



Newsletter



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Dear iLEAPS Community,

The March 2026 issue of the iLEAPS Newsletter reflects a period of strong scientific momentum, expanding collaborations, and a deepening commitment to addressing some of the most pressing environmental challenges of our time. Across regions and disciplines, the contributions in this issue highlight how integrated land–atmosphere research continues to evolve as a cornerstone for understanding and managing the Earth system.

A central theme emerging from this issue is the growing importance of high-resolution, data-driven approaches in tackling air quality challenges, particularly in rapidly urbanizing regions. The stakeholder consultation on the development of a dynamic emissions inventory for the Delhi–National Capital Region represents a significant step toward improving the scientific foundation of air quality management. By integrating detailed activity data, sector-specific emission factors, and continuous updates, such efforts are poised to enhance forecasting capabilities and support more informed and timely policy interventions.

Complementing this, the insights from the DelhiFlux component of the APHH project underscore the complexity of urban air pollution. The findings reveal not only the diversity of emission sources—from transport and domestic combustion to regional biomass burning—but also the importance of high-resolution measurements and modelling frameworks in capturing these dynamics. The advancement of hybrid modelling approaches and locally derived emission factors demonstrates how targeted scientific innovation can reduce uncertainties and improve the reliability

of air quality assessments in megacities.

Beyond South Asia, this issue also emphasizes the critical need to strengthen Earth system science in regions facing disproportionate climate risks. The UCAR Africa Initiative illustrates how collaborative, capacity-building efforts can bridge gaps in observational infrastructure, modelling capabilities, and scientific expertise. By fostering equitable partnerships and aligning research with regional priorities, such initiatives contribute to more resilient and informed responses to climate variability, air quality degradation, and land-use changes.

The newsletter further reflects the vitality of the iLEAPS community through its diverse regional activities, scientific engagements, and capacity-building programmes. From expanding observational networks and advancing modelling systems to supporting early-career researchers and interdisciplinary dialogue, these efforts reinforce the role of iLEAPS as a global platform for collaboration and knowledge exchange.

At the same time, the call to host the iLEAPS International Project Office marks an important moment for shaping the future trajectory of the programme. It presents an opportunity to further strengthen global partnerships, enhance inclusivity, and expand the reach and impact of iLEAPS activities in the years ahead.

As environmental challenges become increasingly interconnected—spanning air quality, climate change, ecosystem dynamics, and human well-being—the need for integrated, collaborative science has never been greater.

The contributions in this issue collectively demonstrate that progress lies not only in advancing scientific understanding, but also in translating that knowledge into actionable solu-

-tions through sustained engagement with policy-makers, stakeholders, and society at large.

This issue stands as a testament to the collective efforts of the iLEAPS community and its partners worldwide, and it reaffirms the importance of continued collaboration in addressing the complex challenges of a changing Earth system.

Welcoming Prof. Gabriel Filipelli as Co-Chair of the iLEAPS SSC



Dr. Gabriel Filipelli

We are delighted to welcome Gabriel Filipelli as the new Co-Chair of the iLEAPS Scientific Steering Committee (SSC).

Dr. Gabriel Filipelli is a Chancellor's Professor of Earth Sciences and Executive Director of the Indiana University Environmental Resilience Institute. Prof. Filipelli is a distinguished environmental scientist with extensive expertise in urban geochemistry, air quality, and the interactions between human activities and the Earth system. His work has made significant contributions to understanding environmental health risks, particularly in urban environments, and to advancing solutions for more sustainable and resilient cities.

With his strong interdisciplinary background and global research collaborations, Prof. Filipelli brings valuable perspectives that align closely with the mission of iLEAPS—advancing integrated research on land–atmosphere interactions and their role in the Earth system.

We look forward to his leadership and contributions in strengthening iLEAPS activities, fostering international collaborations, and enhancing the visibility and impact of our community.

Please join us in warmly welcoming Prof. Filipelli to this role.

Atmospheric Emission Quantification and Air Quality Impacts in Megacity Delhi: Insights from the DelhiFlux, APHH project

Gurjar, B.R., Sharma, M., Mandal, T.K. and Saxena, P.

Urban air pollution is one of the most critical issues in the world, but it is particularly severe in rapidly sprawling megacities in India. The residents of these megacities are exposed to high levels of air pollution from various sources. Megacity Delhi is considered amongst the highly polluted cities in the world. The rapid increase in urbanization and industrialization poses a severe health risk to the inhabitants. Annual concentrations of PM_{2.5} and ground-level ozone (O₃) were associated with approximately 20,000 premature deaths per year (WHO, 2014), with projections suggesting this figure could reach 30,000 by 2025 (Lelieveld et al., 2015). The need to assess the emissions and identify significant sources of air pollution, led to the development of At-

mospheric Pollution and Human Health in an Indian Megacity which was a four-year research programme (2018-2022) jointly funded by the Ministry of Earth Sciences (MoES) and Department of Biotechnology (DBT) from India and Natural Environment Research Council (NERC), the Medical Research Council (MRC) from UK under the Newton–Bhabha Fund.

The pollution challenge in Delhi is multifaceted. Local contributors include the transportation sector, biomass combustion for residential cooking and heating, road dust resuspension, and open waste burning. The episodic and seasonal pollution spikes in the air pollution are further amplified by transboundary crop residue burning (CRB) in the states of Punjab and Haryana, located upwind of Delhi in the Indo Gangetic Plain (IGP). During October–November, large-scale paddy field burning releases massive quantities of particulate matter,

greenhouse gases, and reactive trace gases, sharply deteriorating air quality across the entire IGP.

To significantly improve the estimation, characterization, and modelling of emissions in Delhi by giving estimating emission at a 1 km² resolution, APHH has a sub project titled “Megacity Delhi atmospheric emission quantification, assessment and impacts (DelhiFlux). Using a bottom-up approach, the study quantified total suspended particulate (TSP) concentrations, non-methane volatile organic compounds (NMVOCs), intermediate-/semi-volatile organic compounds (I/SVOCs), trace gases (SO₂, CH₄, CO, CO₂, NO, NO₂), and heavy metal (HM) emissions from multiple source sectors.

Chemical Characterisation of TSP

To identify the chemical composition of Total Suspended Particulate (TSP) samples from

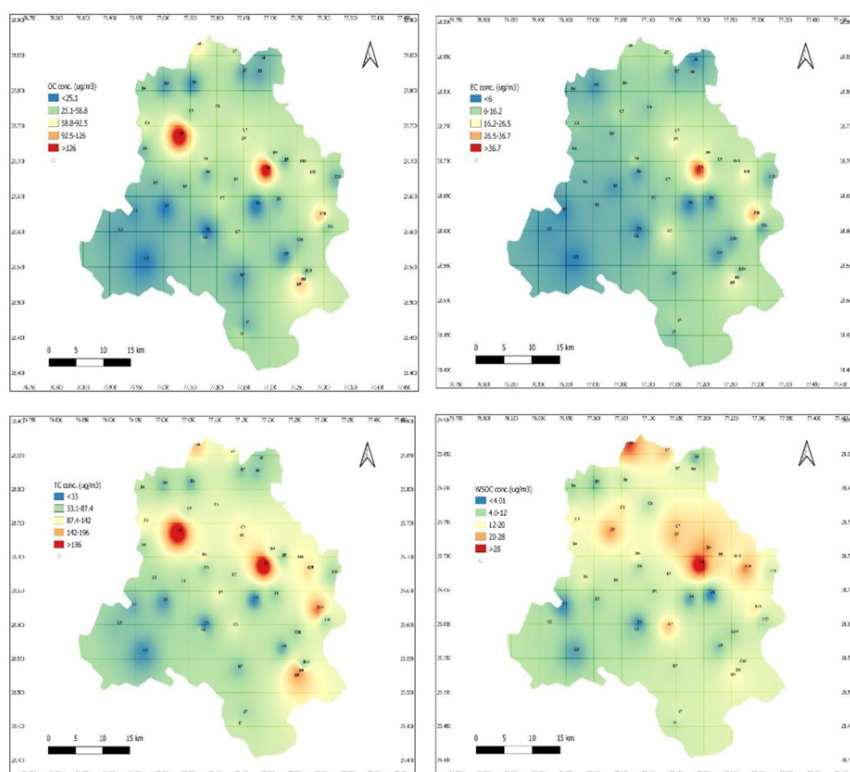


Figure 1: Spatial distribution of TSP concentration and carbonaceous components (OC, EC, WSOC) across 47 grid sites in Delhi (winter 2019).

January–February 2019 was collected and analysed using various techniques. The mean TSP concentration across the 47 sampling sites revealed marked spatial heterogeneity. The highest concentrations were recorded at Rana Pratap Bagh, a known pollution hotspot, while Udyog Nagar exhibited the highest PAH concentrations — attributable to its proximity to heavy diesel vehicle corridors and open waste burning areas. Organic carbon (OC) and elemental carbon (EC) showed elevated concentrations across north and

north-west Delhi, consistent with residential biomass burning activity (Figure 1).

The mean concentration of the sum of 16 PAH compounds (Σ PAH) is summarised in Table 1. Source apportionment using PCA identified soil dust as the primary contributor to TSP, followed by biomass burning, open waste burning, secondary aerosol, and vehicular emissions — consistent with the known source mix in Indian megacities (Nagar et al., 2017, Gurjar et al., 2022).

NMVOC Emission Factors from Domestic Fuels

The identification of NMVOC Emission Factors from domestic fuels were conducted for 76 burns of domestic fuel samples - fuelwood, dung cake, crop

Table 1: Statistical summary of 16 PAH compounds in TSP collected over Delhi during January–February 2019 (ng m⁻³)

PAH Compound	Min (ng m ⁻³)	Mean (ng m ⁻³)	Max (ng m ⁻³)	% of Σ PAH
Naphthalene	0.12	3.81	18.42	21.4
Acenaphthylene	0.05	1.23	6.57	6.9
Fluorene	0.08	1.65	7.91	9.3
Phenanthrene	0.15	2.48	12.30	13.9
Fluoranthene	0.09	1.87	9.44	10.5
Pyrene	0.10	1.54	7.82	8.7
Benzo[a]pyrene (BaP)	0.01	0.84	4.71	4.7
Indeno[1,2,3-cd]pyrene	0.02	0.73	3.92	4.1
Benzo[g,h,i]perylene	0.01	0.61	3.47	3.4
Σ 16 PAHs (total)	–	17.80	–	100

residue, municipal solid waste (MSW), and LPG — collected from 56 grid cells across Delhi. Mean NMVOC total emission factors (EFs) varied substantially by fuel type. Municipal solid waste burning produced the highest mean EF (87.3 g kg⁻¹), followed by cow dung cake (62.0 g kg⁻¹), crop residue (37.9 g kg⁻¹), and fuelwood (18.7 g kg⁻¹). These values are consistent with or exceed comparable international studies (Stockwell et al., 2015; Koss et al., 2018). The largest contributors to NMVOC emissions across all fuel types were small oxygenated species (33–55%), furanics (16–21%), and phenolics (6–12%).

Table 2: Mean total measured NMVOC emission factors (g kg⁻¹) by fuel type

Fuel Type	Mean EF (g kg ⁻¹)	Low EF (g kg ⁻¹)	High EF (g kg ⁻¹)	IVOC fraction (%)	No. of burns
Fuelwood	18.7	4.3	96.7	~21	39
Crop Residue	37.9	8.9	73.8	~22	8
Cow Dung Cake	62.0	26.3	154.7	~18	11
Municipal Solid Waste	87.3	41.4	183.5	~27	9
LPG	4.5	3.1	6.2	<1	5

Figure 2 presents the measured EFs grouped by chemical functionality for all fuel types and species. The variation between individual fuelwood species was up to a factor of 20 (4.3

–96.7 g k⁻¹). EFs measured during the flaming phase were consistently higher than for the complete combustion cycle: 88% higher for fuelwood, 87% for crop residue, 73% for coal,

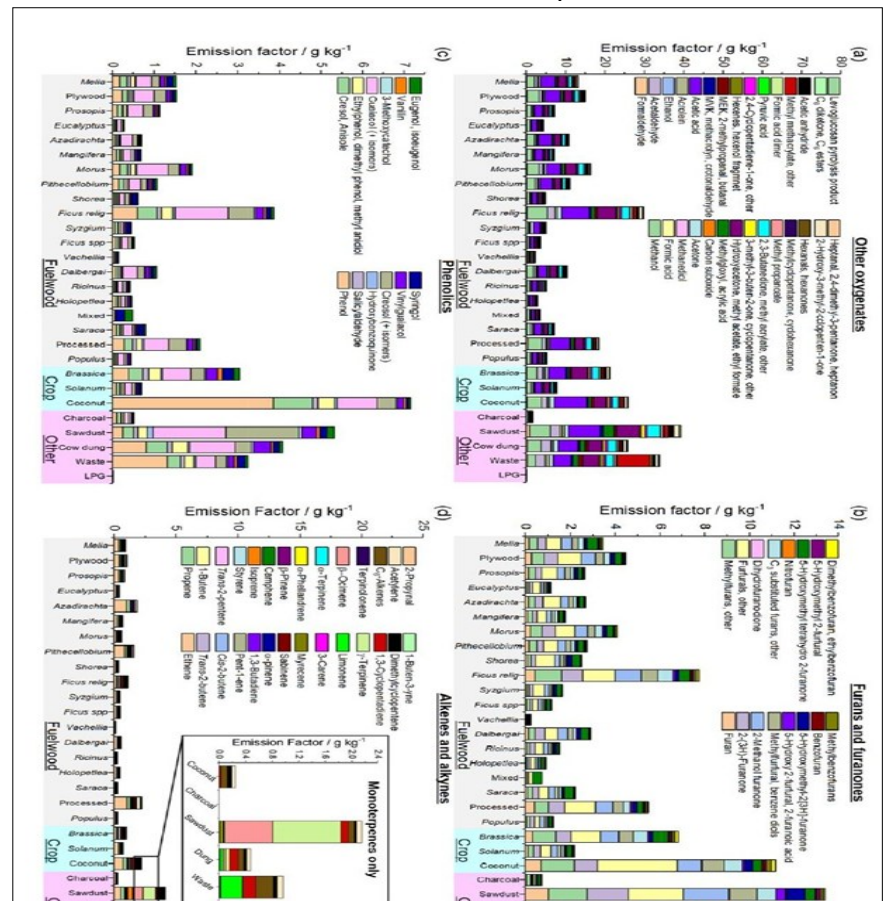


Figure 2: Measured NMVOC emission factors (g kg⁻¹) grouped by chemical functionality for all fuel types and individual fuelwood/crop species. Panels show (a) other oxygenates, (b) furans and furanones, (c) phenolics, and (d) alkenes, alkynes and monoterpenes.

and 31% for dung cake — an important consideration for real-world emission inventories.

Intermediate-volatility organic compound (IVOC) emissions constituted approximately 18–27% of total measured NMVOC from all solid fuel types, indicating that domestic combustion is a large and underappreciated IVOC source globally (Mondal et al., 2021).

Heavy Metal Emissions from the Transport Sector

A GIS-based bottom-up inventory was compiled for the base year 2018 at 1 km² resolution. Exhaust heavy metal emissions were estimated using a Tier-1 methodology with fuel consumption as the activity variable, drawing on three sets of emission factors (COPERT III, EIG 2019, Pulles et al., 2012). Non-exhaust emissions from brake wear and tyre wear were estimated as the product of vehicle-kilometres travelled (VKT) and published emission factors (Kummer et al., 2009; Johansson et al., 2009). Road resuspended dust PM_{2.5} was estimated using the US EPA AP-42 silt load methodology, incorporating measured silt loads for each road category, mean vehicle weights, and a precipitation correction factor. The GIS-based inventory estimated total

heavy metal (HM) emissions of 695.2 Mg/year for the base year 2018. The transport sector was the dominant source, contributing approximately 78% of total HM emissions. Within the transport sector, exhaust emissions accounted for 81% and non-exhaust (brake wear and tyre wear) for 19%. Of all HMs, Zinc (Zn) constituted the largest share (~48%), followed by Copper (Cu, ~21%), consistent with the dominance of tyre and brake wear as emission pathways. Road resuspended dust contributed ~4% and biomass burning ~0.1% of total HM emissions. Spatial analysis revealed that the highest HM emission densities were concentrated along major arterial roads and in central and western Delhi (figure 3) (Gurjar et al., 2022).

Crop Residue Burning — Satellite Evidence and Modelling

The Weather Research and Forecasting model coupled with Chemistry (WRF-Chem) was applied to assess the impact of CRB emissions on PM_{2.5} and secondary aerosol (SA) formation in Delhi during the October–November 2013 and 2014 burning seasons. NASA FIRMS satellite data confirmed a sharp increase in fire counts in the north-west of Delhi between 25 October and 15 November annually, corresponding to paddy harvest burning in Punjab and Haryana (figure 4). The WRF-Chem model estimated maximum PM_{2.5} concentrations of 287 µg m⁻³ in 2013 and 249 µg m⁻³

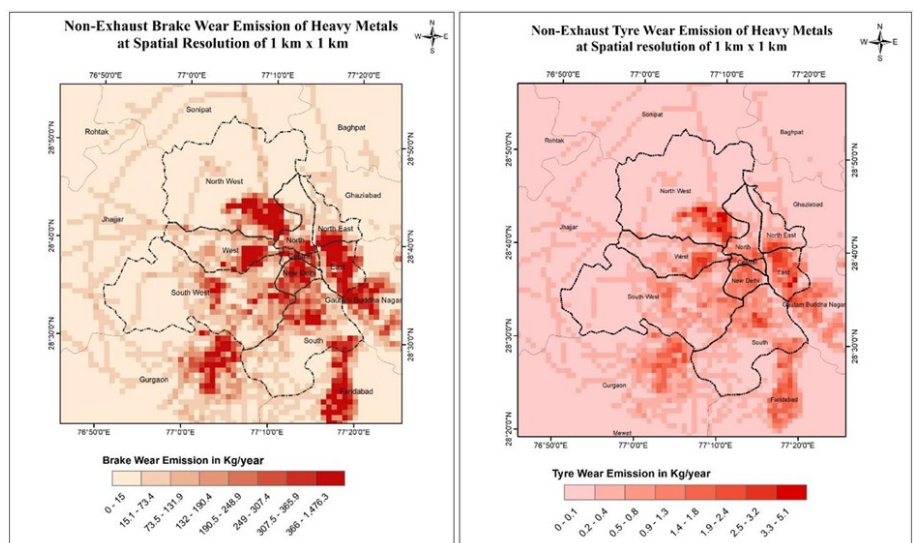


Figure 3: Gridded emissions of heavy metals from vehicles at a spatial resolution of 1 km²

in 2014 in and around Delhi during peak CRB. However, the model substantially underestimated observed $PM_{2.5}$ levels, with a mean bias of 138–263 $\mu g m^{-3}$ and a correlation coefficient of $r < 0.15$ during the CRB period — reflecting well-documented limitations of chemical transport models in capturing episodic, near-field smoke effects (Michael et al., 2014; Govardhan et al., 2015). The Hybrid Model (HM) was developed to overcome these limitations. It incorporated WRF-computed $PM_{2.5}$ from regular anthropogenic sources alongside a CRB indicator variable derived from modelled CO and NO_2 contributions from fire emissions. The hybrid model showed markedly improved performance, with statistically consistent model variables across CRB and post-CRB periods and across different monitoring locations in Delhi. Overall, the hybrid model estimated that crop residue burning contributed $31.0 \pm 16.1\%$ of $PM_{2.5}$ in Delhi during the October–November peak burning season — a finding with significant policy implications for both Delhi and the broader IGP.

Conclusions

The DelhiFlux project represents a significant advance over prior emission inventories for Delhi, both in spatial resolution (1 km²) and in the breadth of pollutants and source sectors covered. The bottom-up approach with locally measured emission factors, systematic household surveys across 6,498 households, and GIS-based disaggregation substantially reduce uncertainties compared to earlier studies relying on national-scale consumption data (Jalan & Dholakia, 2019). Total heavy metal emissions amount to 695.2 Mg/year mainly from the transport sector. The transport sector contributes ~78%, with Zn (~48%) and Cu (~21%) as the dominant species. Annual NMVOC emissions from domestic fuel burning total to about 12.01 Gg/yr. Cow dung cake and MSW exhibit significantly higher EFs than fuelwood and merit priority attention in urban air quality management. CRB contributes an estimated $31.0 \pm 16.1\%$ to Delhi's $PM_{2.5}$ during October–November, validated by a novel Hybrid Model that corrected severe WRF-Chem underestimation. North-West Delhi is

the leading district-level hotspot for biomass-derived trace gases and NMVOCs, driven by dense slum and village clusters with high biofuel dependency. This high-resolution emission inventory can prove useful in getting better results in forecasting of air pollutants.

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The UCAR Africa Initiative: Strengthening Earth System Science for a Climate-Resilient Africa

Wenfu Tang, Rajesh Kumar, Anna del Moral Mendez, and Pieter Levelt

Africa faces a rapidly intensifying set of environmental challenges driven by climate change, population growth, urban expansion, and evolving land-use practices. Despite contributing only a small share of global greenhouse gas emissions, the continent experiences disproportionate impacts in the form of rising temperatures, erratic rainfall, prolonged droughts, floods, and declining air quality. These pressures directly affect public health, food and water security, and economic stability. At the same time, scientific understanding of these processes remains constrained by limited observational networks, data gaps, and uneven research capacity across the region. Strengthening Earth System Science (ESS) in Africa is therefore central to improving resilience and enabling informed policy responses.

The UCAR Africa Initiative

represents a concerted effort to address these gaps through sustained, equitable scientific collaboration. It brings together African institutions and the international research community to co-develop knowledge, enhance technical capacity, and strengthen observational and modeling capabilities across the continent. The initiative has evolved into a broad network of researchers, institutions, and stakeholders, facilitating workshops, training programs, collaborative research projects, and knowledge-sharing platforms. Emphasis is placed on co-design and co-production of science, ensuring that research priorities are aligned with regional needs and that outcomes are both scientifically robust and societally relevant. Capacity building through training of early-career scientists, development of regional expertise, and improved access to data and tools forms a core component of this effort. This initiative has five core themes described briefly below.

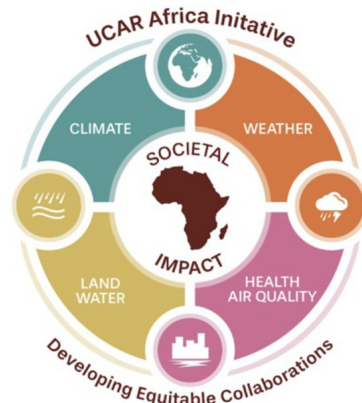
1. Air quality has emerged as a critical concern in many African cities, where particulate matter concentrations frequently exceed international health guidelines. Rapid urbanization, transport emissions, household energy use, and open burning contribute to deteriorating air conditions. However, the lack of comprehensive monitoring systems introduces large uncertainties in estimating exposure and health impacts. Expanding ground-based observations, integrating satellite measurements, and improving emission inventories are essential steps toward developing reliable air quality assessments and mitigation strategies. The initiative supports these efforts by encouraging deployment of low-cost sensors, strengthening observational networks, leveraging spaceborne observations, and advancing regional modeling frameworks.

2. Weather systems across Africa exhibit complex dynamics that strongly influence rainfall variability and extreme events. Phenomena such as the West

African Monsoon, African Easterly waves, and mesoscale convective systems play a key role in shaping regional climate patterns. Limited observational coverage and gaps in process-level understanding constrain forecasting accuracy, particularly for high-impact events like floods and severe storms. Advances in modeling and early warning systems are improving predictive capabilities, supported by collaborative research efforts and improved data assimilation techniques promoted under the initiative.

Climate variability and long-term change present additional layers of uncertainty. While global and regional climate models provide useful projections, their application in Africa is often challenged by coarse resolution and insufficient representation of local processes. Land-use change, agricultural expansion, and biomass burning are contributing to evolving greenhouse gas emissions, while natural aerosols such as desert dust introduce further complexity in climate forcing. Strengthening high-resolution modeling, improving emission datasets, and integrating sat-

ellite observations are key priorities that must be advanced through collaborative scientific efforts.



3. Land and water systems are undergoing significant transformation due to urban growth, deforestation, and changing agricultural practices. These changes are increasing vulnerability to floods, reducing water availability, and degrading ecosystems. With a large proportion of agriculture dependent on rainfall, fluctuations in precipitation patterns directly affect food security. Hydrological monitoring remains sparse, limiting the ability to manage water resources effectively. Efforts are underway to improve land-use datasets, hydrological models, and early warning systems to better support water and agricultural management.

4. Understanding the human

dimensions of environmental change is equally important. Social, economic, and institutional factors shape how communities experience and respond to environmental risks. Integrating social science perspectives strengthens the communication of climate information, supports inclusive decision-making, and ensures that scientific outputs are aligned with user needs. Interdisciplinary approaches are therefore essential for developing actionable and equitable solutions.

Several cross-cutting priorities emerge for advancing ESS in Africa. Expanding and sustaining observational infrastructure is fundamental for improving data quality and reducing uncertainties. Enhancing access to data, computational tools, and training opportunities will support more robust scientific analysis. Strengthening long-term, equitable partnerships remains critical to ensuring shared ownership and sustained impact.

Collectively, these efforts provide a pathway toward improving environmental understanding, enhancing early warning systems, and supporting

informed policy decisions. By fostering collaboration, building capacity, and advancing integrated scientific approaches, the UCAR Africa Initiative contributes to strengthening resilience and promoting sustainable development across the African continent.

Reference:

- Tang, W., Kumar, R., and Coauthors, 2025: The UCAR Africa Initiative: Recent insights, challenges, and opportunities to foster collaborative research for environmental sustainability. Bull. Amer. Meteor. Soc., <https://doi.org/10.1175/BAMS-D-24-0118.1>.

Briefing about Stakeholders' Consultation Workshop for "Development of High-Resolution, Dynamic Regional Emissions Inventory for Delhi-National Capital Region"

A Stakeholders' Consultation Workshop was held today at the India Habitat Centre (IHC), New Delhi, under the consortium project titled "Development of High-Resolution, Dynamic Regional Emissions Inventory for Delhi-National Capital Region". The project is funded by the Central Pollution Control Board (CPCB) and is being closely monitored by the Commission for Air Quality Management in the National Capital Region and Adjoining Areas (CAQM). The project is being executed by a consortium of leading research institutions Automotive Research Association of India (ARAI; lead agency), The Energy and Resources Institute (TERI), Indian Institute of Tropical Meteorology (IITM), Pune, and Indian Institute of Technology Delhi (IIT-D).

The project seeks to develop a high-resolution (500 m × 500 m) emissions inventory for the baseline year 2026, using up-to-date activity data and NCR-specific emission factors across multiple economic and pollution-contributing sectors. The project also incorporates an annual update mechanism for the next three years, enabling the emissions database to remain current and scientifically robust. This updated emissions inventory will support the region's Air Quality Early Warning System (AQ-EWS), enhancing the accuracy and timeliness of air quality forecasts for Delhi-NCR.

- The project consists of several specialized modules, including:
- Baseline emissions inventory for 2026
- Model-based source apportionment using AQ-EWS
- Future emissions scenario analysis
- GIS-enabled interactive digital platform
- Development of new

emission factors and PM source profiles

- Annual updates of emissions and air quality assessments

These outcomes will strengthen regulatory decision-making, support research innovation, and empower the broader public with improved access to air quality information.

The workshop brought together policymakers, regulatory bodies, leading research institutions, industry representatives, and civil society organizations to discuss the project framework and chart a collaborative path toward improved air quality management in Delhi-NCR.

The inaugural session was graced by Shri. Rajesh Verma, Chairperson-CAQM, Dr. Bharatkumar Sharma, Member Secretary-CPCB, Dr. Reji Mathai, Director - ARAI, Dr. Suruchi Bhadwal, Director -Climate Change and Air Quality, TERI, and Dr. Sachin Ghude, Scientist-F, IITM-Pune who shared encouraging and insightful



thoughts. Shri. Moqtik Bawase, Principal Investigator of the project, from ARAI presented the overview of the project, its significance and highlighted the importance of stakeholders' participation in the project. The workshop was compered by Dr. Anju Goel, Associate Director (Air Quality Research), TERI and the vote of thanks was proposed by Prof. Sri Harsha Kota, IIT Delhi. The session on data collection process for emission inventori- zation was chaired by Dr. S. D.

Attri, Member (Technical)- CAQM and he emphasised the need of participation of stake- holders' and sharing of data for effective execution of the project. Shri. Yogesh Sathe, ARAI provided overview of elements of emission inventory and data collection activities planned under this project. The pro- gram ended with an appeal to stakeholders for active partici- pation for the successful exe- cution of the project.

The workshop marked an im- portant milestone in Delhi- NCR's efforts to strengthen air quality governance through data-driven interventions. CPCB, CAQM, and the consor- tium institutions expressed their appreciation to all partici- pants and reaffirmed their commitment to delivering a state-of-the-art emissions in- ventory that will support clean- er air initiatives across the re- gion.

iLEAPS Regional Updates - 2026

C hina

A major conference on Geoscience and Climate Change was held in Shanghai in January, bringing together over 1,500 experts across eight key disciplines, including atmospheric science, seismology, and land-atmosphere interactions. The event featured a dedicated session on land-atmosphere interactions, highlighting its growing importance within the research community.

India

Significant progress and engagement were reported across multiple activities - Contributions from iLEAPS SSC member, Dr. Pallavi Saxena, to global scientific efforts included authorship of Chapter 3 ("Air") in a major UN report released in December, as well as an updated chapter on tropospheric ozone impacts in the Encyclopaedia of Atmospheric Sciences.

The Future Earth–ESA project on urban air quality and resilience led by iLEASP SSC member Dr. Sachin Ghude, in Delhi is progressing, with a stakeholder meeting rescheduled to March and a manuscript in preparation. A Fog and Dew Conference is planned for September 2026, with strong financial backing and potential for an iLEAPS side event.

Further activities from Dr. Ghude include participation in the Better Air Quality conference in Bangkok, coordination of a regional consortium studying black carbon impacts on Himalayan glaciers, and continued operation of an air quality forecasting system originally deployed during the Qatar FIFA World Cup, with a related paper under review.

Japan

iLEAPS Japan continues to be highly active, having organised a joint meeting with the Global Carbon Project by iLEAPS SSC member Dr. Masayuki Kondo, featuring 26 presentations, primarily by early-career researchers. Preparations are

underway for the iLEAPS Open Science Conference in March 2027.

In place of the annual national workshop, iLEAPS Japan will host a dedicated session and lecture at the AOGS conference, which has already attracted 40 abstracts. This will provide a strong platform to discuss progress and future directions.

Australia

Efforts by iLEAPS SSC member Qiaoyun Xie, are underway to strengthen iLEAPS visibility through national scientific forums. The upcoming Earth Observations of Australia Forum in November (Tasmania) will be used to promote the iLEAPS international conference.

There is also ongoing engagement with the OzFlux community and land surface modelling groups. Future activities will focus on enhancing collaboration, particularly through working groups, and strengthening iLEAPS' role in coordinating international research and increasing its global profile.

Discussions are underway to strengthen collaboration with iLEAPS through a range of activities, including the organisation of virtual seminar series that would help foster knowledge exchange and broaden community engagement.

With ongoing developments and restructuring within CEO-AS, there is a promising opportunity to build a deeper and more sustained partnership between the university and iLEAPS, contributing to expanded scientific collaboration and increased visibility of iLEAPS activities in the North American region.

Europe

The German Meteorological Service is developing an innovative serious game aimed at helping professionals better navigate uncertainties in weather and flood forecasting. This interdisciplinary initiative brings together experts in meteorology, hydrology, game design, and disaster risk management.

At the same time, collaboration is expanding internationally, with ongoing exchanges in-

volving colleagues in Italy to share insights, compare approaches, and explore the development of joint methodologies.

Meanwhile, research efforts at the ATTO site continue to grow, with participating Max Planck Institutes and European universities advancing work in aerosol and trace gas measurements.

Africa

South Africa is strengthening its contribution to global environmental monitoring and research through several key initiatives. Flux data from six South African sites are being incorporated into the upcoming FLUXNET 2025 release, alongside integration into the data shuttle, enhancing accessibility and global collaboration. At the same time, major internally funded projects are underway focusing on the nitrogen cycle, covering the full spectrum from emissions through atmospheric chemical transformation and transport, to deposition and soil processes. Complementing these efforts is a growing interest in the use of low-cost air quality sensors, with plans for large-scale

deployment across selected urban areas to improve monitoring coverage and support more responsive air quality management.

Call to Host the iLEAPS International Project Office (IPO)

The Integrated Land Ecosystem–Atmosphere Processes Study (iLEAPS, www.ileaps.org), a Global Research Network of Future Earth, is pleased to announce an opportunity to host the iLEAPS International Project Office (IPO). The UK Centre for Ecology & Hydrology (UKCEH) will step down as host of the IPO in March 2027, and iLEAPS is now seeking a new institutional partner to support the next phase of its international mission.

About iLEAPS

iLEAPS supports cutting-edge scientific research on land–atmosphere interactions, biogeochemical feedbacks, climate and air quality, ecosystem functioning, and broader Earth system processes. Through its Scientific Steering Committee and global network, iLEAPS promotes collaboration, capacity building, international partnerships, and science–policy exchange.

Role of the IPO

The IPO serves as the operational hub of iLEAPS:

- It works with the Co-chairs and members of the Scientific Steering Committee to deliver the iLEAPS mission
- It is responsible for communication, outreach, and community building
- It facilitates capacity development, regional engagement, and new initiatives
- It provides support for iLEAPS workshops, symposia, and working groups
- It supports strategic planning and funding development
- It manages the annual grant from Future Earth and is responsible for any reporting required by Future Earth
- It supports Future Earth engagement and partnerships

What We Are Seeking

iLEAPS welcomes applications from universities, research institutes, Future Earth hubs, national science organisations, and similar bodies with experience in international collaboration and sustainability sciences.

As host of the iLEAPS IPO, the Host Institution will provide:

- Suitably-qualified staff and administrative capacity to cover the IPO operations
- Institutional infrastructure for international coordination
- Support for collaboration across world regions
- Flexibility to engage communities including early-career and Global South researchers
- Willingness to contribute to a vibrant and inclusive global network

The IPO is also responsible for:

- Hosting the iLEAPS website (www.ileaps.org) and keeping it up to date
- Operating the iLEAPS social media channel
- Producing newsletters

Co-hosting or regional hub models may also be considered. In this case, the application should clearly identify the lead organisation and describe the arrangements and responsibilities.

Strategic Priorities for the Next Hosting Cycle

The next phase of iLEAPS offers opportunities to:

- Deepen scientific collaboration across disciplines
- Enhance participation from low- and middle-income countries (LMICs)
- Strengthen science–policy interfaces
- Expand on capacity building and education (e.g., working groups, training programmes, regional activities)
- Support Future Earth strategic goals on sustainability and global change

Eligibility and Submission

Applications (6 pages max) should briefly describe:

1. Institutional profile and alignment with iLEAPS
2. Proposed hosting model, staffing, and operational support
3. Vision for strengthening iLEAPS in the coming years
4. Relevant experience hosting international programmes or networks
5. Opportunities for regional and global engagement

Timeline

- **March 2026:** Call launched
- **31 October 2026:** Deadline for applications
- **November 2026:** Evaluation of applications
- **January 2027:** Transitioning
- **March 2027:** Formal take over from UKCEH

Enquiries and Submission

Questions and applications may be directed to: ipo@ileaps.org

We look forward to engaging with interested institutions and shaping the next chapter of iLEAPS together.

Certificate Course on Climate, Ecosystems and Sustainability



The iLEAPS International Project Office, in collaboration with Hindu College, University of Delhi, has launched a nine-month hybrid certificate course on “Climate, Ecosystems and Sustainability.” The programme was formally inaugurated on 13 March 2026 at Hindu College.

The inaugural ceremony was graced by Chief Guest Dr. Yash Veer Bhatnagar, Country Head of International Union for Conservation of Nature (IUCN) India, and Guest of Honour Dr. Garry Hayman

The event was also attended by distinguished resource persons, including Dr. Renu Pandey (Indian Agricultural Research Institute), Prof. Kamna Sachdeva, and Ashish Gupta.

The course brings together 21 early-career researchers from institutions across India and features three key components: expert-led lectures and hands-on sessions from iLEAPS and international speakers; laboratory visits to leading research institutes in India; and a dedicated two-month hybrid internship programme offered by resource persons and IUCN. In total, 19

eminent experts from institutions worldwide contribute to the programme. Participants will also have the opportunity to compete for an early-career award supporting a research stay at an international university or institute.

The programme commenced with its first lecture delivered by Dr. Garry Hayman, who introduced the iLEAPS initiative and its global research agenda.



Rajesh Kumar has been awarded the prestigious Baron Nicolet Prize for the 13th biennial period (2022–2023) by the Royal Belgian Academy of Sciences. The award ceremony will be held on 14 December, when the prize will be formally conferred.

The Baron Nicolet Prize for Aeronomy is a highly respected international award that recognizes outstanding contributions to the study of the upper atmosphere, including atmospheric chemistry, ionospheric processes, and interactions with solar and cosmic radiation. Named after the renowned Belgian scientist Baron Marcel Nicolet (1912–1996), the prize honours significant scientific achievements in aeronomy.

This recognition highlights Rajesh Kumar's exceptional contributions to atmospheric science and reflects the continued global impact of his work.



Prafull Prakash Yadav has been awarded the Dr. S. K. Ghosh Memorial Young Scientist Award – 2026 (First Prize) by the Indian Meteorological Society, Kolkata Chapter, for his outstanding research paper titled “Assimilation of High-Resolution Ocean Color Monitor (OCM) Aerosol Optical Depth in WRF -Chem Improves PM_{2.5} Forecasts over the Indian Region.”

This prestigious recognition honors outstanding contributions in meteorology and allied sciences, a field vital for environmental sustainability and public health.

His work is mainly focused on air quality forecast improvement using data assimilation techniques, contributing to more accurate and reliable prediction systems.

The awarded research demonstrates significant improvements in PM_{2.5} forecasting over India by integrating high-resolution satellite data into advanced atmospheric models, supporting better air quality management and informed decision-making

EGU 2026

EGU 2026 iLEAPS Sessions

iLEAPS will be prominently represented at the European Geosciences Union (EGU) 2026 conference through PICO sessions and a townhall, showcasing interdisciplinary research and global collaboration.

PICO Session – Biogeosciences (Session BG1.13):

“Urban Ecosystems, Human Health and Well-being: A Way Towards Sustainability” Led by PS and co-convened by SVS, EE (iLEAPS), and Giles Sion (Future Earth Global Hub, Japan), this session has received 21 abstract submissions. A related special issue proposal for Biogeosciences has been drafted and submitted, with a response pending.

PICO Session – Atmospheric Sciences (Session AS3.28):

“Urban Air Pollutants in the Anthropocene: Composition, Chemistry and Health Impacts” Convened by Saurabh Sonwani (iLEAPS Asia & Middle East representative) and co-convened by SVS and Atul Kumar Srivastava (India), this session has 19 abstracts submitted, highlighting the importance of urban air quality and its impacts on human health.

Town Hall Session (Session TM19):

“Climate Change: What Policies and Actions for Vulnerable and Marginalised People?” Convened by Pallavi Saxena and co-convened by Semeena Valiyaveetil Shamsudheen and David Crookall (Ocean-coast-climate literacy, participatory simulation, debriefing, sharing), this session will provide an interactive forum for discussion on emerging topics and community priorities. The panellists include:

- Gabriel Filippelli, Indiana University, USA
- Giles B. Sioen, The University of Tokyo, Japan
- Kamna Sachdeva, The Energy and Resource Institute, India
- Saurabh Sonwani, University of Delhi, India
- Chloe Hill, European Geosciences Union, Germany
- Elias Symeonakis, Manchester Metropolitan University, UK
- Juliette Rooney-Varga, University of Massachusetts Lowell, USA



This townhall event will provide a platform for an inclusive discussion on actionable climate policies targeting vulnerable and marginalized communities, highlighting global perspectives and collaborative approaches from diverse regions.

iLEAPS Japan at AOGS 2026 (AOGS 2026 | Home)

iLEAPS Japan will host a dedicated session and lecture at the Asia-Oceania Geosciences Society (AOGS) 2026 Conference. The session has received 40 abstract submissions, providing a robust platform to showcase the progress of iLEAPS Japan and discuss future activities. This engagement highlights the active participation of the Japanese iLEAPS community and fosters collaboration across the Asia-Oceania region.

Joint MPAS/WRF Users Workshop 2026

The NSF NCAR Mesoscale and Microscale Meteorology (MMM) Laboratory invites participants to the 2026 Joint MPAS/WRF Users Workshop, bringing together developers and the scientific community working on mesoscale and global atmospheric modeling systems.

The workshop aims to provide updates on the MPAS and WRF modeling systems, discuss model development and challenges, and share progress in innovative applications and evaluation.

The scientific program will cover a wide range of topics, including:

1. Model development and updates, including improving model performance and efficiency;
2. Data assimilation development and updates for global/regional applications, including assimilation of new observations;
3. New or improved physics, physics infrastructure, and scheme evaluation;
4. Applications that include coupling to other modeling components;
5. Applications that enhance operational forecasting and seasonal prediction capability;
6. Applications of AI/ML methods using MPAS/WRF.

The workshop will include oral and poster presentations (in-person), as well as virtual oral presentations. In addition, short lectures and mini tutorials will be conducted on topics such as aerosol interactions using MPAS-GOCART2G and mesh generation capabilities in MPAS. The event will also provide opportunities for discussion on future model development and the transition from WRF to MPAS.

The deadline for abstract submission is **15 April 2026**.

- **Dates:** 22–26 June 2026
- **Venue:** NSF NCAR | UCAR Center Green Campus, Boulder, Colorado, USA (with virtual participation option)
- **More details:** <https://www.mmm.ucar.edu/events/workshops/wrf-mpas>

10th International Conference on Fog, Fog Collection, and Dew

Conference Overview

The International Conference on Fog, Fog Collection, and Dew is a triennial global event that brings together researchers, scientists, and practitioners to discuss fog, dew, and atmospheric water collection technologies.

The conference focuses on the physical processes of fog and dew formation, their environmental impacts, and advances in sustainable water harvesting techniques, especially in arid and semi-arid regions. Organized by The International Fog and Dew Association (IFDA), this conference serves as a platform to share research, solutions, and advancements in sustainable water resources.



Scientific Themes

- Fog and Dew collection as a water resource
- Fog and Dew measurement and monitoring, including in-situ sensors and collectors
- Fog and Dew field campaigns in different environments
- Fog as a water resource and its effects on human activities, including transportation, renewable energy, communications, and health
- Chemistry of Fog and Dew
- Fog and Dew Physics
- Ecosystem interaction with Fog and Dew
- Studies of ice fog, riming, and frost
- Satellite remote sensing of fog and low clouds
- Numerical modelling and forecasting of fog and dew

Host Institution

The conference will be hosted at the Indian Institute of Tropical Meteorology (IITM), Pune, a premier research institute under the Ministry of Earth Sciences, Government of India.

IITM is known for major fog research initiatives such as the Winter Fog Experiment (WiFEX), aimed at improving fog nowcasting and operational forecasting over North India.

Important Dates

- Registration opens: 1 March 2026
- Abstract submission deadline: 10 April 2026
- Acceptance notification: 1 May 2026
- Early-bird registration deadline: 31 July 2026
- Registration closes: 15 August 2026
- **Dates:** 22 – 26 September 2026
- **Venue:** Meghdoot Auditorium, Indian Institute of Tropical Meteorology (IITM), Pune, India
- **More details:** <https://ews.tropmet.res.in/fogdew26/register.php>

APARC General Assembly 2026 (APARC GA-2026)

Atmospheric Processes and their Role in Climate (APARC) is a core project of the World Climate Research Programme (WCRP). As part of its quadrennial conference series, the APARC General Assembly brings together an international community of scientists working across atmospheric processes, composition, dynamics, and climate variability and change.

The APARC General Assembly 2026 will focus on advancing our understanding of the atmosphere and its role in the climate system. The scientific program will cover a wide range of themes, including:

1. Toward High-Resolution Representation of the Climate System
2. Atmospheric Composition and Its Variability in a Changing Climate
3. Dynamical and Thermodynamic Fingerprints of Climate Forcing
4. Circulation, Composition, and Extreme Events in the Tropics
5. Climate Prediction from Sub-Seasonal to Decadal Scales

6. APARC Science with and for Society

The General Assembly provides a unique platform for researchers and professionals to present and share their latest findings, recognize scientific achievements, identify knowledge gaps, engage in focused discussions, and collaboratively shape how the APARC community can address emerging scientific and societal challenges.

The deadline for abstract submission is **30 April 2026**.

Additionally, an Early Career Researcher (ECR) event will be held on **11 October 2026 at IITM, Pune**, specifically for early-career researchers and students.

- **Dates:** 12-16 October, 2026
- **Venue:** IITM, Pune, India
- **More details:** <https://aparc2026.tropmet.res.in>

7th iLEAPS Open Science Conference, Hiroshima, Japan

The 7th iLEAPS (Integrated Land Ecosystem-Atmosphere Processes Study) Open Science Conference will be held in Hiroshima, Japan, with the iLEAPS-Japan committee. <https://esd.nies.go.jp/ileaps-japan/eng/> <https://esd.nies.go.jp/ileaps-japan/> from the National Institute for Environmental Studies <https://esd.nies.go.jp/ileaps-japan/> hosting the event at Hiroshima University. The conference is scheduled for **March 1-5, 2027**.



- **Location:** Hiroshima University, Hiroshima, Japan.
- **Dates:** March 1-5, 2027 (with pre-conference events on February 27-28).
- **Sponsor:** iLEAPS (Integrated Land Ecosystem-Atmosphere Processes Study).
- **Organized by:** iLEAPS-Japan, with support from the National Institute for Environmental Studies.
- **Focus:** Open Science within the context of iLEAPS' research on land-atmosphere interactions

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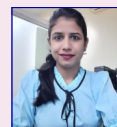
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