Australian Government
Bureau of Meteorology

Urban Modelling for the 2024 Paris Olympic Research Demonstration Project

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Paris Olympic Research Demonstration Project (RDP)

➤ Endorsed by WWRP & GRUME

➤ Objective:
- "Future weather forecasting systems at ~100 m resolution for urban areas".

➤ Science Questions:
- Exploring nowcasting & NWP in cities at ~100 m.
- Probabilistic Forecasting (Ensembles).
- Big data, non-conventional data, data fusion.
- Delivery of tailored weather info at urban scale.

➤ Partners (in addition to Australia):
- WMO, France, UK, USA, Canada, Sweden, Austria, China, Hong Kong.

WMO WWRP activities focus on 4 challenges

High-impact Weather: Toward impact-based forecasts in a variable and changing climate

Water: Modelling and predicting the water cycle for improved disaster risk reduction and resource management
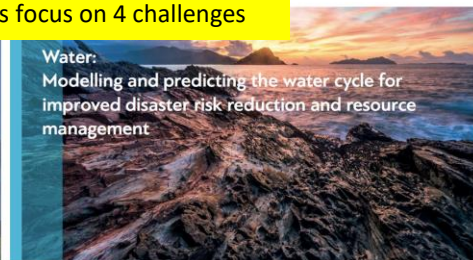
Urbanization: Research and services for megacities and large urban complexes

Evolving Technologies: Their impact on science and their use

Paris Olympic RDP


The 2024 Paris Olympics Games

WWRP – World Weather Research Program (WMO)
GRUME – Global Atmospheric Watch Urban Research Meteorology and Environment (WMO)
NWP – Numerical Weather Prediction

Why is the Bureau interested in RDP

1. Australia is one of the most urbanized countries in the world.

2. Some of our cities are experiencing a rapid urban sprawl.

3. A heightening demand for a range of services in the urban, peri-urban areas.

4. Bureau's R&D Plan 2020-2030 includes the target of providing urban scale models.

5. A Bureau proposal to develop an urban NWP system at 100-300m resolution has been preliminarily approved

6. Current operational LAMs (called "city" models) run at 1.5 km resolution.
   - Uses the "slab" scheme over urban grids.

7. The Paris RDP is an opportunity for us to:
   - learn from and collaborate with experts in urban meteorology
   - learn about urban modelling (specifically, MORUSES).
   - upskill and develop our own operational urban scale models.

Source: ABS

Source: Urban Sci. 2019, 3(2), 40.

Courtesy: Shaun Cooper
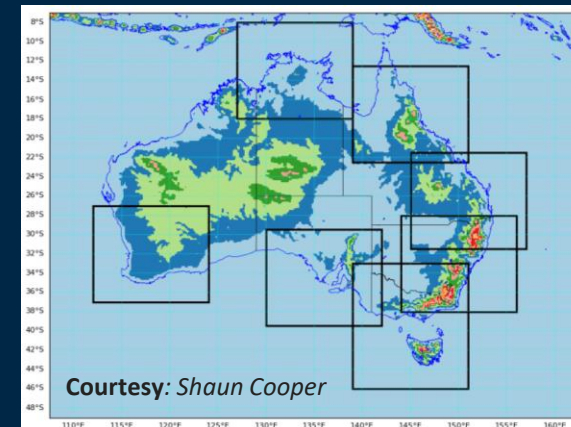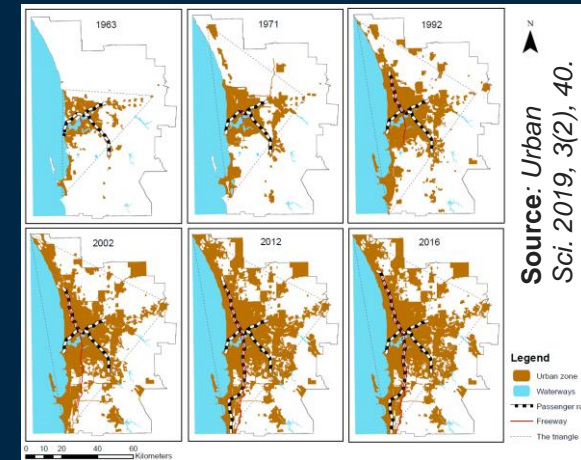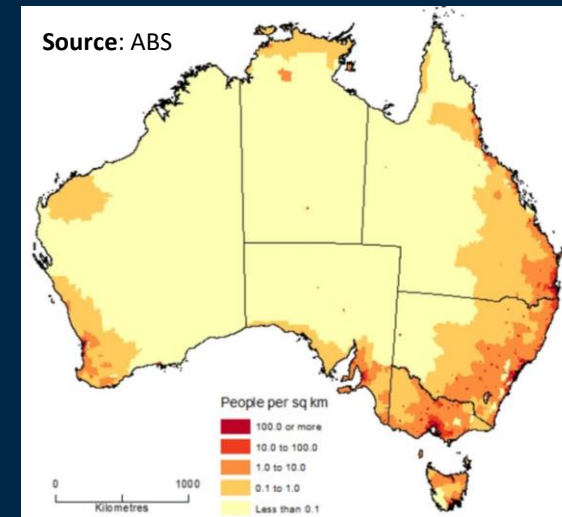
Specific modelling research questions and methodology

1. Incorporate a third-party urban data in to the MORUSES modelling framework.

2. Evaluate the impact of new urban dataset compared to the existing one (CCI).

3. The model evaluation will initially be based on a simulated heatwave case over Paris in July 2019.

4. What is the impact of resolution? (comparing 100 and 300m)

5. What are the benefits of more complex urban schemes?

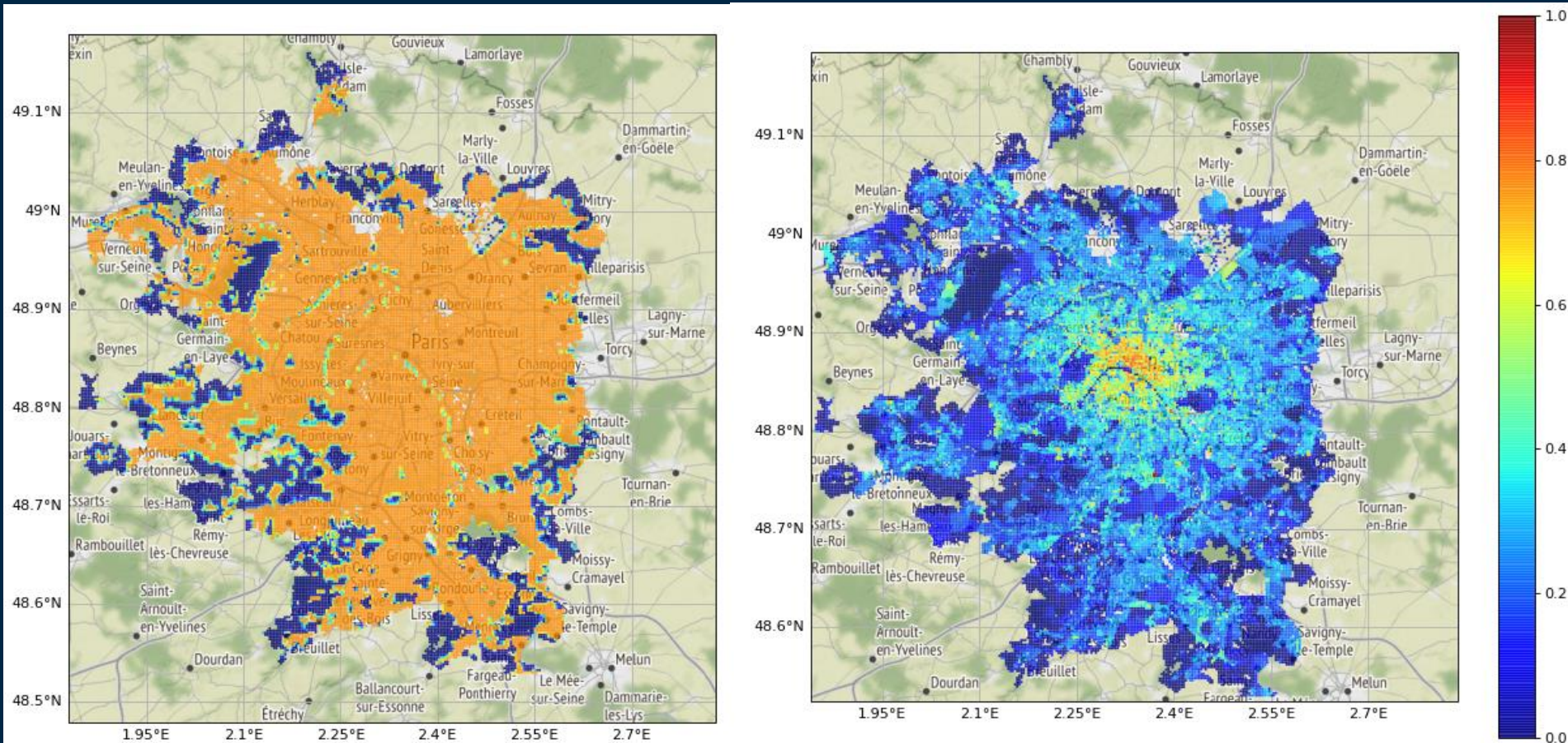6. Are models able to capture any observed UHI?

7. Model limitations?
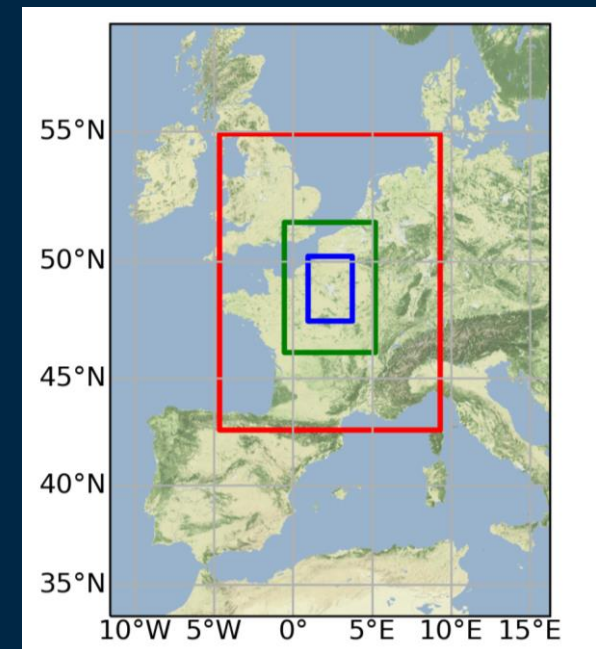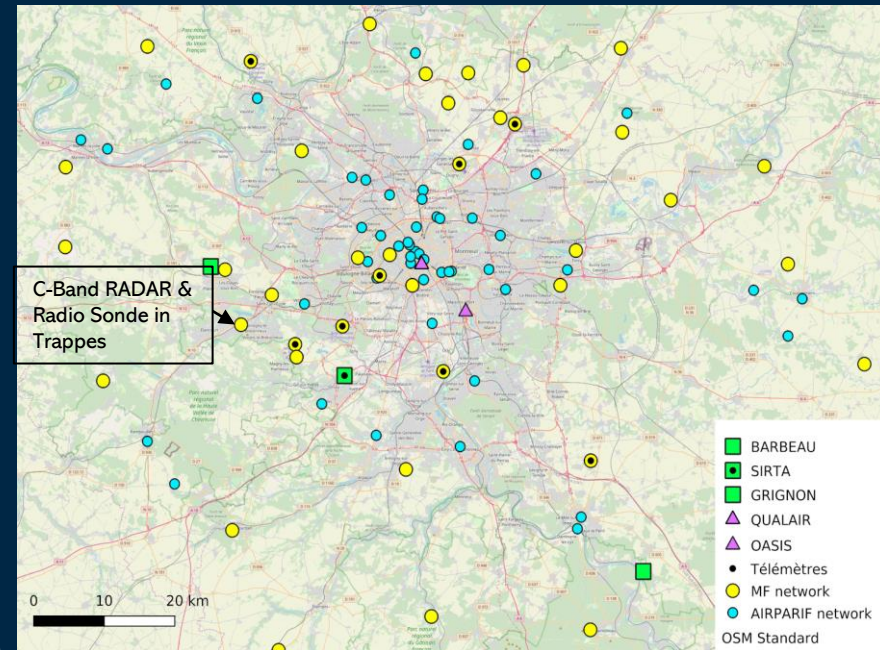
Ancillary Comparison:

Example: Urban cover fractions

UM (based on CCI)   Locally mapped

Thank you

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