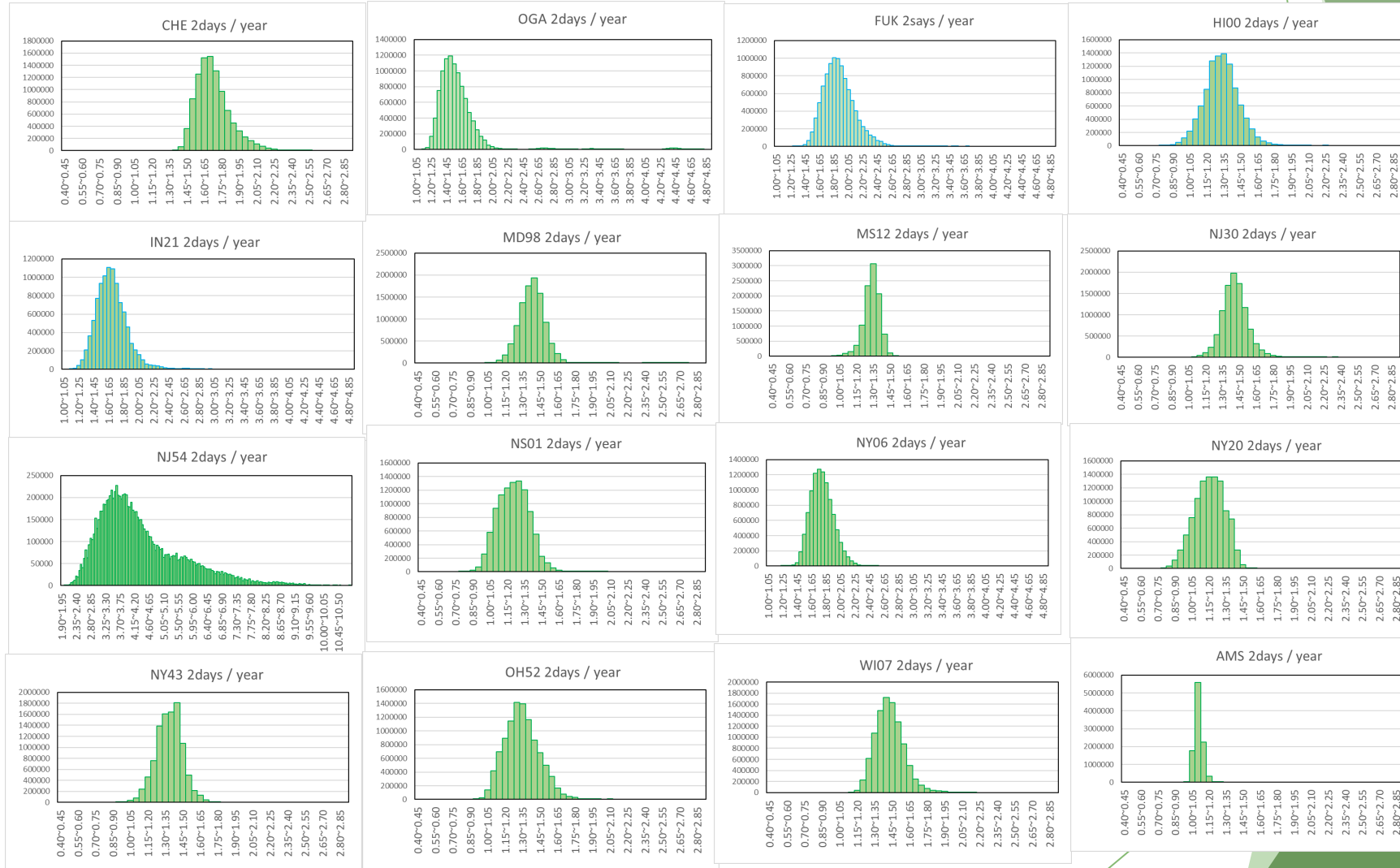
How much is the annual mean different between intermittent and continuous monitoring?

Random Sampling Simulation

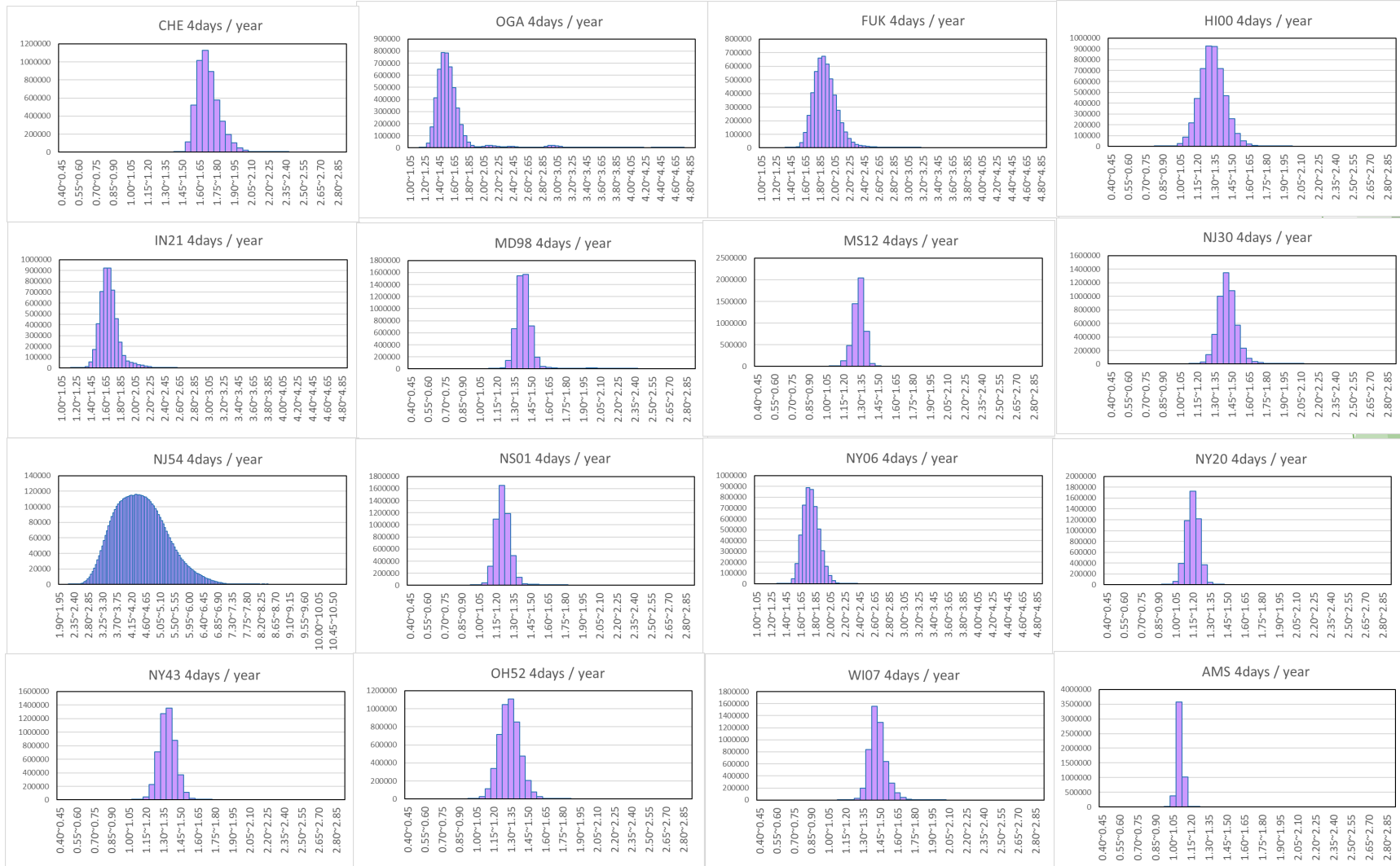
- Randomly picking up 24 hours data from each interval of continuous data. (e.g., 10 Apr, 20 Jul, 3 Nov, 25 Feb ...)
- Calculation of annual mean from picked up random sampling data.
- Repeat random sampling and calculation (500,000 - 10,000,000 times).
- Statistical analysis of the data (e.g. standard deviation, 5th and 95th percentile)



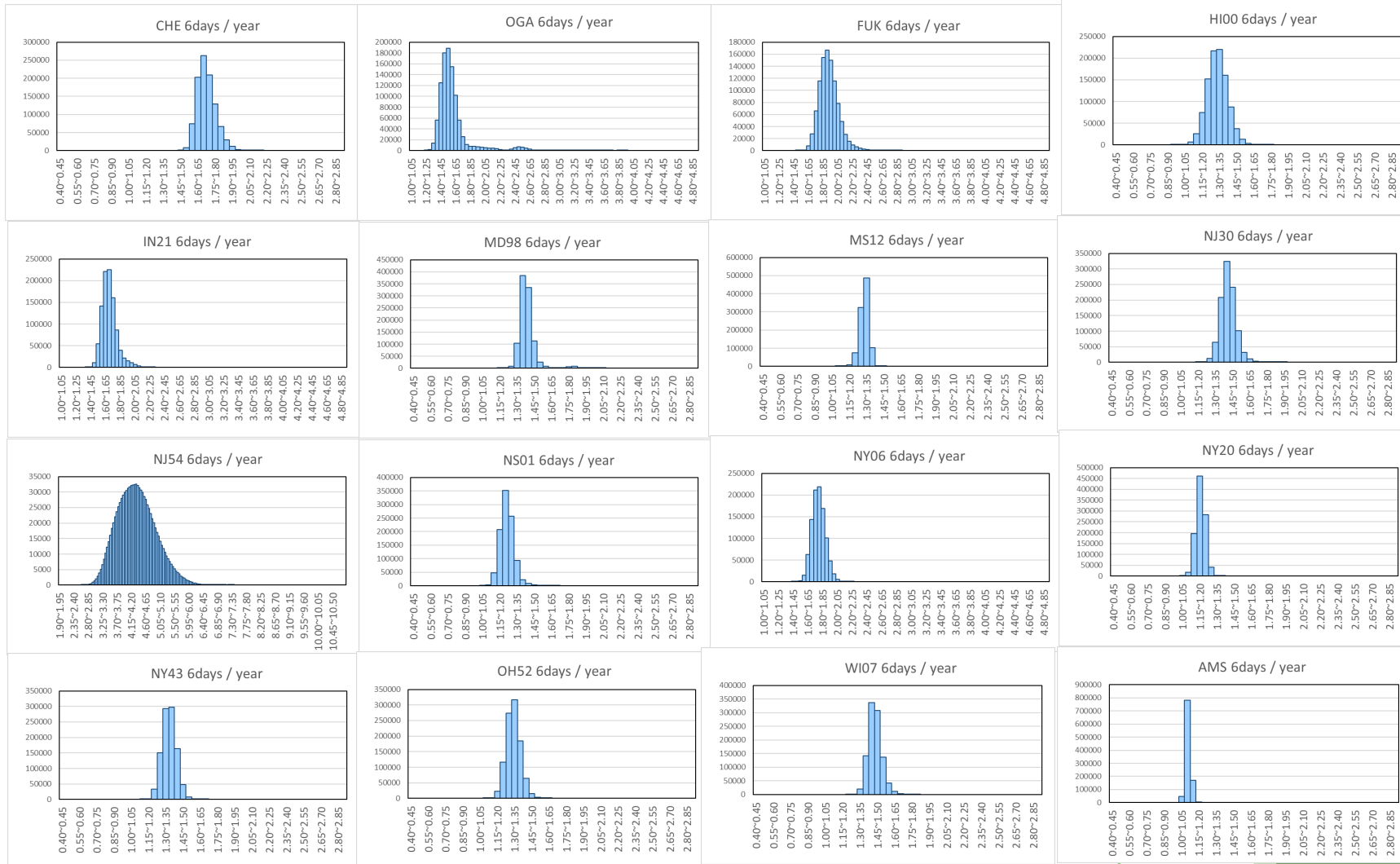
Distributions of Random Simulation (2days/year): I



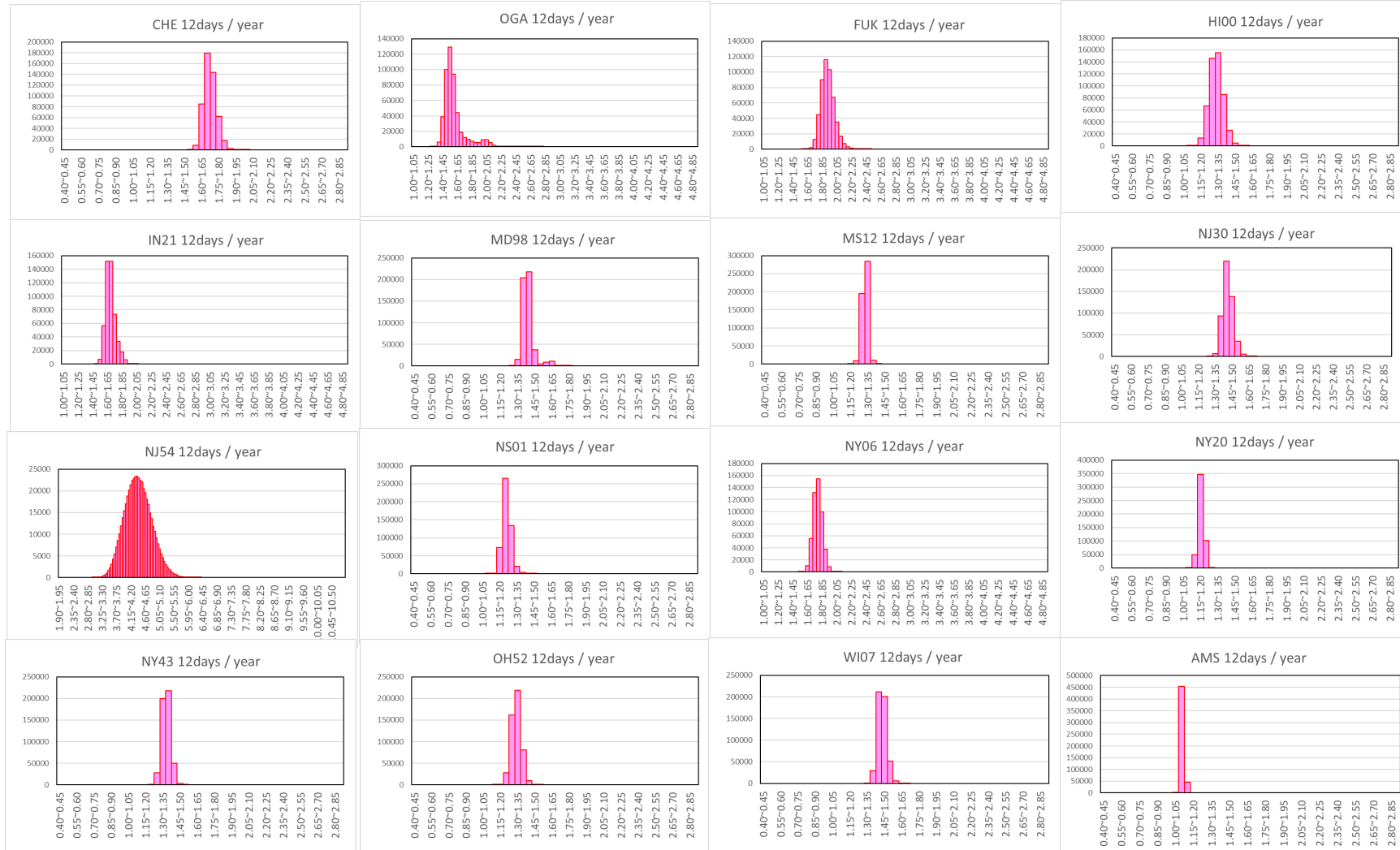
Distributions of Random Simulation (4days/year): I



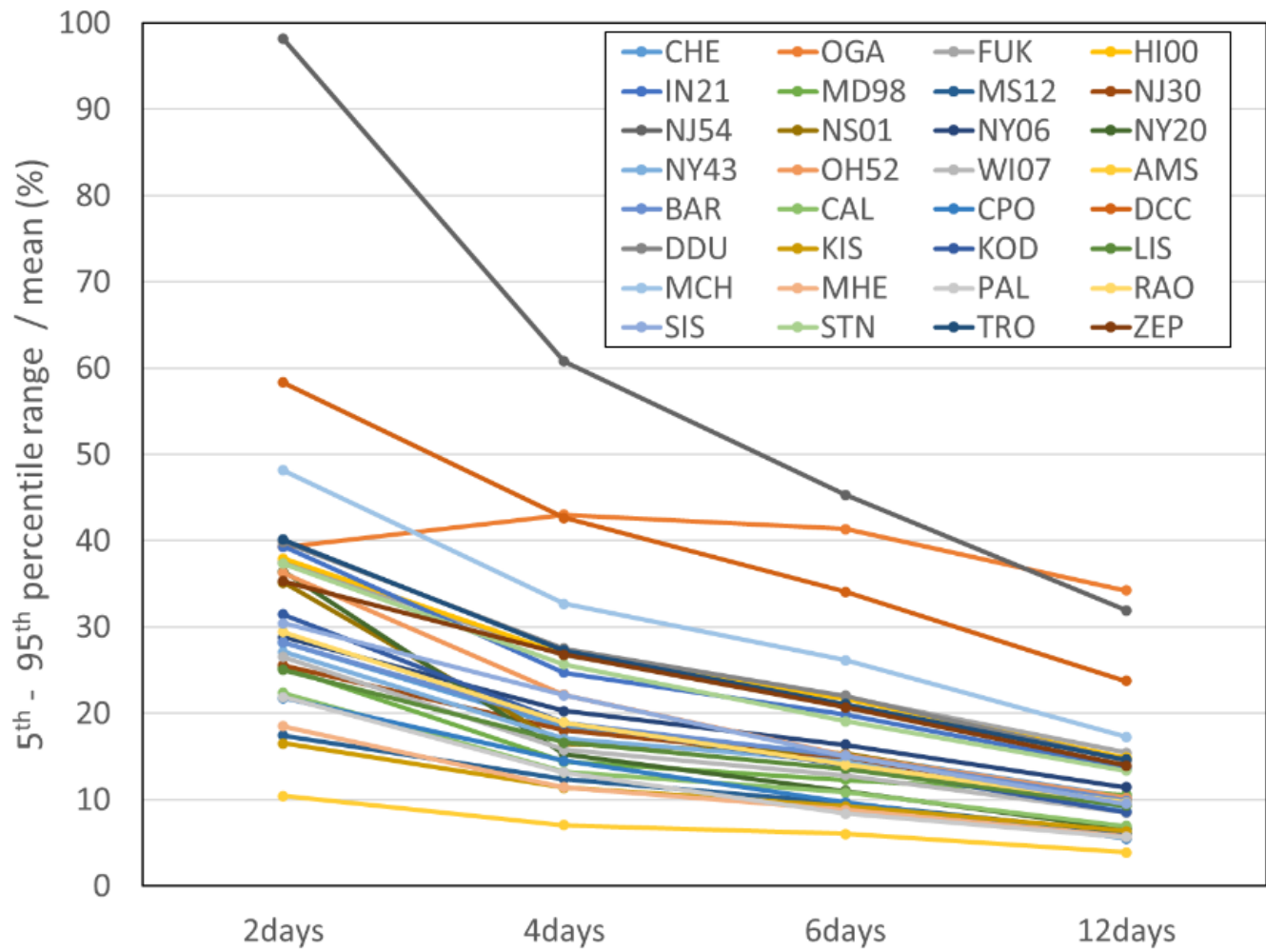
Distributions of Random Simulation (6days/year): I



Distributions of Random Simulation (12days/year): I



Sampling Frequency and 5th-95th Percentile Range



- ▶ The monitoring sites where the variability of the simulation results is greater, the greater the decrease in variability as the sampling frequency is increased.

Upcoming trainings

- **Manual active sampling training in Cape Town for African countries on 28 and 29 in July (back-to-back with ICMGP)**
 - >special thanks to Dr. Martin!
- **Manual active sampling training in Taipei in the beginning of September for countries in Asia Pacific region (back-to-back with Asia Pacific Mercury Monitoring Network (APMMN) annual meeting)**
 - >special thanks to Dr. Shue!

Thank You for Your Attention!





環境省