Urban Climate News

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From the IAUC President

Dear IAUC community,

It is my pleasure to welcome you to the latest edition of the IAUC newsletter. Time flies… this is the last newsletter before the exciting upcoming event that lies ahead: the **11th International Conference on Urban Climate** (ICUC-11) in Sydney.

I recently asked ChatGPT about ICUC-11, and this was the response: "This eagerly awaited event promises to be a hub of intellectual discourse and exchange, bringing together brilliant minds from around the globe to explore the multifaceted dynamics of urban climates. We are thrilled to witness the groundbreaking discussions and insights that will undoubtedly emerge from this remarkable gathering of urban climate experts. With only eight weeks left until the conference, we encourage you to finalize your preparations and eagerly anticipate the enriching experiences that lie ahead." Thank you, ChatGPT; I could not have said it any better! However, for more useful information on ICUC-11 please check out Negin's and Melissa's update at the end of this newsletter.

Issue No. 88 is packed with urban climate news! The feature article by **Chao Ren** and team focuses on safeguarding the elderly population in cities from the health effects of extreme weather events exacerbated by climate change. The "Urban Project" category includes a report on a recent WUDAPT-NCAR workshop, co-authored by **Jason Ching**, **Gerald Mills**, and **Fei Chen**. The report outlines the progress made in integrating urban characteristics into weather and climate models and highlights promising future prospects of this work. Next, we have a Special Report titled "Urban-climate sessions at the EGU General Assembly 2023" by **Daniel Fenner** and colleagues from the University of Freiburg, Germany. This report provides a comprehensive overview of the urban-climate sessions held during EGU.

As always, we have an essential section dedicated to conference and special issue announcements, compiled by Joe McFadden, and a Bibliography section, compiled by Chenghao Wang and the Bibliography Committee. I extend my heartfelt thank you to all the authors and contributors who have dedicated their time and expertise to enriching this *Urban Climate News* issue. Your contributions are indispensable to the growth and progress of the IAUC community!

Wishing you all a fruitful and enlightening reading experience, and hopefully, see you in Sydney!

– Ariane Middel
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Inside the June issue...

African cities and climate change: the real debate is who should pay to fix the problem

June 2023 — For most city mayors and managers in Africa, the debate about whether climate change is real is a moot topic. They know it is. They are on the front lines dealing with the impact of droughts, rising sea levels and floods, such as those in the Gulf of Guinea.

Cyclones are more frequent and intense. Cyclone Freddy, which hit Malawi, Mozambique and Madagascar in June 2023, is an example. More than 1,000 people were killed.

Climate change's impact on water supplies is particularly dire. The first city in the world to nearly run out of potable water was Cape Town in 2018. Like many cities in Africa, it draws most of its water from a rain-fed system. This meant that its water reservoirs ran close to empty when the worst drought in over 300 years started in 2015.

For those responsible for running African cities, the climate change debate is therefore around who should be paying. The question is relevant because African cities contribute the least to climate change. Yet cities in low-income countries face the highest impacts of climate change in terms of frequency and severity of weather events.

A recent World Bank report shows that 70% of greenhouse gases are generated in cities. But cities in low-income countries, including most of Africa, have contributed less than 0.2% of this total to date.

So who should foot the bill for mitigating the impacts and adapting infrastructure to future extreme weather events?

Based on my research as well as my work with many African city mayors and managers, I agree that more climate finance must reach African cities directly. Countries that developed on the back of the environment will have to step up their financial support for climate change mitigation and adaptation efforts in lower-income economies, particularly in Africa.

At the same time, African leaders at a national and city level must demonstrate foresight, planning, strong leadership and management so that the climate finance received is properly invested and can benefit their populations.

Mismatch between cause and effect

Many African leaders point to the mismatch of cause and effect in the global climate system. All countries, as per the Paris Agreement, are expected to drastically reduce their greenhouse gas emissions to prevent the global temperature rising by 1.5°C.

Former Nigerian vice-president Yemi Osimbajo re-

Most mayors and managers of African cities know too well that climate change is real. *Source:* theconversation.com

layed these concerns in 2022. He denounced the hypocrisy of richer countries which developed through climate unfriendly industries, often in the manufacturing sector. Requiring African countries to develop along low-carbon lines, and thus constrain their energy policy choices, would mean they couldn't industrialise. Yet industrialisation has been a precursor to economic growth and developmentfor all developed countries.

Re-balancing this equation so that African cities can urbanise sustainably and unlock productivity will require immediate and major investments in infrastructure. Retrofitting cities once people have already settled comes at a financial as well as political and social cost.

Costs and benefits

Cities in Africa and in low-income countries elsewhere will have to make substantial contributions to countering climate change.Yet there are potentially large benefits. A path to net zero can have substantial positive outcomes for African cities.

For example, for cities like Kampala, combating pollution is already a priority because rapidly deteriorating air quality has led to an increase in respiratory and other illnesses. Most activities in cities that are related to deteriorating air pollution, particularly around transport and industry, also directly contribute to global climate change.

Thus, tackling one improves the other and enhances overall liveability for residents in these cities.

There are also other benefits. A study conducted across 35 cities in Ethiopia, Kenya and South Africa estimated the total benefits of investing in green cities to be about US$1.1 trillion up to 2050. This is equivalent to 250% of these countries' annual economic output.

In addition, it estimated that it could generate returns of US$90 billion in Ethiopia, US$52 billion in Kenya and US$190 billion in South Africa.

The report also found that although there would be job losses from carbon-intensive industries, there could be a net positive gain on the order of hundreds of thousands of new jobs.

Who should pay

The same study that calculated the estimated total benefits of greening Africa's cities also noted that the costs of infrastructure investment were around US$280 billion between now and 2050 for all the 35 cities in Ethiopia, Kenya and South Africa.

Yet climate finance flows to these three countries in 2018 totalled only US$4.7 billion, about 1.7% of what's required. This is where upper- and middle-income countries come in. They can support their low-income country counterparts by increasing climate finance flows.

Another important source of finance will be from the private sector. Currently, about half of the climate finance globally comes from the private sector. But in Africa it makes up only 14% of the total flows. An even smaller share of this flows directly to cities.

Unlocking this will require reforms at national and city levels. This can also be supported by so-called blended finance where private financial flows are encouraged through development finance.

Managing the finances

Leadership in African cities will be key. It must ensure that this finance is invested in infrastructure that helps mitigate and adapt to the impact of climate change, and makes cities more compact and liveable.

For example, a city's shape has a substantial impact on its emissions. The more compact the city, the lower its greenhouse gas emissions. This will require more foresight in planning, as well as information and targeted incentives to shape behaviour. Nearly 1 billion people will settle in African cities between now and 2050. They should do so in areas that are safe and secure.

This is a big ask. African cities are developing in vulnerable locations. For example, the stretch of coastal west Africa between Côte d'Ivoire and Nigeria, including large cities such as Abidjan, Accra, Lomé, Cotonou and Lagos, is the fastest urbanising region in the world. It is projected to become a megalopolis by 2050.

This is the same region that in 2022 had the worst flooding in recorded history, affecting 5.9 million people.

— ASTRID R.N. HAAS *Source:* https://theconversation.com/african-cities-and-climate-change-the-real-debate-is-who-should-pay-to-fix-the-problem-207634

Intensifying Rains Pose Hidden Flood Risks Across the U.S.

In some of the nation's most populous areas, hazardous storms can dump significantly more water than previously believed, new calculations show.

June 2023 — As climate change intensifies severe rainstorms, the infrastructure protecting millions of Americans from flooding faces growing risk of failures, according to new calculations of expected precipitation in every county and locality across the contiguous United States.

The calculations suggest that one in nine residents of the lower 48 states, largely in populous regions including the Mid-Atlantic and the Texas Gulf Coast, is at significant risk of downpours that deliver at least 50 percent more rain per hour than local pipes, channels and culverts might be designed to drain.

"The data is startling, and it should be a wake-up call," said Chad Berginnis, the executive director of the Association of State Floodplain Managers, a nonprofit organization focused on flood risk.

The new rain estimates, issued on Monday by the First Street Foundation, a nonprofit research group in New York, carry worrying implications for homeowners, too: They indicate that 12.6 million properties nationwide face significant flood risks despite not being required by the federal government to buy flood insurance.

The nation is set to pour hundreds of billions of dollars into new and improved roads, bridges and ports in the coming years under the bipartisan infrastructure plan that President Biden signed into law in 2021. First Street's calculations suggest that many of these projects are being built to standards that are already out of date.

Matthew Eby, First Street's executive director, said he hoped the new data could be used to make these investments more future-proof, "so that we don't spend $1.2 trillion knowing that it's wrong."

The threats to American infrastructure from intense rain have been on stark display in recent years. In Pennsylvania, New Jersey and New York, the remnants of Hurricane Ida overwhelmed drains and turned streets into rivers in 2021. In Houston and southeast Texas, flood after flood has shut down highways and stranded people away from their homes.

The National Oceanic and Atmospheric Administration, the agency under the Commerce Department that produces the precipitation estimates used by planners and engineers across the country, declined to comment.

NOAA's estimates are "the floor, not a ceiling," said Abdullah Hasan, a White House spokesman. "States and lo-

calities often consider additional factors best suited to their local geographies when making project decisions."

Every additional increment of global warming increases the likelihood of intense rain in many places for a simple reason: Hotter air can hold more moisture. But NOAA's estimates of expected rainfall are only intermittently updated. And, as NOAA scientists described in a recent report prepared in collaboration with university researchers, the agency's estimates assume that the intensity and frequency of extreme rain hasn't increased in recent decades, despite ample evidence to the contrary.

The result, according to First Street, is that NOAA is substantially underestimating the risk of severe rain in some of the nation's largest cities: Baltimore, Chicago, Dallas, Detroit, Houston, New York, Philadelphia and Washington among them. Other places where there are large differences between First Street's rainfall estimates and NOAA's include the Ohio River Basin, northwestern California and parts of the Mountain West.

In other areas, including those east of the Sierra Nevada and Cascade Range, First Street finds that NOAA is overestimating the likelihood of intense rain, implying that resources there might not be best spent on upgrading flood infrastructure.

NOAA and its predecessor agencies have been publishing data on expected rain and snow for decades. Its latest estimates, covering nearly every part of the country, are contained in a multivolume publication called Atlas 14. (Another set of estimates, called Atlas 2, covers the Northwestern states.)

Pick any point on the map, and the NOAA atlases tell you the probabilities there of various precipitation events — that is, a certain number of inches falling over a given span of time, from five minutes to 24 hours to 60 days. But the atlas estimates are based on rain measurements collected over the past several decades, or, in some places, since the 19th century, "in a climate that just doesn't exist anymore," said Jeremy R. Porter, First Street's head of climate implications research.

By contrast, First Street's peer-reviewed methods for estimating precipitation use only rainfall records from this century, and only ones collected by the government's most modern weather stations. (First Street plans to publish additional documentation on how it computed its new estimates on July 31.)

NOAA is working on updating its atlas estimates to better account for the warming climate. But the agency says its first data for Atlas 15 might be ready only in 2026.

First Street's rain estimates also raise questions about the federal government's guidance on flood risks to homes. The Federal Emergency Management Agency maps areas of the country that it calculates to be at significant risk in a 100-year flood, or one with a 1 percent chance of occurring in any given year. FEMA's maps guide

Residents of Bridgeport, Pa., assess flooding damage following Hurricane Ida in 2021. *Source:* nytimes.com

decisions by builders, insurers and banks, and determine whether homeowners need to buy flood insurance.

But First Street's data suggests that 17.7 million properties nationwide are at risk in a 100-year event. Of those, only about 5 million properties also fall into a FEMA flood-hazard zone. That means millions of other homeowners might be making decisions with an incomplete understanding of the true physical and financial risks they face. In Houston, 145,000 properties lie in First Street's 100-year flood zone but not in FEMA's. New York has 124,000 such properties; Philadelphia, 108,000; and Chicago, 78,000.

In an emailed statement, FEMA said it welcomed outside efforts to improve the nation's understanding of flood risk but cautioned that First Street's assessments relied on data and methods that were different from its own. "FEMA's process is careful to neither understate nor overstate the current flood risk," the statement said. "The accuracy of the flood data necessary to service the nation's largest flood insurance program and the nation's largest regulatory land use program is fundamentally different than the level of accuracy necessary to support First Street Foundation."

NOAA began publishing Atlas 14 in 2004, which means that any drains, culverts and storm-water basins built since then might potentially have been sized according to standards that no longer reflect Earth's present climate. But plenty of America's infrastructure was laid down even earlier, meaning it was designed to specifications that are probably even more obsolete, said Daniel B. Wright, an associate professor of civil and environmental engineering at the University of Wisconsin-Madison.

"Certainly, updating Atlas 14 is something that needs to be done," Dr. Wright said. "But the problem is huge, in the sense that there are trillions upon trillions of dollars of things that are based on horribly out-of-date information at this point." *Source:* https://www.nytimes.com/2023/06/26/climate/rainstorms-hidden-flood-risk.html

Michael R. Bloomberg and Sadiq Khan launch US$ 30 million Breathe Cities initiative to take clean air global

June 2023 — On June 26, the first day of London Climate Week, Michael R. Bloomberg, the UN Secretary-General's Special Envoy on Climate Ambition and Solutions and founder of Bloomberg Philanthropies, and Mayor of London and C40 Chair Sadiq Khan announced the launch of *Breathe Cities* to break down barriers to action and ensure communities around the world have access to clean air.

The new US$30 million clean air initiative is a partnership between Bloomberg Philanthropies, the Clean Air Fund, and C40 Cities to save lives, improve health, and reduce air pollution that is both harmful to public health and the climate. Funding, technical support, air quality data, community engagement, capacity building and more will be provided to a group of cities to be announced later this year.

The initiative builds on Mayor Khan's visionary work to tackle air pollution in London. In August, Mayor Khan will oversee the London-wide expansion of the Ultra-Low Emission Zone, his world-leading initiative to reduce vehicle pollution, ensuring five million more Londoners will breathe cleaner air. The ULEZ has already been revolutionary in London, already benefiting four million Londoners, with harmful nitrogen dioxide (NO_2) concentrations 21% lower in inner London than they would be without the ULEZ and 46% lower in central London. Since the ULEZ was first introduced four years ago it has led to a reduction of around 800,000 tonnes of CO_2 emissions from vehicles across London – showing how air quality and carbon reduction are linked issues.

Almost no urban area has air quality that meets the guidelines of the World Health Organization (WHO). 41% of cities have air pollution over 7 times higher than WHO's recommendation, meaning their residents are breathing dangerously polluted air that can cause a suite of health issues such as asthma and respiratory illnesses. Air pollution is also associated with 7 million premature deaths each year. And worldwide, air pollution costs the global economy US$ 8.1 trillion, the equivalent of 6.1% of global GDP. Residents who live in cities where density, geography, and pollution from transportation and industry pose unique daily hazards live face to face with this reality.

"Cities around the world are proving that, with the right technology and support, they can reduce air pollution, protect public health, and fight climate change," said Michael R. Bloomberg, UN Secretary-General's Special Envoy for Climate Ambition and Solutions and founder of Bloomberg L.P. and Bloomberg Philanthropies. "Building on the effective work of London and others, our new Breathe Cities initiative brings together strong partners to help even more local leaders craft ambitious and equitable policies that can save and improve lives."

"As Chair of C40 Cities, I am committed to working collaboratively across national borders and city boundaries to tackle air pollution and address the climate crisis," said Sadiq Khan, Mayor of London and Chair of C40 Cities. "Toxic air pollution is a public health crisis in many of our cities – leading to premature death and chronic disease. Countries in the Global South – which have contributed the least to climate change throughout history – are most severely affected, bearing the brunt of climate chaos. In my own city, to help drive down emissions, we are expanding the Ultra Low Emission Zone London-wide, meaning five million more Londoners can breathe cleaner air. I'm proud that this partnership with Bloomberg Philanthropies, Clean Air Fund, and C40 Cities will enable cities across the globe to drive down emissions and tackle the air pollution crisis head on."

Breathe Cities will arm cities with resources and support by focusing on four key pillars:

Data and Research: Expand the availability of local air quality data through the use of innovative new technologies and research into causes of air pollution to provide local governments with evidence for implementing and enforcing new policies.

Stakeholder and Community Engagement: Engage local campaigns and grassroots organisers to build awareness and support for air quality action, especially for communities most affected by air pollution.

Technical Policy Assistance: Support local governments and city halls to develop and deliver clean air policies by providing technical assistance and capacity building to support policymakers in identifying and implementing solutions.

Lesson Sharing: Share learnings across cities to help other cities to act.

"Clean air is a fundamental necessity for everyone to live, grow, and thrive. That is why we are proud to partner with Bloomberg Philanthropies and C40 Cities, to tackle air pollution in cities across the world," said Jane Burston, Executive Director, Clean Air Fund. "By advancing action at the local level, promoting new data and technologies, and building a robust network to share valuable lessons along with fos-

tering community cohesion, we are collectively empowering cities to improve air quality and address one of the greatest public health problems of our time. Together, we can create a future where everyone can breathe clean air."

"With 7 million deaths every year caused by air pollution, tackling the toxic air we breathe cannot wait," said Dr. Maria Neira, the World Health Organisation's Director of Environment, climate change and health. "Nine out of every 10 people around the world, particularly those living in cities, are breathing air that is not consistent with WHO standards. Innovative solutions like this new partnership will help to arm mayors and other local leaders with political and technical support to implement stricter air quality standards and ensure people can breathe freely."

"Air pollution is the greatest environmental threat to human health," said Martina Otto, Head of Secretariat, Climate and Clean Air Coalition, UN Environment Programme. "We must tackle air pollution locally, regionally, and globally to combat this climate and health emergency. Breathe Cities has the potential to bring about health, development, and environmental benefits by removing barriers and actively working towards cleaner air. We commend Mike Bloomberg and Mayor Sadiq Khan for this new initiative, and look forward to partnering to create healthier, more livable cities where present and future generations can breathe freely."

"The difference between clean and polluted air is a matter of life and death for so many," said Rosamund Adoo-Kissi-Debrah CBE, World Health Organization advocate for health and air quality and founder of the Ella Roberta Family Foundation. "Millions of people are living with the health consequences of breathing dirty air — asthma, cancer, autoimmune diseases, miscarriages, and more non-communicable diseases. While there is still more to do, we have made progress improving air quality in London and I applaud this new effort from Mayor Khan and partners to bring the tools that have benefitted London to other cities around the world. No matter where you live, you deserve to breathe clean air, it is a social justice issue as we don't all breathe the same air."

"Clean air is a fundamental human right and we must take action to address the disproportionate impact that poor air quality has on vulnerable populations across the globe. We particularly need to pay attention to the Global South, where air pollution is worsening and yet there is very limited monitoring capacity to understand the extent and magnitude of the problem to quickly act to protect the growing vulnerable population. This is why I am extremely delighted to see the launch of this new initiative by Mike Bloomberg and Mayor Sadiq Khan, empowering cities globally to scale visionary solutions and measurable advancements in air quality," said Dr. Kofi Amegah, Associate Professor of Epidemiology at University of Cape Coast, Ghana and Lead, Ghana Urban Air Quality Project (GHAir).

"Through public-private collaboration, we have been able to provide government officials with the up-to-date data needed to make a real impact on air pollution in London," said Professor Frank Kelly, Battcock Chair in Community Health and Policy at Imperial College London. "We are thrilled to see this collaboration with Bloomberg Philanthropies expand beyond London to provide communities around the world with the tools they need to combat air pollution, save lives, and improve economies."

At COP26 in 2021, Mayor Khan called for the creation of Breathe Cities to build upon the successful Breathe London program to help more cities address the global air pollution crisis, and now he's making good on that promise. Breathe Cities also builds on existing efforts led by Bloomberg Philanthropies and the Clean Air Fund in the cities of Brussels, Jakarta, London, Milan, Paris, and Warsaw to track air pollution and shape public advocacy and policy measures to reduce pollution, and C40 efforts to increase global commitments to clean air, support mayors in implementing ambitious air quality actions, and create forums for mayors and city staff to scale solutions. Additionally, Breathe Cities builds off of Bloomberg Philanthropies support to the City of Denver and its Mayors Challenge-winning program called Love My Air, which deployed air quality sensors to track hyper-local air quality data at Denver Public Schools, and made that data broadly available, to help residents and city leaders respond to local air quality. With a clear blueprint for achieving clean air in cities, Breathe Cities will support local governments and their communities to bring policies and solutions to life.

This unique partnership builds on Bloomberg Philanthropies' efforts to support cities around the world to reduce air pollution, fight climate change, and ensure better, longer lives for communities, C40's work with its global network of nearly 100 mayors united in action to confront the climate crisis, and the Clean Air Fund's global work with governments, funders, business, and campaigners to create a future where everyone breathes clean air. *Source:* https://www.c40.org/news/bloomberg-khan-breathe-cities-launch-clean-air-global/

Outdoor Workers Have Little Protection In A Warming World

May 2023 — Even before the official start of summer – the June 21 solstice – many parts of the northern hemisphere saw unusually high temperatures, providing a taste of what's to come. American heat records were set from Texas to Massachusetts, with the National Oceanic and Atmospheric Administration predicting a hotter-than-usual June, July, and August. While many of us can seek refuge from the heat by turning on the AC or going to the local community pool, outdoor workers – like farm laborers, garbage collectors, construction workers, and air conditioner mechanics – are likely to bear the brunt. These essential workers have some of the least protections when it comes to workplace heat.

According to a new study published in *JAMA Open Network*, extreme heat events are associated with higher overall adult death rates across the U.S. Outdoor workers are particularly at risk. Between 1992 and 2017, heat stress injuries killed 815 U.S. laborers and seriously injured more than 70,000, according to the Occupational Safety and Health Administration (OSHA). Another study published last year by the Union of Concerned Scientists estimates that if fossil fuel emissions are not significantly reduced, there will be "staggering increases in unsafe workdays" by 2050, particularly for outdoor workers, with a potential cumulative loss of $55.4 billion in earnings annually. Yet heat protection standards at worksites in the U.S. are piecemeal, outdated, and inadequate, if they exist at all – and in most states, they don't. But as climate change drives temperatures even higher, making intense heat waves more likely, that may be starting to change.

Only four states currently have outdoor workplace heat standards: California, Colorado (for agricultural workers only), Oregon, and Washington. Last September, President Joe Biden announced a new initiative to address the impact of extreme heat on American labor and asked OSHA to set new federal heat protection standards that would apply to the approximately 32 million people who work outdoors. While it could take years for new rules to be implemented, on May 3 OSHA held its first stakeholder meeting, inviting public comment. Workers shared stories of passing out from the heat, of not being allowed to take breaks, and of not getting enough water. "I want important people to know that this is our reality," one farmworker commented. "Our people are getting sick. We are thirsty. And no one seems to care."

The human body can only withstand a limited range of temperatures before it begins to break down. High heat triggers a series of emergency protocols in the body designed to protect vital functions while sacrificing everything else. First, blood flow to the skin increases, putting a strain on the heart. The brain tells the muscles to slow down, causing fatigue. Nerve cells misfire, leading to headache and nausea—the first signs of heat exhaustion. If the core temperature continues to rise past 104-105°F (40-41°C), organs start shutting down and cells deteriorate, leading to kidney failure, blood poisoning, and ultimately death. When heat is combined with humidity, which is likely to increase along with climate change in many areas, the risk of overheating is even more pronounced as the body loses its ability to self-cool through perspiration.

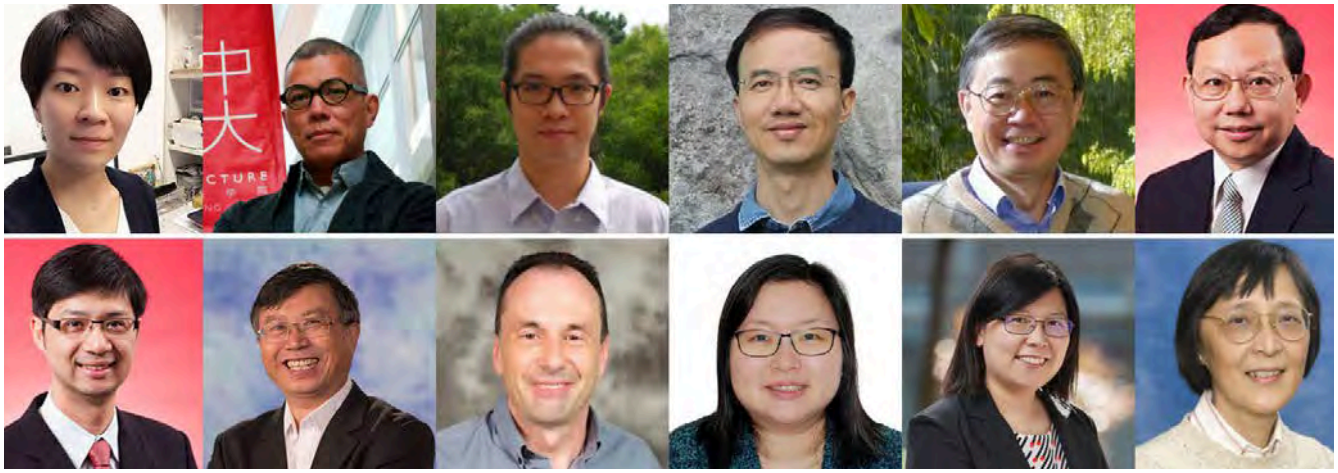
Preventing heat exhaustion, heat stress, and ultimately heat stroke, is relatively simple: rest, find shade, and hydrate. Those remedies, however, are not always easy to find, or to ask for, on a work site, particularly for workers from marginalized groups who fear putting their jobs or their paychecks on the line. Per OSHA's general duty clause, employers are supposed to ensure that workers are safe from "recognized hazards," but the rule is neither heat specific nor regularly enforced. When OSHA does cite an employer for inadequate protection, it is usually only after workers have been hospitalized or died from heat exposure.

The current small patchwork of state-level rules not only leaves millions of U.S. workers unprotected but it also creates unnecessary confusion for employers working across multiple states, says Juanita Constible, the senior advocate for climate and health at the New York-based environmental organization Natural Resources Defense Council. Constible says OSHA needs to expand and enforce standards that include: whistleblower protections; a requirement for employers to provide workers with water, rest breaks, and shade; establish heat acclimatization plans for new and returning workers; conduct heat stress prevention training for managers and employees; and set up a detailed plan for dealing with heat-health emergencies.

Some industries are pushing back against the administration's efforts to improve outdoor work conditions, arguing that establishing nationwide standards for locally defined heat hazards will be costly and impractical. But to Erick Bandala, an environmental scientist at the Desert Research Institute in Las Vegas, providing those kinds of worker protections is just common sense: "Heat protection regulations save money and lives." Bandala is the lead author on a new study published on May 11 in the *International Journal of Environmental Science and Technology* that looks at the growing threat of extreme heat on outdoor workforce health in Las Vegas, Los Angeles, and Phoenix – three of the hottest cities in North America. He found not just a strong correlation between high temperatures and heat illnesses, but also an increase in workplace injuries. "For outdoor workers, extreme heat poses extreme danger," says Bandala. But as long as temperatures keep rising, and outdoor labor is necessary, "we have no choice but to create some adaptation strategies. That means protecting the workers and protecting them as soon as possible."

Source: https://time.com/6181785/outdoor-workers-heat-climate-change/

Increasing the resilience of elderly people to the health impacts of extreme weather under future climate change



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Background

Under future climate change, extreme weather events are expected to occur more frequently and with greater intensity. This impact is exacerbated due to the increasing urbanisation and compact urban living in Hong Kong. Older adults are particularly vulnerable to the impacts of extreme hot weather due to declining physiological functions and behaviour. To develop effective mitigation and adaptation plans to address the challenges, high-resolution spatial and temporal data is urgently needed to assess exposure and vulnerability to extreme hot weather. An understanding of the impacts of extreme hot weather on the living environment and the health impacts of extreme hot weather on older adults is also important.

Introduction of the Project

This four-year project, supported by the Research Impact Fund (R4046-18) from the Research Grants Council of Hong Kong, aims to contribute by providing local data for understanding extreme hot weather in Hong Kong and incorporating the scientific knowledge of extreme heat and its associated impacts on the senior health and well-being into a comprehensive plan for response actions. Three main research tasks to translate the urban climate knowledge into practice are: (1) Understanding the future local climate for advancing local weather information services; (2) Developing guidance for the building sector based on building performance modelling and microclimate simulation under extreme heat; and (3) Highlighting the heat health risks to raise public awareness and enhancement of supporting services for older adults (Fig. 1).

Research Tasks and Findings

Climate Data

Local climate datasets on an hourly basis for typical summer conditions and extreme hot summer conditions under different greenhouse gas emissions scenarios in the 2040s and 2090s have been established using downscaled projection data.

Built Environment

Regarding the indoor environment, the building performances under different cooling provision scenarios applied to a high-rise residential building under the near extreme weather conditions were investigated and compared (Fong et al., 2023). The potential benefits of ten indoor design strategies were evaluated as compared to the current situation.

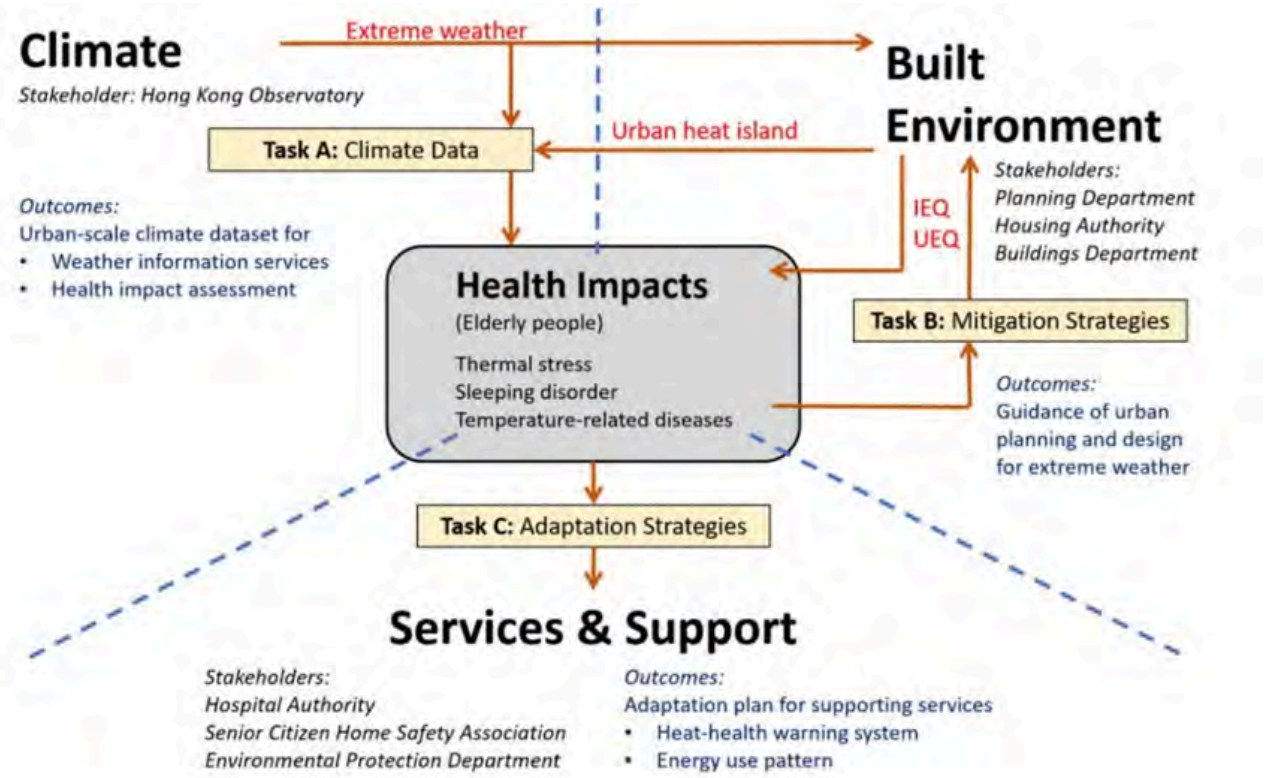

Figure 1. The research methodology and the interaction of the three disciplines.

As for the outdoor environment, different heat mitigation strategies and their combinations in the landscape were evaluated to improve thermal comfort. The study also found that tree view factor was more suitable than green coverage ratio for thermal comfort assessments and urban green infrastructure design in complex urban settings.

Heat Health and Support Services

Numerous studies were conducted to assess the health impacts of extreme hot weather. From historical trends in Hong Kong, the extreme hot weather pattern of two very hot days and three hot nights had the strongest association with mortality and there was a significant lag effect for five days. In addition, consecutive hot nights imposed even higher risk than very hot weather in the daytime, of which five or more consecutive hot nights were the most dangerous (Wang et al., 2019).

The urban heat island effect-related mortality under extreme heat scenarios in Hong Kong from 2010 to 2019 was also studied. Under extreme heat scenarios, areas of moderate and high urban heat island (UHI) effects posed a significant increase in mortality risk; and the risk of high UHI effect areas demonstrated almost double the risk of moderate urban heat island effect areas (Ho et al., 2023).

A spatiotemporal hazard-exposure-vulnerability assessment of the extreme heat risk in Hong Kong was developed. It integrated cumulative very hot day hours and hot night hours in summer, population density and principal component analysis (PCA) of demo-socio-economic characteris-tics. The heat risk was found spatially variant and high risk mainly occurred in the core urban areas in both daytime and nighttime (Fig. 2) (Hua et al., 2021).

Apart from mortality and physical health issues, hot weather also negatively correlated with the mental well-being of older adults. Based on the analyses of 320 in-home assessments in the experience sampling study, older adults with lower socio-economic status were the most psychologically vulnerable to hot weather. Engaging in meaningful activities buffered against the negative effect of extreme hot weather and this buffering effect was more significant among lower-SES older adults.

As the baseline scenario of current perceptions, there is generally a lack of public education and support services in the community regarding the heat-health issue, reflected in the questionnaires and semi-structured focus group interviews. Some older adults perceived that hot weather did not have any impact and adaptation was not necessary. Even when they feel hot at home, they would rather tolerate the heat than turn on air-conditioning, mainly due to financial considerations, as reported by both service providers and older adults (Lai et al., 2023). Most importantly, there was a gap between the self-reported thermal sensation by older adults and the threshold of hospitalisation and mortality rate, i.e. when older adults felt hot, the best time to protect them from extreme heat might have already been missed. As such, taking precautionary actions and cooling interventions play an extremely crucial role in preventing and reducing the adverse health outcomes of extreme heat among older adults.

Impacts and Implications

This project provides a holistic understanding of urban heat issues in Hong Kong from different perspectives. This allows the application and implementation of mitigation and adaptation by different sectors.

Among the follow-up actions identified, a heat alert system is of the utmost importance to both supporting services and preventive measures by the individuals. The project team has communicated with the Hong Kong Observatory (HKO) regarding the heat-health findings, especially regarding the prolonged heat and the health risks to older adults. Service enhancement of the HKO weather forecasting for heat alerts has been eventually implemented in these two years: First, upgraded precautionary actions and warnings for older adults associated with the very hot weather warning. Second, employing a new alert on prolonged heat through the mobile app and official website. Third, issuing the new "extremely hot" weather warning when the actual or predicted temperatures commonly reach 35°C in the HKO Headquarters or New Territories, i.e. core urban area or residential areas in the new towns.

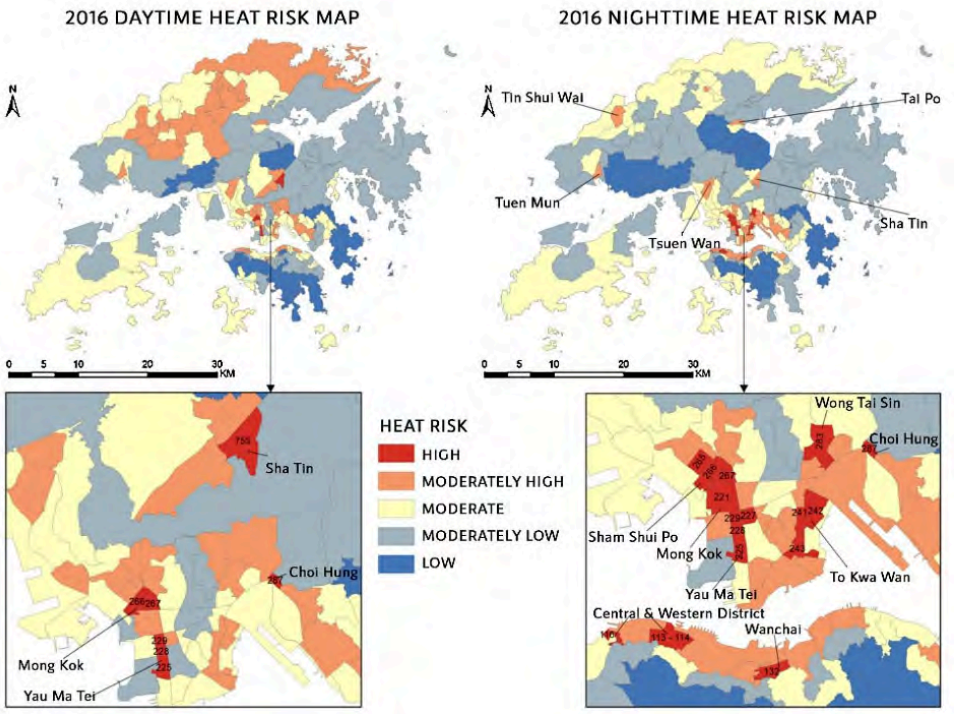

Figure 2. The heat risk maps for daytime and nighttime in 2016.

For the built environment, the future climate datasets are made available online for free for the building industry to carry out building performance simulations and thermal comfort evaluations in future urban development, taking into account the impacts of extreme heat under climate change. An easy-to-understand design guidebook for architectural practice is in preparation to encourage optimisation of the built environment in future development through adopting evidence-based heat mitigation strategies.

For the development of cooling interventions and community services, the heat risk maps for daytime and nighttime visualized and identified areas of higher heat risk to prioritise design/planning mitigations and community adaptation programmes at district and community levels, e.g. long-term planning for cool spots, cooling facilities and heat shelters. To raise public awareness and preparedness for heat-related health impacts, a series of knowledge transfer activities including health talks, video series and a press conference were conducted. Educational materials were distributed to community senior centres and stakeholders of the support services. Wide media coverage also helps disseminate heat-health knowledge and research findings.

This project is set to be completed in June 2023. Renewal funding has been awarded for extreme cold weather to further the work for a year-round understanding. More project details can be found at: https://www.cuhk.edu.hk/proj/rif

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Progress and prospects on 'urbanizing' multiscale weather and climate models: Report on a WUDAPT-NCAR workshop

WUDAPT decade

Advanced parameterizations that could account for urban canopy physics were first introduced into Mesoscale Meteorological Models (MMMs) at the start of this millennium (Kusaka et al. 2001; Martilli et al. 2002). These schemes link numerical descriptions of the urban landscape (urban canopy parameters, UCPs) to atmospheric responses. The urbanised models have provided a golden opportunity to conduct research on weather-related topics that are impacted by cities (including the urban heat island, urban precipitation effects and air quality). However, a major barrier to the application of these urbanised models has been a general lack of UCP information on cities, which has implications for model evaluation and improvement. As a result, progress toward an urban climate science and the development of multi-scale weather/climate modelling has been impeded. The World Urban Database and Access Portal Tool (WUDAPT) project was created to overcome this data gap by generating climate-relevant urban data that is consistent in terms of scale and content using tools that are publicly available.

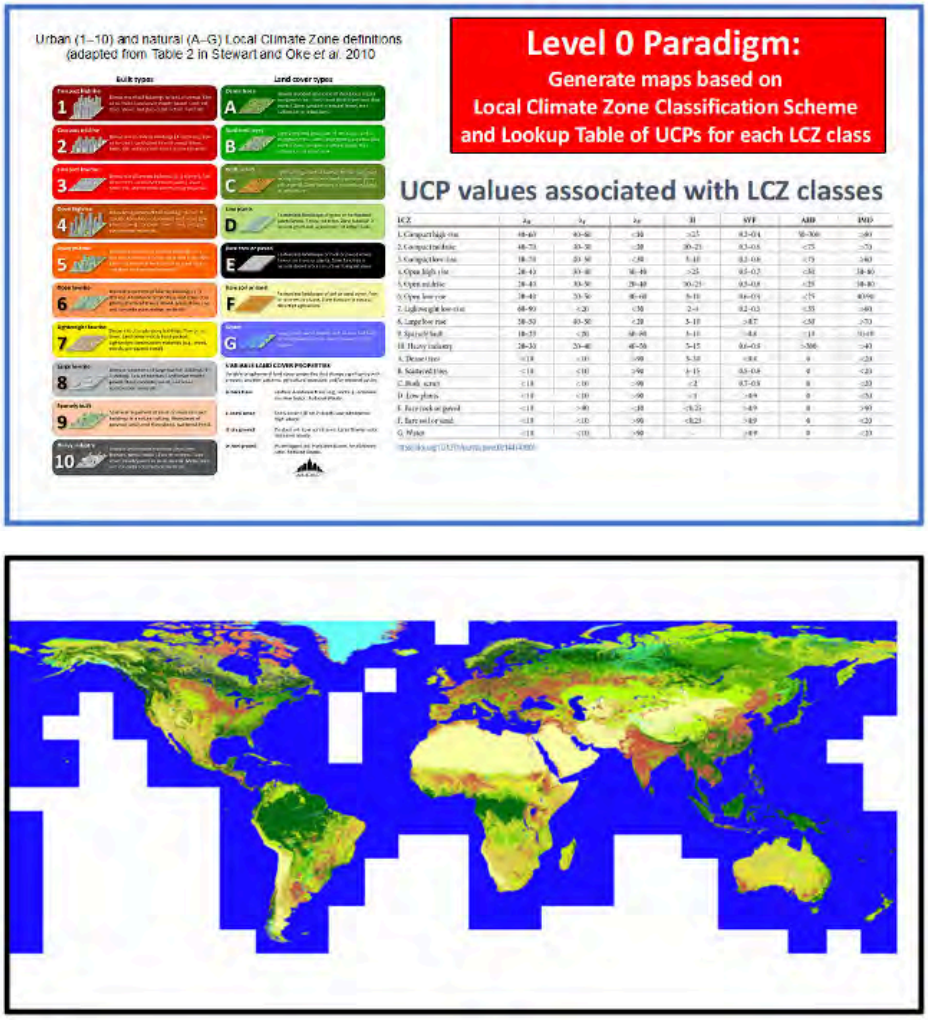

Figure 1. Top: Local Climate Zone Paradigm, featuring 10 urban classes and 7 natural classes and a companion table of ranges of values of UCPs. Bottom: Global map of LCZ (Demuzere et a.,2022)

WUDAPT was launched at the 8th International Conference on Urban Climates (ICUC8) in Dublin (Ireland) in 2012 (Ching et al., 2018). Its objectives are:

(1) Acquiring information on aspects of form and functions of cities relevant to climate studies.

(2) Storing the data in a geographic framework that is searchable and widely accessible.

(3) Building portal tools to extract parameters and analyze urban properties for cross-urban comparison and model building.

WUDAPT takes its inspiration from the NUDAPT project (Ching et al, 2009), which generated gridded UCP data for several cities in the US using detailed municipal data on building footprints and heights, and road networks, for example. However, to generate useful UCP data at a global scale a different approach is needed as urban geospatial data is either not available or does not exist. WUDAPT employed the Local Climate Zone (LCZ) scheme to categorise urban landscapes into one of ten types, alongside an additional seven natural types[1] (Stewart and Oke, 2012). Each LCZ type is associated with a range of values for a set of fundamental urban canopy parameters (e.g., impervious surface cover and sky view factor) that are applicable at a local scale (≈1km^2). In the WUDAPT project the LCZ classifications for cities were derived using remote sensing techniques (see Bechtel, 2015, and Huang et al., 2023) that subsequently evolved to generate continental scale and global LCZ maps[2] (see Demuzere et al., 2022) and Fig 1. These geospatial databases of LCZ types are also maps of UCP values that can be incorporated into a suite of models (e.g., SUEWS and WRF). The development of the LCZ mapping tool and the creation of large scale LCZ (and UCP) maps is a major achievement of the first decade of WUDAPT.

NCAR Workshop

The next phase of WUDAPT will continue to identify, design, and promote appropriate 'fit for purpose' urban applications and develop more precise urban databases to support urban climate science. As we plan the work required for this phase, NCAR took the opportunity of the annual AMS meeting in Denver (January 2023) to organise and host an International Workshop at NCAR on January 13, 2023 on the topic of 'Integration of WUDAPT with Environmental Modeling Systems' (Fig 2).

WUDAPT and NCAR are both strong proponents of community-based approaches for the benefit of science. NCAR is a significant partner to the urban climate modelling community best known for its development and support of the urbanized Weather Research and Forecasting (WRF-Urban) platform (Chen et al., 2011). There is a long standing collaborative synergism between NCAR and the urban community, dating back to the introduction of urban canopy based physics into the NCAR MM5 modeling system and NUDAPT and subsequently evolving to WRF and WUDAPT. Both strategically employ a community-based approach in their science-based developmental strategy which has been quite successful; WRF has several urban canopy-based science options and WUDAPT is providing a data infrastructure making possible a worldwide capability for multiscale meso-to-urban scale modelling applications. In recognition of the significant milestones achieved during the WUDAPT Decade, this workshop provided a platform for discussions to review implementation into WRF, CESM and eventually MPAS and a crystal ball for meaningful path forward plans towards strengthening the collaborative synergisms between NCAR and WUDAPT communities and their contributing collaborators.

Integrating WUDAPT data into NCAR modelling frameworks

The following section summarizes key Workshop highlights, including discussions of current plans and future enhancement prospects for the generation of more precise WUDAPT urban products and their integration into NCAR modelling systems – including WRF, the Community Earth System Model (CESM) and the Model for Prediction Across Scales (MPAS).

Workshop host **Fei Chen** (NCAR-RAL) and others from NCAR provided opening remarks which placed the urban work of Research Applications Laboratory (RAL) into a historical context. NCAR had previously hosted the National Urban Data Based and Access Portal tool (NUDAPT) workshop, and subsequently implemented its UCP data into WRF-Urban; the worldwide WRF user community has more than 60,000 users. Recent developments to its other physics-based climate modeling systems will allow LCZ-based UCPs to be incorporated into its Earth-Atmosphere global climate modeling system, EaSM, specifically CESM

Figure 2. Meeting of International Collaborators at their "Integration of WUDAPT with Environmental modeling systems" Workshop underway at NCAR, Boulder CO on January 13, 2023.

via its Community Urban Climate Land Surface system (UCLIM). Finally, under consideration is the envisioned urbanization to incorporate these data into MPAS (Skamarock et al. 2012).

Gerald Mills provided an overview of the evolution of WUDAPT from its inception at ICUC8. The project envisaged a tiered development of climate-relevant urban databases; the first of which was based on the Local Climate Zone scheme. The tier is complete (although further refinement will follow) and advanced canopy-based modeling can now be applied to every major urban area in the world. Acquiring higher tier data (that is more precise information on urban form and functions) is our next goal, which will be pursued using a variety of techniques such as DSC and UBEM (Ching et al., 2019) **Dan Aliaga** and **Liu He** discussed progress on the Digital Synthetic City tool (Fig 3), which uses AI approaches to simulate realistic urban landscapes that can be used to derive more precise morphological UCPs using the UCP-tool developed and described by **Michael Wong**.

Cenlin He described the recent integration of the Global LCZ map into the WRF system; details are now available in a technical document (Demuzere et al., 2023) that describes the hybrid 100-m global land cover dataset and its implementation in the state-of-the-art WRF model version 4.5[3]. In short, this hybrid CGLC-MODIS-LCZ dataset is based on 1) the Copernicus Global Land Service Land Cover (CGLC) product resampled to MODIS IGBP classes (CGLC-MODIS), and 2) the global LCZ map. Both the CGLC and LCZ products are available at a 100-m spatial resolution and are representative for the year 2018. This dataset has been implemented into the WRF Preprocessing System (WPS) as tiled binary data files with a new GEOGRID table entry to allow WRF/WPS users to flexibly use this dataset.The impact and significance of this achievement are substantial, as it will make possible myriad 'fit-for-purpose' urban to mesoscale weather prediction applications.

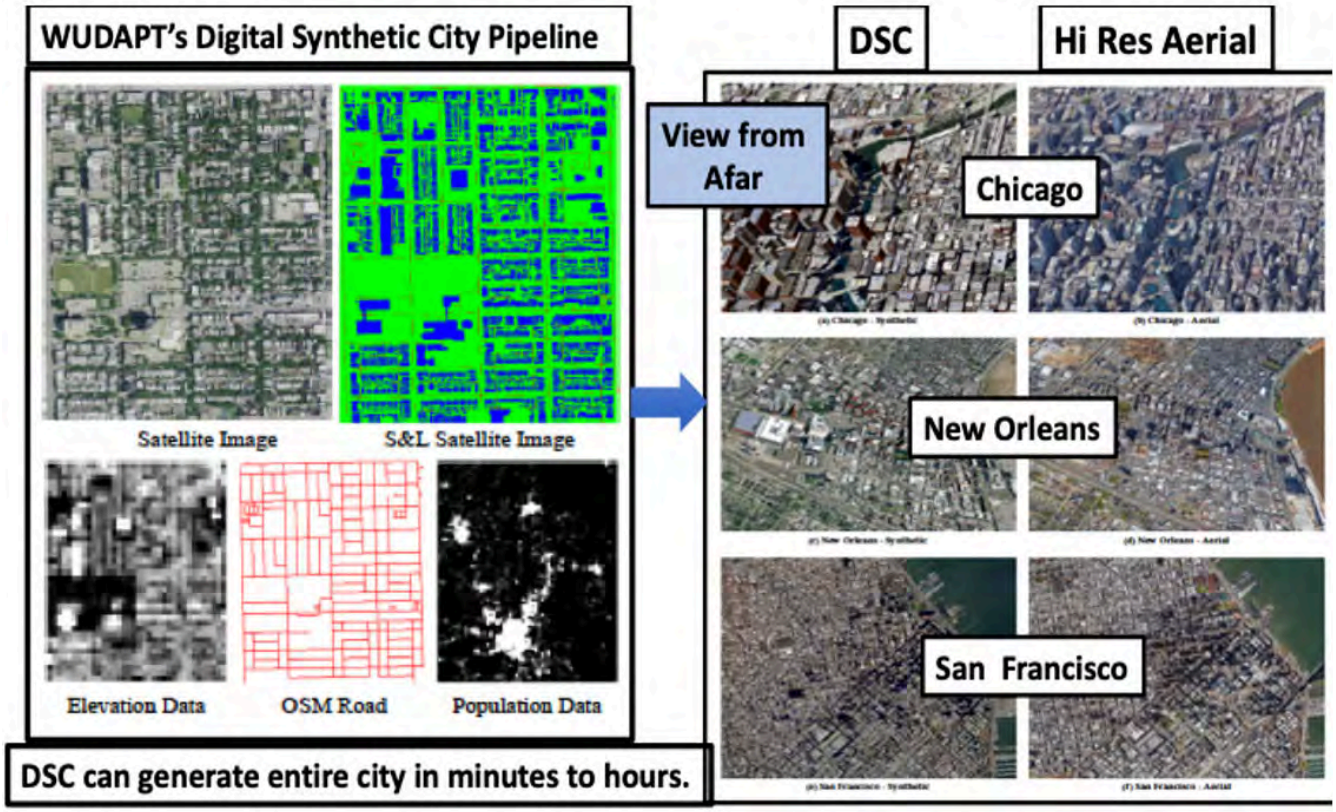

Figure 3. The DSC, and the UCP Tool under development, will generate urban-scale detailed morphology data and gridded building-related UCPs for greater precision than the LCZ approach.

Lei Zhao described a strategy and plans for implementing the Global LCZ product into the CESM via its land cover UCLM5 system. This effort was inspired by the prototype in which specific (default) UCP values were inserted into the LCZ maps of 60 eastern Chinese cities (Sun et al., 2021). Specifically, the four urban Land-Units for each grid cell in the current UCLIM system are-replaced by the urban LCZ classification (Fig 4). This implementation is currently underway based on the UCLM protocol at NCAR; further progress is to be presented at the upcoming WUDAPT Session at ICUC11.

Bill Skamarock, Principal Investigator for MPAS, provided an overview of the system which utilizes Voronoi meshes and C-grid discretization to permit multi-scale modelling without the need for nested, grid-based modelling approaches.[4] The urbanization capabilities of MPAS are at an early stage and Workshop discussions provide an impetus and awareness of the implementation challenges, given the power of the MPAS system. **Jon Pleim**, an MPAS partner, illustrated examples of air quality simulations based on EPA's global air quality modeling system that couples MPAS to the Community Multiscale Air Quality modeling system (CMAQ) (Gilliam et al., 2021). For this, MPAS calls CMAQ as a module with 2-way data transfer through a coupler analogous to its WRF-CMAQ modeling system (Fig 5). Prospects towards applications in urban areas is possible in principle, and eventually in an analogous manner with MPAS.

Discussion

Future path-forward activities and opportunities were briefly introduced and we summarise these below:

Scott Krayenhoff indicated the need for detailed 3D vegetation information in urban models and described features of his BEP-Tree model (Krayenhoff et. al., 2020), which can be implemented with the WRF model. The inclusion of trees in canopy parameter schemes can improve understanding of canopy-boundary layer mixing, building energy modelling and outdoor thermal comfort. However, computational requirements to handle direct tree-building interaction requires a new view factor calculation for different combinations of building and tree leaf area densities. Current WUDAPT LCZ data cannot support this need.

Gerald Mills described how WUDAPT data could be derived to support Urban Building Energy Models (UBEMs). This approach would use data on building archetypes, which are available in architectural databases (such as the EU's TABULA database) to create urban-scale data on buildings that could be used to run UBEM simulations and improve UCP information on the thermal properties of cities. UBEMs can be run to generate gridded Anthropogenic Heat (AH) and GHG emissions as inputs to models such as WRF.

Jason Ching presented and discussed a WUDAPT Testbed plan to stimulate and demonstrate the value of WUDAPT products to address urban climate change

Figure 4. Implementing UCPs from LCZ into the UCLM land use processor (UCLM5) of the CESM.

issues using exemplar city projects. **Ashish Sharma**, the lead for the U.S. Department of Energy's recent deployed Integrated Field Laboratory (IFL) for Chicago provided an example of a potential test; the Chicago IFL has the capability for providing critical ground-truth information to support analyses of comparative benefits of WUDAPT data at each tier of development. Other examples now under consideration would be to test the utility of the Digital Synthetic City & UCP tools for generating input parameters for running Street level pollution exposure models such as the Street-in Grid (SinG) models (Kim et al., 2018). This idea will be explored further at the CMAS 21st Symposium this Fall . Similarly, the Phoenix IFL which has a focus on heat exposure and shade modeling investigations would provide another potential WUDAPT testbed.

Concluding Remarks

The first decade of WUDAPT has just completed and the global LCZ map is a measure of the potential for community-based research initiatives. Formal integration of this data into the WRF-Urban system is well underway and should be officially released later this year. Moreover, these data will soon be available within the CESM system. Further, the prospects for WUDAPT products into the seamless MPAS modeling system for urban applications is promising. WUDAPT has made major developments in its so-called Level 1 and 2 methods. For example, the DSC has been used to simulate the urban landscapes of several dozens of cities and has been implemented into WRF in a proof-of-concept application for Chicago. The WUDAPT-UBEM approach is being tested in Dublin, again as a proof-of-concept. The WUDAPT-Testbed project provides an opportunity to evaluate the utility of our UCP data to tackle urban modeling challenges and advance urban climate science. However, it is also clear from the Workshop that more work is needed to acquire other urban data; for example, this includes information on urban trees (dimensions, locations, species, etc.), and on construction materials. These data will be needed to support multi-scale modelling efforts in the near future.

The various themes discussed at this Workshop will be further examined at the ICUC-11 in Sydney (Australia) later this summer. Please note that an opportunity is available to the urban community to prepare and submit WUDAPT relevant papers to a Special Issue of the journal *Urban Climate* on the "Decadal Anniversary of WUDAPT." Further, a special WUDAPT session at CMAS 2023 (https://cmascenter.org/conference/2023) will provide opportunities to feature and explore collaborations exploring multi-scale air quality modeling simulations between the WUDAPT and Air Quality Communities.[5] The prospects of introducing WUDAPT with the Street in Grid modeling system (such as MUNICH) towards enabling Street Level Exposure applications will be an exciting new collaboration being featured.

WUDAPT was created by IAUC; it is committed to being community-based. So, whether currently involved or inspired to make a difference, please consider initiating and/or becoming a collaborator in WUDAPT Application inspired "TESTBED" projects.

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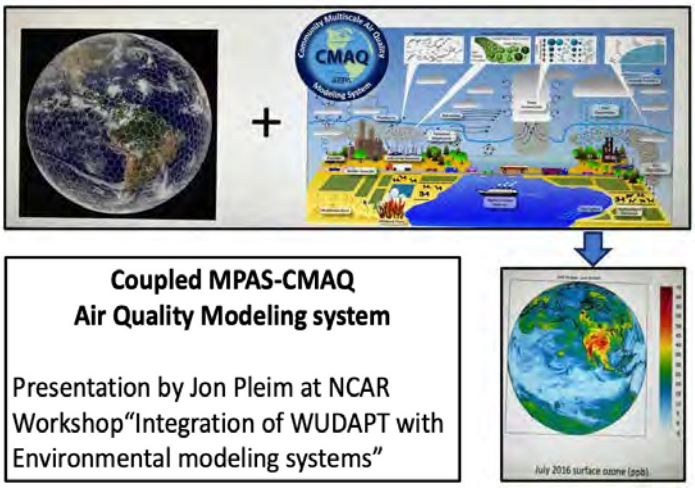

Figure 5. The MPAS-CMAQ system.

[1] There is a large and rapidly growing body of supporting peer reviewed literature (>400) on LCZ since it was first proposed (Chao Ren, personal communication).

[2] See the LCZ generator at https://lcz-generator.rub.de/

[3] See https://doi.org/10.5281/zenodo.7670653.

[4] https://www.mmm.ucar.edu/models/mpas

[5] https://cmascenter.org/

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Urban climate sessions at the 2023 EGU General Assembly

By Daniel Fenner (University of Freiburg, Germany), Gabriele Manoli (École Polytechnique Fédérale de Lausanne, Switzerland), Gaby S. Langendijk (Climate Service Center Germany, Germany), Maider Llaguno-Munitxa (UCLouvain, Belgium), Dragan Milosevic (University of Novi Sad, Serbia) and Ting Sun (University College London, UK)

This year's General Assembly of the European Geophysical Union (EGU) was held as a hybrid event in Vienna, Austria, and online from April 23-28, 2023. More than 18,000 researchers from 107 different countries attended the meeting, the vast majority of them in person at the busy Austria Center Vienna conference location.

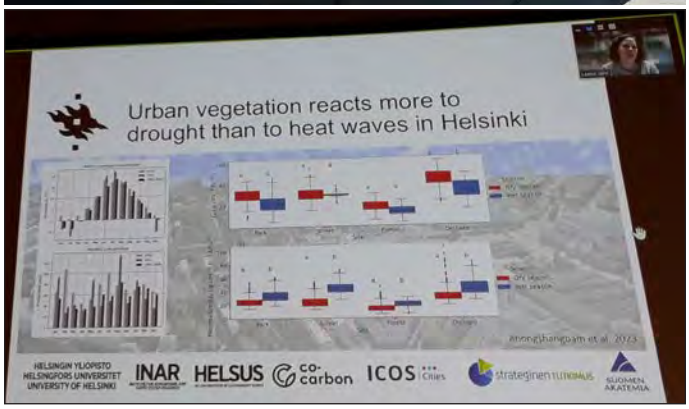
A number of sessions touched on urban climate and related fields, the largest being the session on "Urban climate, urban biometeorology, and science tools for cities", which followed similar sessions over the past years. The session was jointly convened by **Daniel Fenner** (University of Freiburg, Germany), **Hendrik Wouters** (VITO, Belgium), **Natalie Theeuwes** (Royal Netherlands Meteorological Institute, The Netherlands), **Matei Georgescu** (Arizona State University, USA), **Gaby Langendijk** (Climate Service Center Germany, Germany), **Dragan Milošević** (University of Novi Sad, Serbia) and **Valentina Vitali** (WSL, Switzerland), with support as session chair on site by **Matthias Demuzere** (Ruhr University Bochum, Germany).

The session welcomed contributions from a broad variety of topics, reflecting the range of scientific fields connected to urban climate, human biometeorology, climate change in urban environments, urban adaptation, and urban green spaces. More than 40 oral presentations were given, both on site and remotely, and 22 posters were presented in the large poster halls. For the first time, the session spanned two days, with one full day of oral presentations and a second day with more oral presentations and a poster session.

The oral presentations were organised in six blocks, covering the topics of "Multi-scale observations and crowdsourcing", "Model development and evaluation", "Climate change, mitigation, and adaptation", "Science tools and services for scientists and cities", "Urban thermal comfort and heat stress", and "Urban trees, urban green, and nature-based solutions".

A highlight of the session was the invited talk by **Prof. Leena Järvi** (University of Helsinki, Finland) entitled "Observations and modelling of urban carbon and water fluxes to aid cities in climate mitigation and adaptation". She highlighted the importance of different urban green infrastructures for urban carbon storage, especially lawns, and showcased several of her recent and ongoing studies conducted with observations and models in Finland. This year's session concluded with the poster presentations, and many participants took the opportunity to discuss the posters in detail, both on-site as well as online.

Audience listening to the diverse oral presentations during the "Urban climate, urban biometeorology, and science tools for cities" session.



Prof. Dr. Leena Järvi giving her solicited talk at EGU23, held both online and at the Austria Center Vienna.

Another session on "Modelling and Monitoring Complex Urban Systems" was convened by **Gabriele Manoli** (École Polytechnique Fédérale de Lausanne, Switzerland), **Maider Llaguno** (Université Catholique de Louvain, Belgium), and **Ting Sun** (University College London, UK). With 20 oral presentations and 10 posters, this inter- and transdisciplinary session showcased modelling and monitoring studies on multi-sector dynamics and city-biosphere interactions – from urban climate and hydrology to urban growth, urban transport systems, buildings, energy consumption, anthropogenic emissions, and public health.

The large number of contributions covering a broad variety of topics, and the well-attended sessions with lively discussions, highlight the growing interest in urban climatology and connected fields – as well as EGU being a perfect ground to share state-of-the-art research, meet with fellow researchers, and stimulate new research ideas and collaborations. It was also great to see a large number of IAUC members presenting and attending the EGU General Assembly, and we are looking forward to next year for more urban-climate-related sessions at EGU24.

Recent Urban Climate Publications

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Ambrose G, Das K, Fan Y, Ramaswami A (2023) Comparing happiness associated with household and community gardening: Implications for food action planning. *Landscape and Urban Planning* 230 104593.

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In this edition, we present a list of publications in the field of urban climate that have mainly come out between **February and May 2023**. Publications in boldface are **featured papers** recommended by the Bibliography Committee. If you believe your articles are not included, please send the references to my email address below with a header "IAUC publications" and the following format: Author, Title, Journal, Year, Volume, Issue, Pages, Dates, Keywords, URL, and Abstract.

For this quarter, we would like to warmly welcome Dr. **Surabhi Mehrotra** (Maulana Azad National Institute of Technology, India), who recently joined the committee.

We are always looking for researchers at any career stage (especially early career) to join the committee and contribute to the IAUC community. If you are interested in joining or would like to learn more information, please feel free to let me know via the email address below.

Happy reading,

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Upcoming Conferences...

ASIA OCEANIA GEOSCIENCES SOCIETY (AOGS) 20TH ANNUAL MEETING SESSION ON "CITIES, EXTREME WEATHER, AND CLIMATE CHANGE"
Singapore • July 30 - August 4, 2023
https://www.asiaoceania.org/aogs2023/

17TH NATIONAL MEETING OF ENVIRONMENTAL COMFORT IN THE BUILT ENVIRONMENT AND 13TH LATIN AMERICAN MEETING OF ENVIRONMENTAL COMFORT IN THE BUILT ENVIRONMENT
São Paulo, Brazil • October 25-27, 2023
https://www.encac2023.com/en

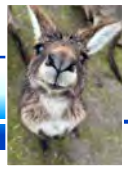
6TH INTERNATIONAL CONFERENCE ON COUNTERMEASURES TO URBAN HEAT ISLANDS
Melbourne, Australia • December 4-7, 2023
https://www.ic2uhi2023.com

AMERICAN GEOPHYISCAL UNION (AGU) FALL MEETING
San Francisco, USA • December 11-15, 2023
https://www.agu.org/fall-meeting/
Abstract deadline August 2, 2023

Call for Papers

SPECIAL ISSUE ON "RECENT PROGRESS IN ATMOSPHERIC BOUNDARY LAYER TURBULENCE AND IMPLICATIONS TO SURFACE- ATMOSPHERE EXCHANGE" in *JGR Atmospheres*
https://agupubs.onlinelibrary.wiley.com/hub/jgr/journal/21698996/features/call-for-papers
Submission Deadline: 31 August 2023

SPECIAL ISSUE ON UNDERSTANDING URBAN CLIMATES WITH ARTIFICIAL INTELLIGENCE AND EARTH OBSERVATION in the *International Journal of Applied Earth Observation and Geoinformation*
https://www.journals.elsevier~understanding-urban-climates-with-artificial-intelligence-and-earth-observation
Submission Deadline: 1 October 2023



ICUC11 update: Welcome to Sydney

The presentation program for ICUC11 is now live on the conference website. We have planned 5 days of presentations in 5 parallel sessions (~420 presentations)! The poster program will be coming shortly, so be sure to keep an eye on your email if you are presenting a poster. In addition to the conference oral and poster presentations, we also have some exciting side events that may be of interest.

Urban Climate Masterclass (August 24-26)

Held in the days leading up to ICUC 11, the urban climate masterclass will be offered both online and in-person at UNSW Sydney. A collaboration between the International Universities Climate Alliance (IUCA) and the UNSW School of Built Environment, the program will explore the latest research findings, best practice approaches and technologies for managing urban heat mitigation and delivering net zero built environments. The Masterclass is designed for urban planners, architects/designers, sustainable development consultants, local governments, post-graduate students and researchers.

Early Career Researchers workshop (August 27)

Held the Sunday before the conference, this workshop will cover science communication and data visualisation. The workshop will be a space where ECRs can learn more about how data visualization can transform our work from being academic papers into research that is more easily communicated and take up by policymakers, stakeholders, and communities. We also have plans in place for an early career research social event and professional development session during the conference week. Details coming soon.

Social Events

We also invite you to join us at the ICUC 11 Social Functions. Network with colleagues, create new connections and enjoy some of the things Sydney has to offer.

Welcome Reception – Venue: UNSW, Sydney / Date: Monday, 28th August 2023. Tickets are included in full registration, and additionally available for $50.00.

Gala Dinner – Venue: The Starship Sydney / Date: Thursday, 31st August 2023. Tickets: Regular: $100.00 / Student: $60.00 / Additional: $150.00

—Negin Nazarian and Melissa Hart, ICUC11 Co-Chairs

IAUC Board Members & Terms

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The next edition of *Urban Climate News* will appear in late September. Contributions for the upcoming issue are welcome, and should be submitted by August 31, 2023 to the relevant editor.

Submissions should be concise and accessible to a wide audience. The articles in this Newsletter are unrefereed, and their appearance does not constitute formal publication; they should not be used or cited otherwise.

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