Urban Weather Intelligence in the Cloud Workshop - Summary Report

Date: 16 January 2026 **Location:** Room 4.04, Simon Building, The University of Manchester

1. Overview

This workshop was sponsored by UKRI and Amazon Web Services (AWS). The event successfully brought together researchers and industry partners to share their needs and challenges in urban weather and climate modelling, as well as impact assessment.

Participants included representatives from leading environmental consultancies and technology organisations, such as WSP/Ricardo, Ramboll, Turner & Townsend, and AWS. Featuring expert presentations, a practical software tutorial, and engaging networking sessions, the workshop aimed to better connect science and engineering with environmental consultancy to support more resilient cities.

2. Topics

- **Dr Zhonghua Zheng, Co-Lead for Environmental Data Science & AI**
  - *Topic: Advances in Urban Weather and Climate Modelling*
  - Dr Zheng introduced new urban climate tools designed to address current modelling challenges and improve the accuracy of environmental assessments.
- **Prof David Schultz, Professor of Synoptic Meteorology**
  - *Topic: Weather Research at The University of Manchester*
  - Prof Schultz explained the principles of weather forecasting and demonstrated how weather forecast models can be effectively utilized for climate-related decision-making.
- **AWS**
  - *Topic: AWS cloud computing and collaborative opportunities*
  - The presentation highlighted AWS's capabilities in managing climate data, supporting sustainability initiatives, and fostering collaborative efforts across sectors.
- **Junjie Yu, Research and Innovation Assistant**
  - *Topic: Tutorial: Introduction about CLMU-Cloud*
  - Junjie provided a comprehensive walkthrough of the newly developed pyclmuapp cloud version, demonstrating how it enables one-click urban climate simulations to provide immediate decision support.

3. Key Challenges

a. Accurate urban temperature

Participants emphasised the difficulty of assessing accurate urban temperature. A major challenge is bridging the data gap between regional weather stations and the complex reality of specific urban sites.

b. Indoor climate and energy consumption

There is a pressing need for precise indoor climate and energy consumption simulations. Professionals require better methodologies to validate building's energy consumption or HVAC performance against real-world historical conditions.

c. Data acquisition and optimization

Industry partners noted that data acquisition and optimization remain a significant hurdle. Translating general historical urban weather data into precise local parameters to reveal how surfaces interact with the atmosphere is critical but difficult to achieve systematically.

d. Energy, air pollution, and CO2 emissions

Stakeholders highlighted the complex interplay between urban energy usage, air pollution, and CO2 emissions, stressing the need for integrated modelling approaches to support comprehensive urban resilience and sustainability targets.

4. Opportunities

a. Cloud simulations

The CLMU-Cloud platform offers high-resolution hindcasting. By calculating surface energy balances (radiation, sensible heat, latent heat), it translates general data into precise urban metrics. This directly empowers downstream applications in urban planning, such as optimising street canyons and selecting cool pavement materials.

b. Leveraging cloud infrastructure for sustainability

AWS cloud computing presents significant opportunities to store, process, and optimize massive climate datasets efficiently, breaking down computational barriers for environmental consultancies and enabling large-scale sustainability projects.

c. Enhancing building performance and public health

Advanced urban weather intelligence allows for the creation of actual meteorological year files to better simulate and validate building performance. Furthermore, analysing historical heatwave events can help assess pedestrian stress levels and heat-related health risks in specific neighbourhoods.

d. Strengthening cross-sector collaboration

The workshop demonstrated a strong appetite for connecting academic research with industry practice. Engaging discussions between academia and environmental consultancies (like WSP/Ricardo and Ramboll) paved the way for co-developing practical tools that directly support resilient city initiatives.

5. Conclusion

The "Urban Weather Intelligence in the Cloud" workshop established a vital platform for dialogue between climate scientists, engineers, and environmental consultants. By identifying core challenges in data optimization, accurate climate simulation, and emission management, the event highlighted the critical necessity of advanced and accessible tools. Moving forward, the deployment of cloud-based solutions and continued partnerships with industry leaders will be instrumental in translating complex urban climate research into actionable strategies for sustainable urban development.