Hub of Talents on Air Pollution and Climate

HTAPC Newsletter

Issue 6, June - July 2024

Highlights

Stay tune with more update

Accomplished Activities
of Hub of Talents on Air Pollution and Climate (HTAPC)

The academic conference titled "Air Pollution: Solution for the Transboundary Haze Issue in the Mekong Subregion"

On June 20, 2024, the Hub of Talents on Air Pollution and Climate (HTAPC), which is under the National Research Council of Thailand (NRCT) and the Ministry of Higher Education, Science, Research and Innovation (MHESI), in collaboration with the Center of Excellence on Environmental Health and Toxicology (EHT), organized an international academic conference at the Chulabhorn Research Institute (CRI) Conference Center. The conference served as a platform for exchanging knowledge and lessons learned regarding transboundary haze issues in the Mekong subregion, with the aim of contributing to effective problem-solving efforts in the future.

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Discussion on academic support collaboration with the Pollution Control Department

On July 5, 2024, the Hub of Talents on Air Pollution and Climate (HTAPC), the National Research Council of Thailand (NRCT), and the Thailand Environment Institute (TEI) participated in a technical support discussion with the Pollution Control Department (PCD) at the PCD headquarters. The meeting covered topics such as the action plan for preventing and addressing particulate pollution, supporting research studies, training programs, and implementing the joint action plan under the "CLEAR Sky Strategy".

In this meeting, the PCD has considered the HTAPC to conduct the public hearing in the southern region. The feedback gathered will serve as the foundation for developing an action plan to prevent and address particulate pollution issues.

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Accomplished Activities

of Hub of Talents on Air Pollution and Climate (HTAPC)

MHESI Fair : SCI POWER FOR FUTURE THAILAND

The HTAPC, under the support of the National Research Council of Thailand (NRCT), Ministry of Higher Education, Science, Research, and Innovation, participated in the "MHESI Fair: SCI POWER FOR FUTURE THAILAND" held from July 22-28, 2024, at the Queen Sirikit National Convention Center. At the HTAPC booth, there are two research projects related to air pollution were exhibited: (1) a Quartz Crystal Microbalance (QCM) device for precise $PM_{2.5}$ measurement, developed by researchers from the National Science and Technology Development Agency (NSTDA), and (2) an online real-time continuous monitoring device for $PM_{1.0}$, $PM_{2.5}$, and PM_{10} emissions from stacks, developed by researchers from Rajamangala University of Technology Lanna. Additionally, the HTAPC organized the "Learn Fun" activities at the activity area, offering engaging educational experiences on air pollution for attendees. These included board games and quiz games with opportunities to win prizes.

On July 25, 2024, Dr. Supat Wangwongwatana, Director of the HTAPC, shared his experiences and insights on networking among experts and the management strategies for the HTAPC during the seminar titled "Sharing Day: Lessons Learned from the Success of Hub of Talents and Hub of Knowledge Managers."

Additionally, on July 26, 2024, the HTAPC organized a seminar on "Air Quality Monitoring in Thailand" and "Air Quality Forecasting Systems in Thailand".

The past experiences, as well as perspectives on the mission from various agencies were presented regarding air quality monitoring, along with air quality forecasting systems of Thailand as well.

Knowledge Dissemination
of Hub of Talents on Air Pollution and Climate (HTAPC)

Deposition of Air Pollutants

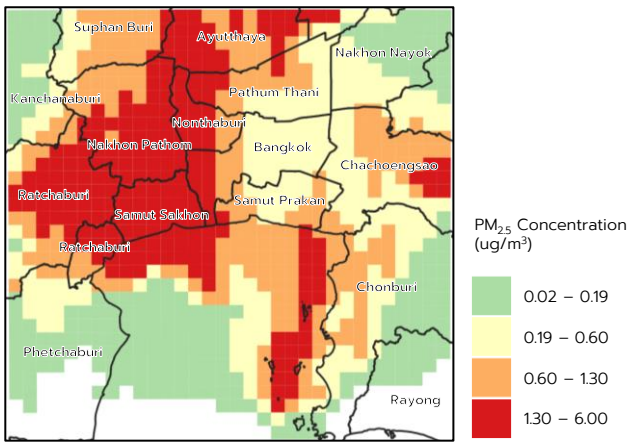

Figure 1: 24-hour Average $PM_{2.5}$ Concentration

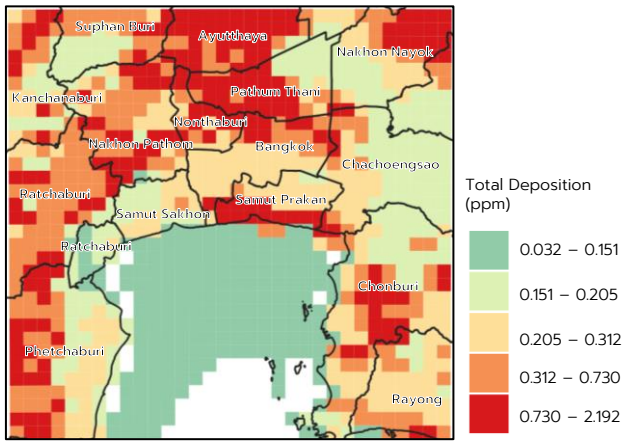

Figure 2: 24-hour Average Air Pollutants Deposition

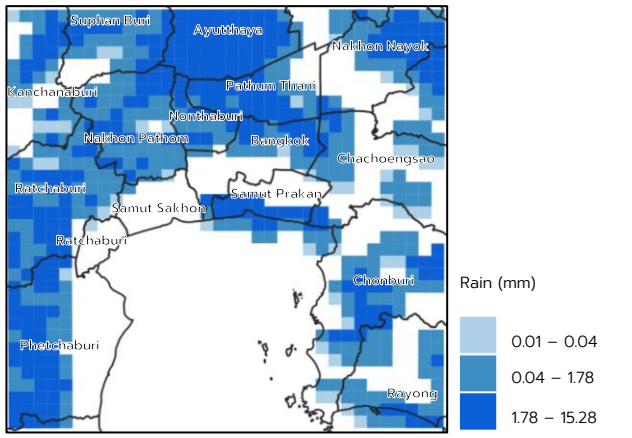

Figure 3: 24-hour Average Precipitation

In the rainy season, although atmospheric air pollutant concentrations are generally low, a critical process that requires monitoring is **air pollutant deposition**.

Air pollutant deposition refers to the process which air pollutants in the atmosphere settle onto the ground, water bodies, structures, or vegetation through atmospheric chemical and physical processes. This deposition can occur in two forms: **wet deposition** and **dry deposition**.

In Thailand, pollutant deposition is a significant concern, especially in areas with industrial development and heavy traffic, such as Bangkok or the Eastern Economic Corridor (EEC). There are various models that can be employed to calculate and forecast the dispersion and deposition of air pollutants. In this article, the HTAPC will present results from the **WRF-CAMx** model, which estimates deposition levels in the central region of Thailand, as illustrated in Figures 1, 2, and 3. These figures depict the concentration levels of $PM_{2.5}$, pollutant deposition, and rainfall on June 1, 2020. This analysis elucidates the environmental and air quality relationship between $PM_{2.5}$ concentration, pollutant deposition, and rainfall.

The accumulation of pollutants in both wet (from rain) and dry forms results from atmospheric pollutants, particularly particulate matter and acidic gases such as sulfur dioxide (SO_2) and nitrogen oxides (NO_x), which originate from primary sources similar to $PM_{2.5}$. These pollutants are washed out by precipitation or may combine with raindrops and fall to the ground. Occasionally, they may settle due to their own weight or through processes in an unstable atmosphere. As a result, areas with high acid or air pollutant accumulation are typically those with frequent rainfall combined with elevated concentrations of $PM_{2.5}$ and acidic gases in the atmosphere (Figure 2-3). Rain can temporarily reduce $PM_{2.5}$ concentrations by washing particulate matter out of the air. However, it also transports atmospheric pollutants to the ground in the form of acids, resulting from atmospheric chemical reactions. This leads to precipitation containing sulfuric acid (H_2SO_4), nitric acid (HNO_3), and hydrochloric acid (HCl), among others.

The application of mathematical modeling can enhance our understanding of the mechanism involved in the atmospheric washout of pollutants and the environmental impacts resulting from the transformation of air pollutants. This understanding can contribute to the development of more effective environmental management strategies in the future.

We cordially invite you to join us

Hub of Talents on Air Pollution and Climate

HTAPC Membership Form for Experts

Official website of Hub of Talents on Air Pollution and Climate (HTAPC)

https://www.htapc.info

This newsletter is part of the project for the Hub of Talents on Air Pollution and Climate under research funding support from National Research Council of Thailand (NRCT)

Monthly Newsletter

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