AsiaFlux Conference 2025

Nature-Based Solutions for Asia: From Advanced Science and Technology to Practices

Post-Event Summary

20 - 25 October 2025
Pangkalan Kerinci, Riau, Indonesia

Printed on: PAPERone

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From Advanced Science and Technology to Practices

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Hosted by

AsiaFlux

Kementerian Lingkungan Hidup/ Badan Pengendalian Lingkungan Hidup Republik Indonesia

KEMENTERIAN KEHUTANAN REPUBLIK INDONESIA

Co-host

CPDS Center for Peatland & Disaster Studies LPPM University of Riau

IPB University Bogor Indonesia

BRIN Badan Riset dan Inovasi Nasional

National Institute for Environmental Studies, Japan

NUS National University of Singapore — NUS Environmental Research Institute

CIFOR

World Agroforestry

LeXtra League of geophysical research +Xcellences for tropical asia

HGI

HITI

IPS International Peatland Society

Facilitated by

APRIL

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FLUXNET

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NRF National Research Foundation of Korea

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AsiaFlux Conference 2025: Science, Collaboration, and Leadership from Indonesia

"*For the first time in Indonesia, over 450 scientists, policymakers, and practitioners from 29 countries came together to strengthen Indonesia's leadership in science and climate action*."

In October 2025, the quiet town of Pangkalan Kerinci in Riau, Indonesia, became the heart of scientific dialogue and collaboration. For the first time, the AsiaFlux Conference - a cornerstone gathering for researchers studying land-atmosphere interactions - was held in Indonesia. The location could not have been more symbolic: surrounded by peatlands, mangroves, and tropical forests, the landscape itself told a story of both environmental challenge and opportunity.

From the opening day, the atmosphere was charged with optimism and purpose. The participation of Indonesia's Minister of Environment, Dr. Hanif Faisol Nurofiq, and Deputy Minister of Forestry, Rohmat Marzuki, reflected the government's strong commitment to ensuring that policy and practice are grounded in science. Their presence underscored Indonesia's determination to lead through evidence-based climate action and regional collaboration.

Over 450 participants from 29 countries came together with a shared purpose - to advance understanding of how Southeast Asia's ecosystems can drive climate solutions. The conference theme, "*Nature-Based Solutions for Asia: From Advanced Science and Technology to Practices*," captured this vision - bridging research with tangible action on the ground.

“AsiaFlux 2025 became a living network of ideas and people - connecting countries, institutions, and generations. It was a reminder that climate solutions are built not only on data, but on trust, cooperation, and shared purpose.”

Technical Training and Young Scientist Meeting: Building Essential Skills and Confidence

"Advancing science must go hand in hand with strengthening the community behind it."

Over 170 participants attended a two-day technical training focused on one of the most urgent needs in climate science: strengthening capacity in greenhouse gas flux measurement and data analysis.

Led by an international team of experts, the sessions were both inspiring and hands-on - turning theory into meaningful learning experiences. Dr. George Burba, Dr. Liukang Xu and Dave Johnson (USA) shared the fundamentals of eddy covariance and soil flux measurements with great clarity, helping participants connect scientific principles to real field practice – theory, instrumentation, data processing. Dr. Hojin Lee (Germany) and Md Shamsuzzaman (Finland) patiently walked everyone through advance data post-processing - from quality assurance to gap filling and GHG budget estimation - making complex steps feel achievable. Prof. Prabir Patra (Japan) brought everything together with a broader view of how these field measurements link to atmospheric and environmental processes in CO_2, CH_4, and N_2O models.

It was a deeply rewarding experience that left participants both enriched and inspired.


Training Course
AsiaFlux Conference 2025
Nature-Based Solutions for Asia:
From Advanced Science & Technology to Practice
20-21 October 2025
Pangkalan Kerinci, Riau, Indonesia

"The training and young scientist meeting exemplified the AsiaFlux mission - to equip the next generation of scientists with the technical rigor, confidence, and global connections necessary to lead climate research across Asia."

Complementing the training, the Young Scientist Meeting became a highlight of inspiration and mentorship. It brought together leading women scientists whose journeys embodied resilience, curiosity, and leadership in research fields historically dominated by men.

The session featured Prof. Angela Gallego Sala (University of Exeter, UK), Prof. Elise Pendall (Western Sydney University, Australia), Dr. Lulie Melling (Sarawak Tropical Peat Research Institute, Malaysia), and Dr. Sonya Dewi (CIFOR-ICRAF, Indonesia) - each sharing stories that transcended data and publications, reflecting passion and purpose in advancing climate and ecosystem science.

Moderated by Dr. Fitri Khusyu Aini (Ministry of Environment, Indonesia) and Pitri Rohayani, M.Eng. (APRIL, Indonesia), the event attracted a diverse audience - from university students to curious high-school participants eager to explore a path in science.

"A memorable moment came when a high school student asked how she could begin her journey toward becoming a scientist.

The speakers' responses echoed a powerful message: curiosity, commitment, and courage are the foundations of every scientific journey."

For many young attendees, this was more than a meeting - it was a moment of realization that women are not just participating in scientific spaces, but leading them, shaping the discourse, and inspiring others to follow.

"It was clear that the conference achieved more than just scientific exchange - it sparked new collaborations, fresh ideas, and a renewed sense of purpose."

The conference, featuring 157 oral presentations and 110 posters, provided a vibrant platform for scientific exchange, presenting numerous opportunities to advance our understanding of how ecosystems respond to climate and land use changes. The wide range of topics, methods, ecosystems, and perspectives demonstrated AsiaFlux's strength in fostering cross-disciplinary collaboration and turning scientific research into actionable solutions. This event was more than just a gathering; it was a catalyst for new partnerships and ideas, strengthening the regional scientific community's shared commitment to tackling climate challenges through innovation, creativity, and cooperation.

Looking ahead, the conference highlighted the immense opportunity in carbon-dense ecosystems, particularly tropical peatlands, for enhancing global carbon storage. While significant data gaps remain in mapping carbon stocks, emissions, and removals, especially in understanding regional variability, these gaps present an opportunity for growth and innovation in climate research. Filling these gaps will be key to developing more effective mitigation strategies.

The current reliance on academic-focused flux measurement techniques limits their broader application in policy and large-scale restoration efforts. However, this also opens doors for advancing these methods, making them more accessible for policy development and large-scale environmental management. The increasing use of satellite-derived greenhouse gas products presents a further opportunity to refine atmospheric data interpretation, particularly for short-term observations. Developing clearer methodologies to integrate dynamic and static data could lead to significant breakthroughs in monitoring and forecasting.

In particular, the advances in machine learning and artificial intelligence provide exciting opportunities to reduce uncertainties in carbon modeling and improve forecasting across ecosystems. The integration of updated emission factors, advanced flux measurement technologies, and ML/AI could be transformative, enhancing the accuracy of greenhouse gas inventories and informing more effective, data-driven climate policies.

A multi-scale approach that combines remote sensing and ground-based measurements offers an opportunity to deepen our understanding of peatland GHG dynamics and create scalable, practical strategies for other ecosystems. This approach has the potential to strengthen national and global carbon accounting systems, leading to policies that promote sustainable land management while delivering clear societal benefits.

International collaborations present a significant opportunity to translate scientific research into practical, locally relevant solutions, advancing climate action on the ground. By investing in data, technology, and collaborative research, we can unlock the full potential of carbon-rich ecosystems, positioning them as key players in mitigating climate change and supporting sustainable livelihoods. The time is ripe to seize these opportunities, driving real-world impact and making a lasting contribution to global sustainability

Impressions of AsiaFlux Training and Conference 2025 by Dr. Prabir Patra, prabir@jamstec.go.jp

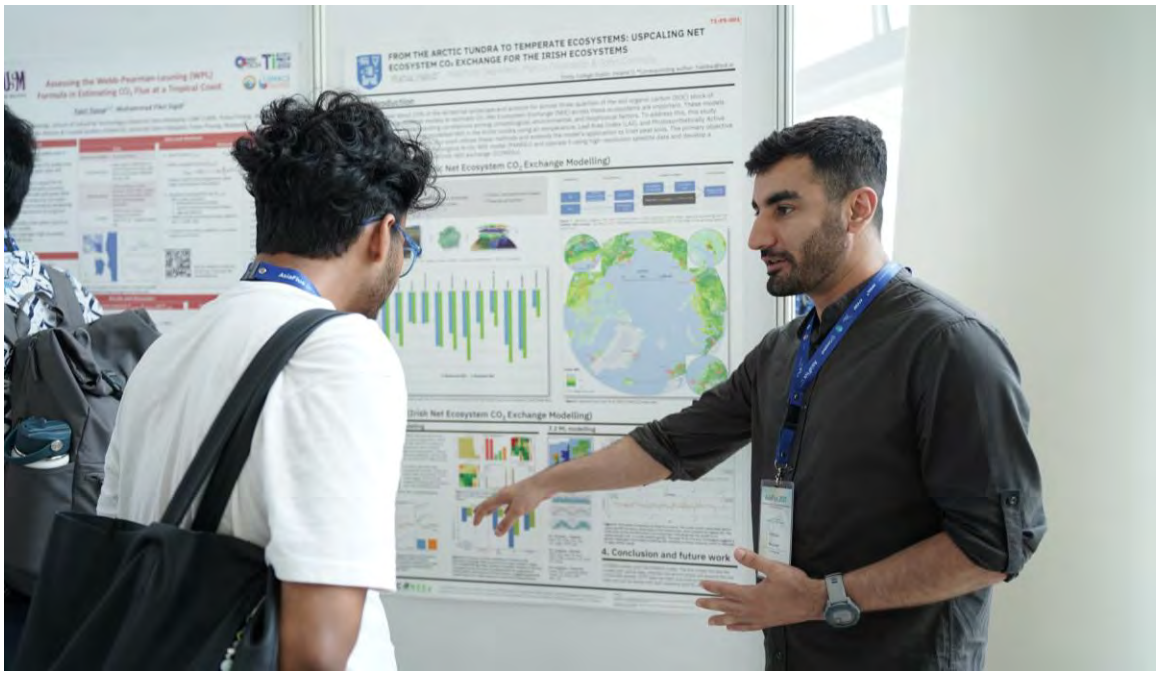
"I have attended several AsiaFlux workshops over the years, with the last one taking place before the COVID-19 pandemic. This year, I had the pleasure of returning, also providing a training course on atmospheric GHG model."

I was impressed by the excellent organization of the event, particularly by the local hosts at APRIL. The arrangements catered to all participants, with accommodations ranging from student hostels to 4-star hotels. The meeting rooms were well-suited for the diverse needs of the workshop and training, and the scientific and social programs fostered meaningful interactions among participants of all ages. Overall, it was a satisfying experience, and I thank Dr. Deshmukh and his team for their efforts in ensuring the success of AsiaFlux-2025.

The scope of AsiaFlux has expanded significantly over the years. The number of research groups involved in flux tower measurements has grown, and with the availability of more affordable instruments, measurement sites now cover remote, rural, semi-urban, and urban areas. This has led to denser data coverage, particularly in disturbed and undisturbed land ecosystems such as forests, peatlands, and plantations. This wealth of data provides valuable insights into the current state of terrestrial ecosystems and their historical changes, which are crucial for policymaking, including national commitments to the UNFCCC's Nationally Determined Contributions (NDCs) and resource management for citizens' well-being. As noted by Indonesian government ministers, this is a significant achievement.

An important opportunity moving forward is the sharing of measurement data in near real-time among governmental and non-governmental institutions, universities, and across borders. If successful, this could accelerate scientific research and promote a common understanding of the actions needed for better land management in the region.

I am also encouraged by the quality of young researchers emerging in the Asia region. They have the potential to make significant contributions to global climate research. However, my experience at the training and workshop sessions highlighted the need for consolidating knowledge sharing to ensure the next generation is grounded in solid scientific principles. For example, discussions linked flux tower measurements with large-scale models and GHG concentration variations observed from remote sensing satellites. While this approach is promising, more cross-disciplinary discussions are needed to refine these methods. Future AsiaFlux workshops could better facilitate such exchanges to drive innovation and progress in climate science.


FROM THE ARCTIC TUNDRA TO TEMPERATE ECOSYSTEMS: USPCALING NET ECOSYSTEM CO2 EXCHANGE FOR THE IRISH ECOSYSTEMS
4. Conclusion and future work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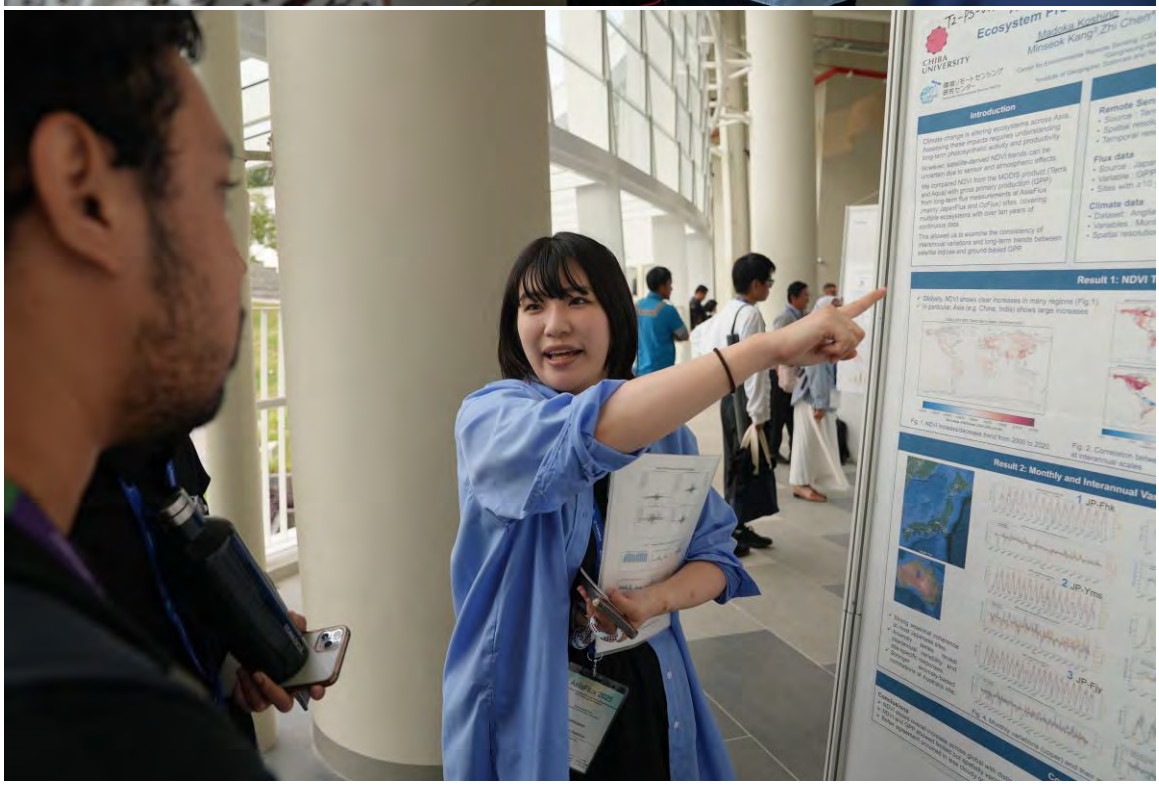
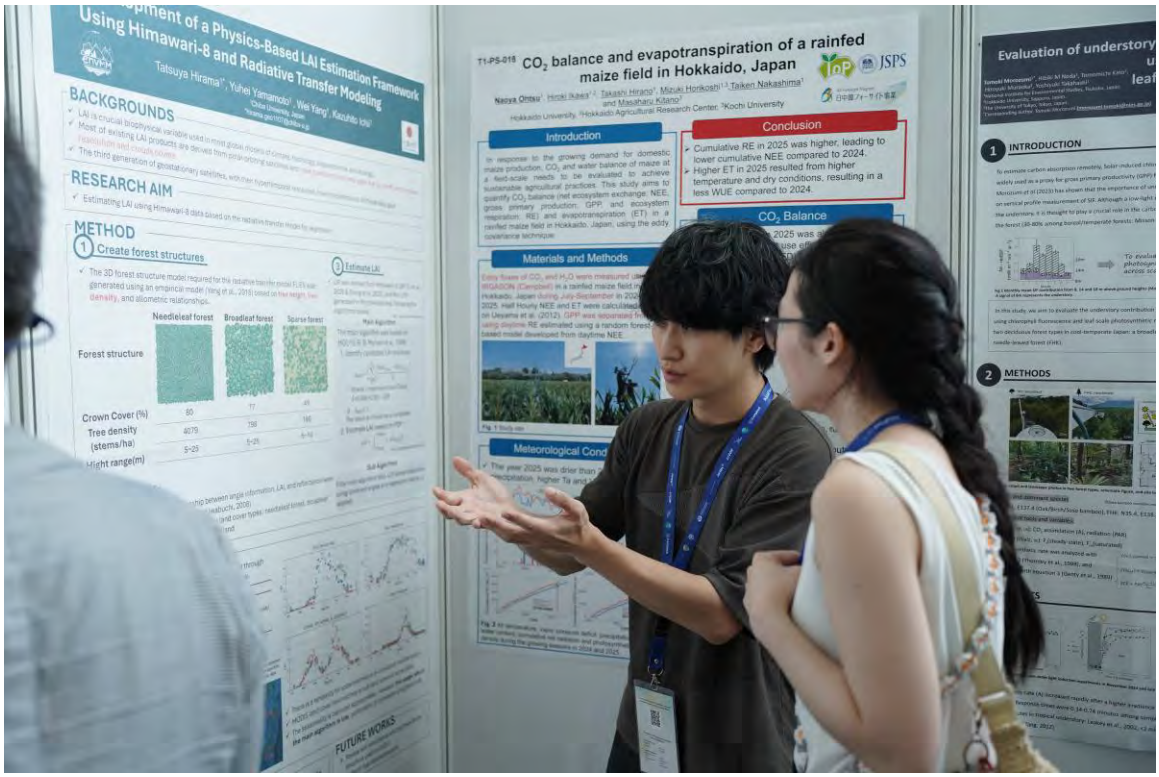
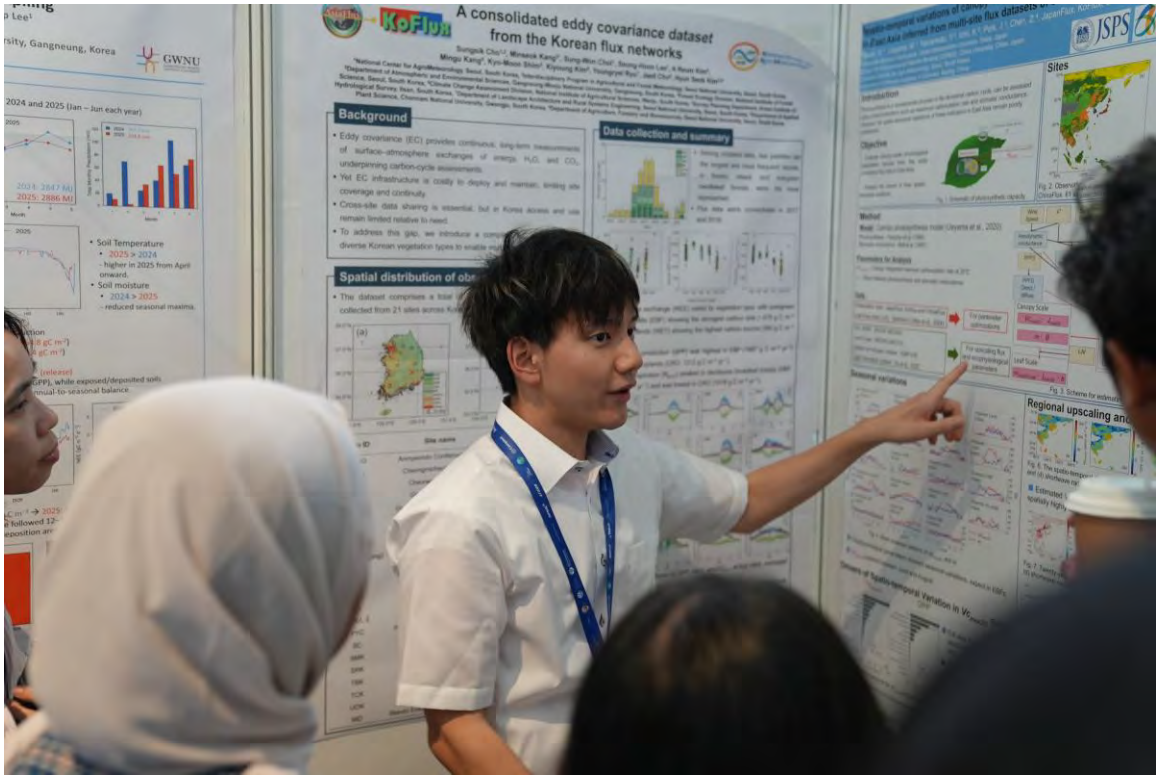
AsiaFlux 2025

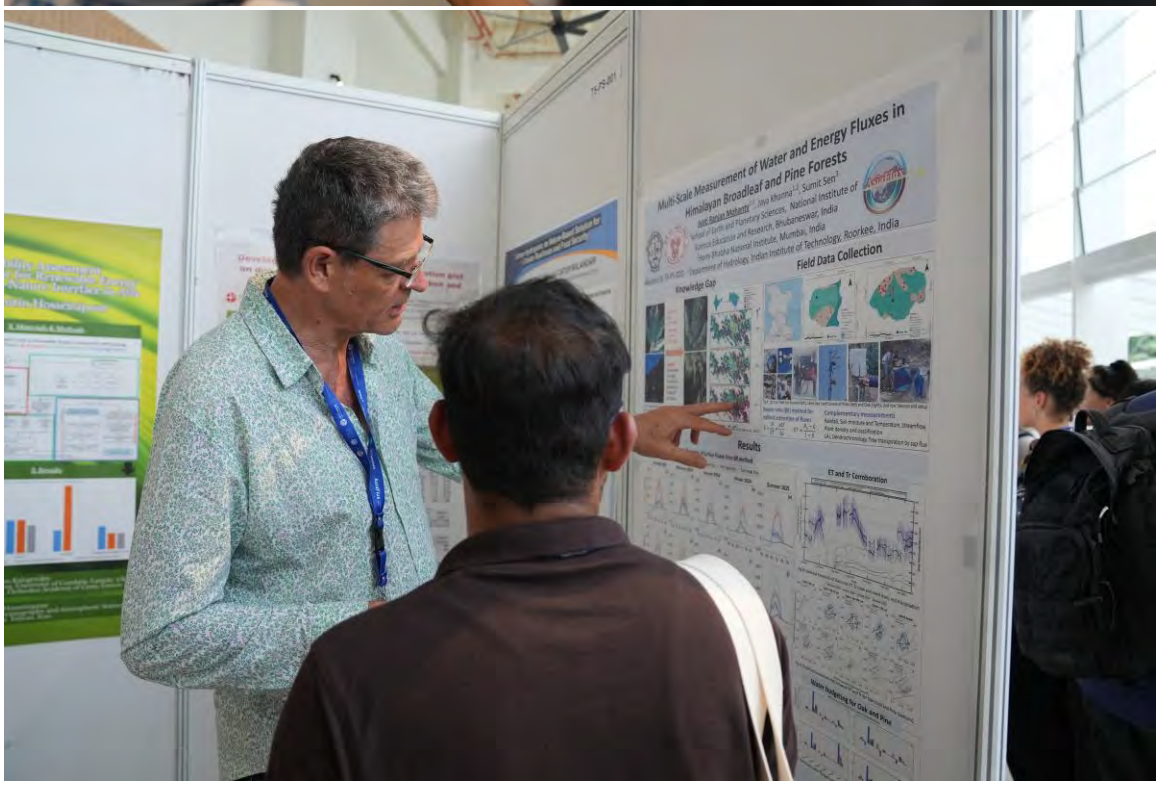

RMIT
Assessing the Carbon Gap: Integrating Carbon Flux Measurements and Sequestration Potential in Tropical Peatlands
Introduction
Peat Subsidence
Methods

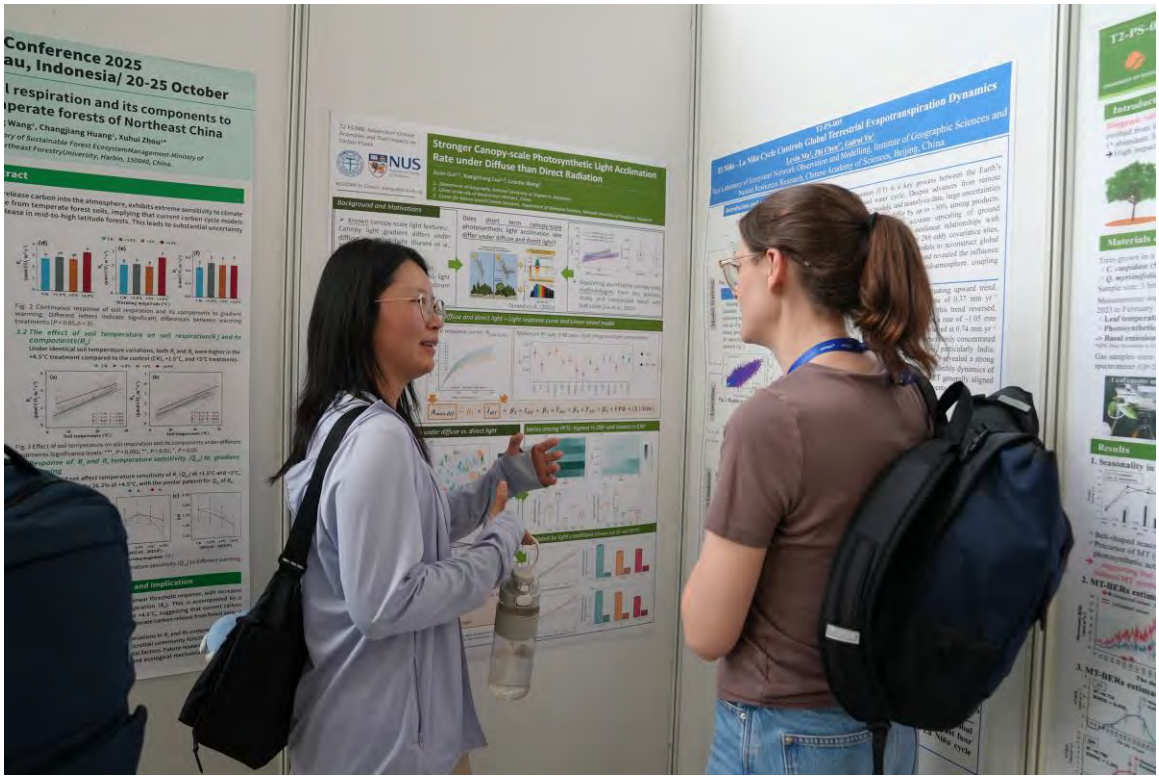

CHIBA UNIVERSITY
Introduction
Result 1: NDVI
Result 2: Monthly and Interannual


Using Himawari-8 and Radiative Transfer Modeling
Tatsuya Hirama
BACKGROUNDS
RESEARCH AIM
METHOD
Create forest structures
Needleleaf forest
Broadleaf forest
Sparse forest
Forest structure
Crown Cover (%)
Tree density (stems/ha)
Hight range(m)
FUTURE WORKS
T1-PS-018
CO2 balance and evapotranspiration of a rainfed maize field in Hokkaido, Japan
Naoya Ohtsu
Hokkaido University
Introduction
Materials and Methods
Conclusion
Cumulative RE in 2025 was higher, leading to lower cumulative NEE compared to 2024.
Higher ET in 2025 resulted from higher temperature and dry conditions, resulting in a less WUE compared to 2024.
CO2 Balance
Meteorological Cond
Evaluation of understory
1 INTRODUCTION
2 METHODS


Indonesia's Forestry
policy and land management
Introduction
Site description
Field equipment and instrumentation
S-009


A consolidated eddy covariance dataset from the Korean flux networks
KoFlux
Background
Data collection and summary
Spatial distribution of obs
Regional upscaling and
Sites
JSPS
GWNU
2024 and 2025 (Jan – Jun each year)
Soil Temperature
2025 > 2024
higher in 2025 from April onward.
Soil moisture
2024 > 2025
reduced seasonal maxima.


Multi-Scale Measurement of Water and Energy Fluxes in Himalayan Broadleaf and Pine Forests
Field Data Collection
Knowledge Gap
Results
ET and Tr Corroboration


Conference 2025
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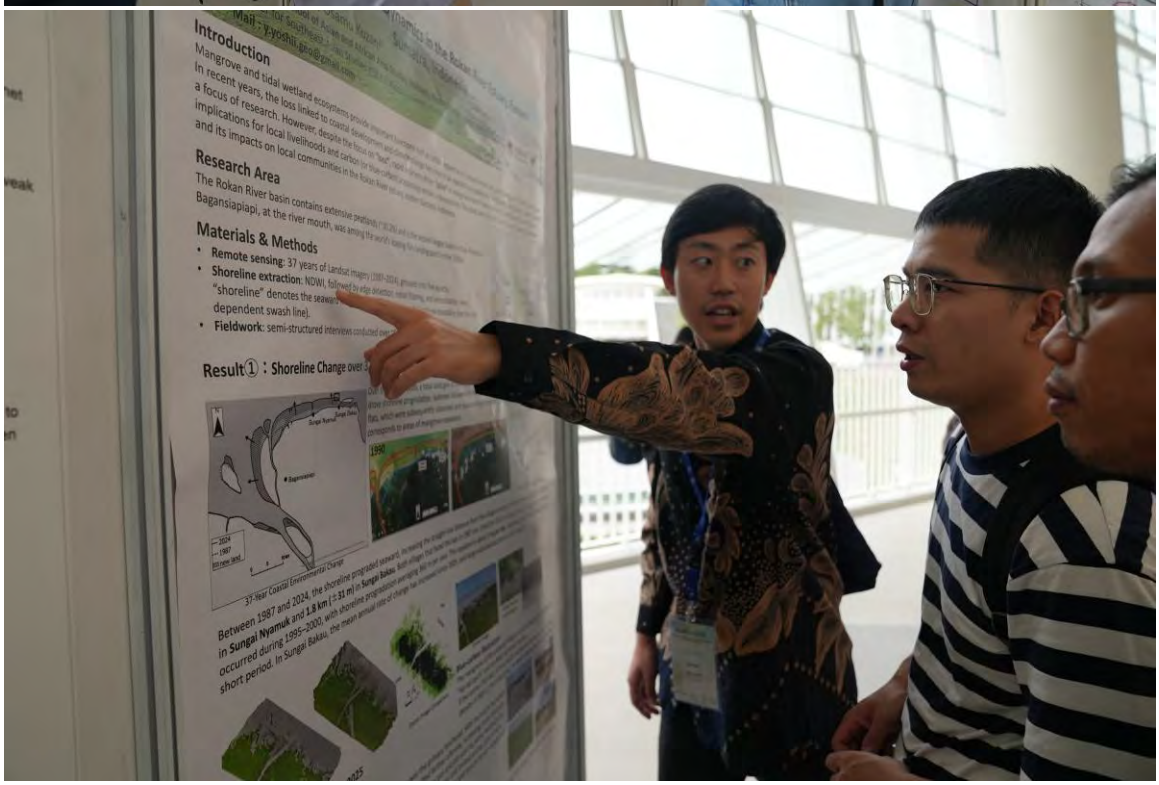
l respiration and its components to
perate forests of Northeast China
Stronger Canopy-scale Photosynthetic Light Acclimation Rate under Diffuse than Direct Radiation
Terrestrial Evapotranspiration Dynamics


Introduction
Research Area
Materials & Methods
Result① : Shoreline Change over


AsiaFlux Conference 2025 - Nature-Based Solutions for Asia:
From Advanced Science and Technology to Practices
Advancing Land-Sector's MRV
to Support
Indonesia's FOLU Net Sink 2030
Haruni Krisnawati
Senior Adviser to the Minister for Climate Change
Ministry of Forestry, Republic of Indonesia
Pangkalan Kerinci Riau, 24 October 2025


Results: Hourly CO_2 and CH_4 exchange values


ts and Discussion...
loor Effect to CO_2 Flux

While every oral and poster presentation brought valuable insights and inspiring ideas, a few stood out for their remarkable innovation and impact. From pioneering studies on carbon dynamics in tropical peatlands to advanced modeling approaches for climate resilience, these works showcased the creativity, communication and commitment driving Asia's scientific community forward.

Oral presentation awards were given to Jennifer Bowen (Georgia Institute of Technology, USA), Parkin Maskulrath (Kasetsart University, Thailand), and Ahmad Fajarusshidiq (Wageningen University & Research, Netherlands). In the poster category, emerging scientists Ivana Fernandez (IPB University, Indonesia), Nur Estya Binte Rahman (Nanyang Technological University, Singapore), and Naoya Ohtsu (Hokkaido University, Japan) were recognized for their innovative and impactful contributions.

Together, all presenters and participants embodied the essence of AsiaFlux — where shared learning, regional collaboration, and scientific passion unite to advance our understanding and care for the planet's ecosystems. Their achievements represented not only individual excellence but also a collective regional momentum toward stronger, science-based climate solutions.

Field Excursion: Experiencing Science in Action

The week concluded with a rare and insightful field excursion to two Eddy Covariance flux tower sites in *Acacia crassicarpa* and *Eucalyptus* plantations. A total of 154 participants took part, exploring the advanced instrumentation systems and observing how these towers continuously capture greenhouse gas exchanges. They also engaged in discussions about the crucial role of field monitoring in advancing climate science and informing policy.

These two sites, home to the only flux towers of their kind in the Asian tropical region, offer a unique, real-world view of ecosystem-scale carbon exchanges.

This visit not only provided valuable technical exposure but also offered a deeper understanding of the challenges and importance of monitoring carbon dynamics in complex tropical landscapes. It was a fitting conclusion to a week dedicated to fostering scientific collaboration and excellence in climate research.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A Gala Dinner: A Night of Culture and Connection

"The Gala Dinner was a truly special evening, not just a celebration, but a heartfelt moment of connection and appreciation of inspiring science and collaboration."

One of the standout highlights of the night was the Tari Nusantara performance - a mesmerizing display of Indonesia's rich cultural heritage. Dancers in vibrant traditional attire performed ten distinct dances from regions spanning the archipelago, from Sabang to Merauke, with each movement telling a story of unity in diversity.

Honoring Indonesia as the host nation, the performance embodied the same spirit that defined AsiaFlux 2025 - celebrating diversity, shared purpose, and the joy of coming together from all corners of the world. It was a beautiful reminder of the strength found in collaboration and cultural exchange.


AsiaFlux Conference 2025
Gala Dinner
Nature-Based Solutions for Asia:
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A New Chapter for Regional Climate Science

"The AsiaFlux Conference 2025 reinforced a key message: true climate leadership is grounded in real data and hard work, not just promises. Whether in discussions or by peatland flux towers, the week underscored the vital role of empirical science in advancing climate and land stewardship."

The conference marked a defining moment for Southeast Asia, demonstrating that the region is not just participating in global climate science but leading it. Through rigorous fieldwork, open knowledge exchange, and cross-border collaboration, Southeast Asia is shaping the future of land-based climate solutions and nature-based strategies for sustainability.

As participants left Riau, the momentum continued, sparking new collaborations and ideas across labs, forests, universities, and policy offices. AsiaFlux 2025 showed how science, driven by commitment and collaboration, can turn knowledge into meaningful action for a sustainable future. The conference also highlighted the region's evolving leadership, with a new generation of curious, capable, and connected scientists ready to lead in blending science and sustainability to address global climate challenges.

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