Mapping the air temperature based on bicycle measurements

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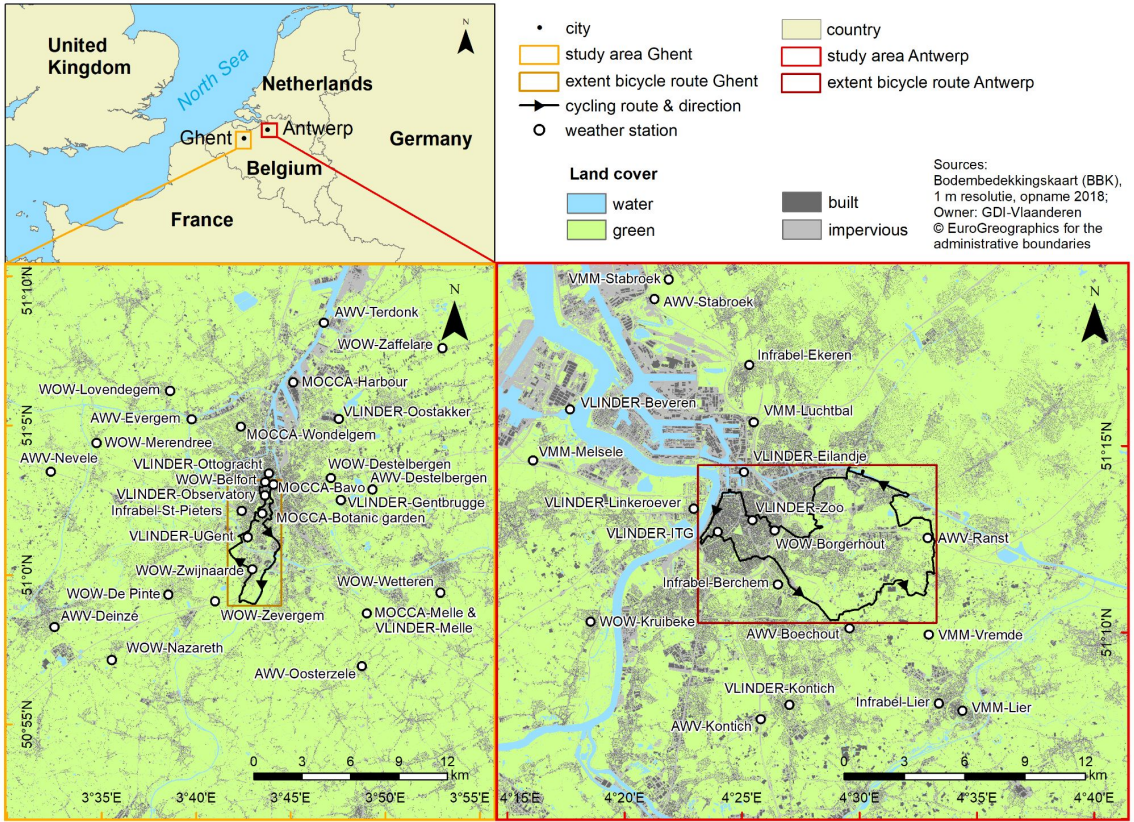
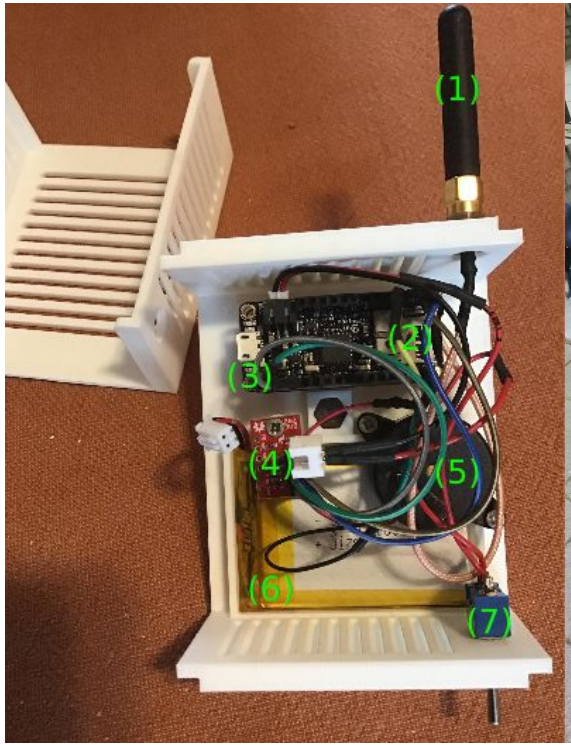
Bicycle measurements: trajectories



- Antwerp and Ghent
- Choose routes yourself
- Large variability in land cover

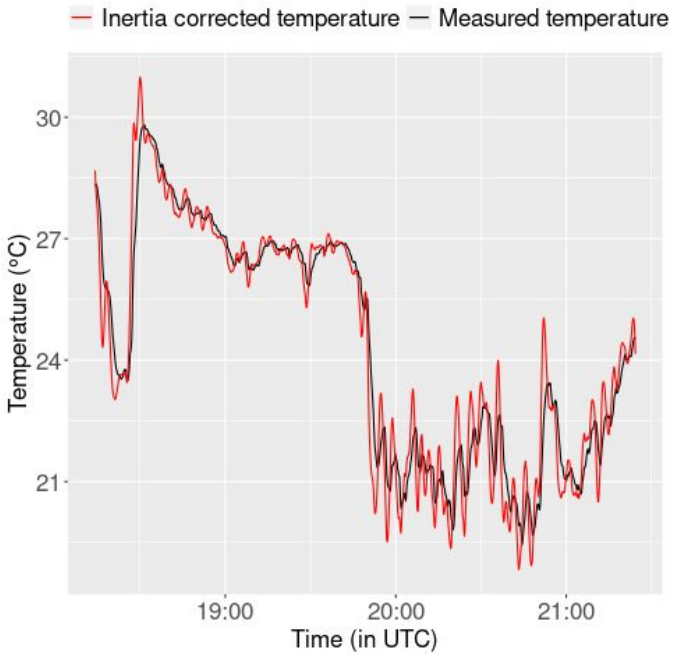
Bicycle measurements: equipment



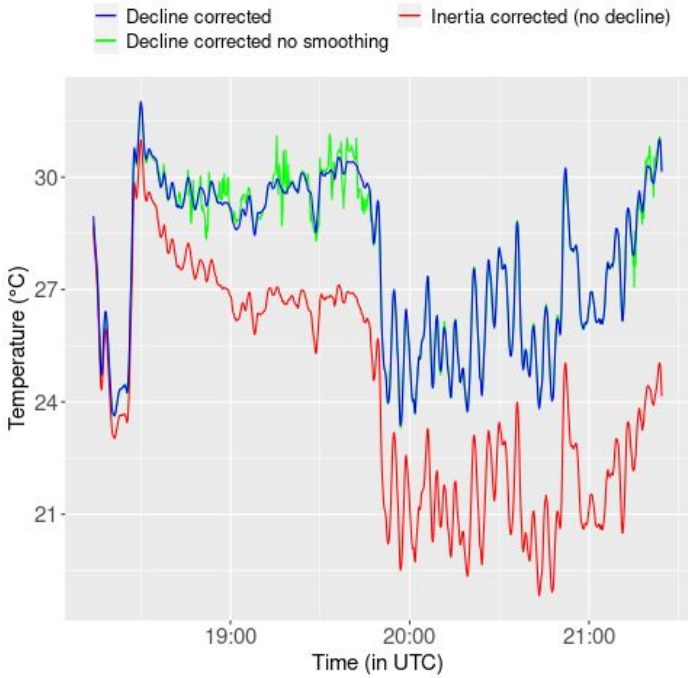
- Station developed at Ghent University itself

Temperature corrections

Correction for reaction speed of sensor

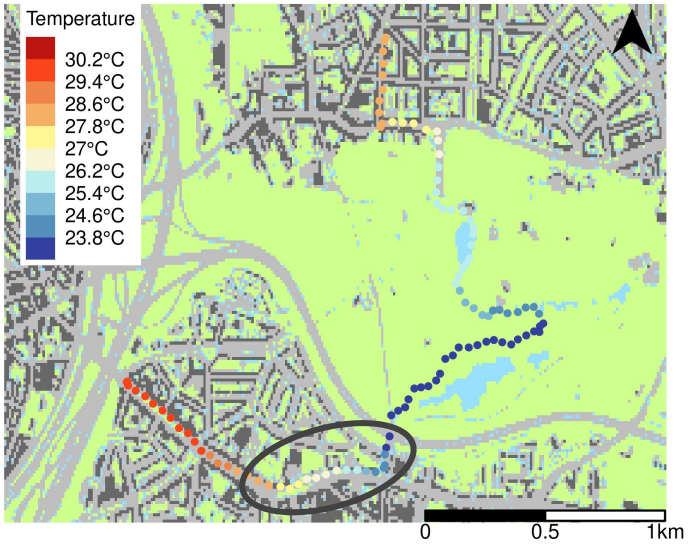


Correction for temperature evolution during the day

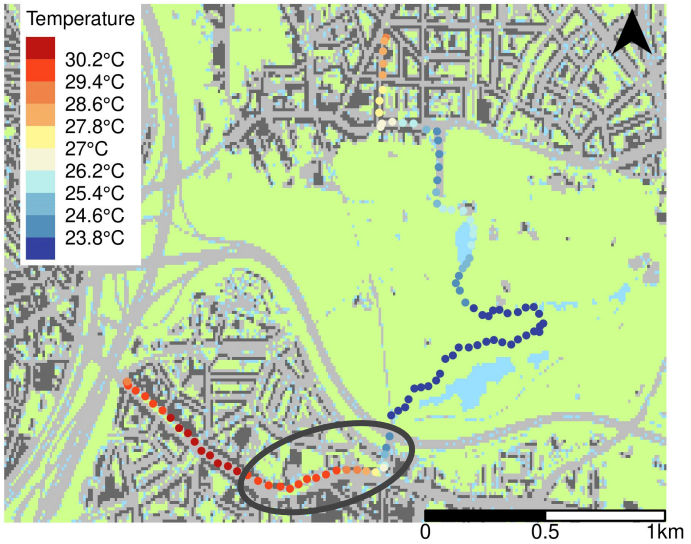


Correction for reaction speed of sensor

Without correction



With correction



Correction for temperature evolution during the day

- Based on temperature evolution of nearby stations during bicycle measurements

Weighted mean based on similarities in land cover (for 250 m radius) around bicycle measurement points and the different stations

- All temperatures referred at same time
- Traditional methods: - Assuming temperature evolution as linear

  - Correction based on temperature evolution of only one station (large dependency on selected station)

Prediction model

$$T = A * \text{impervious}(250m) + B * \text{green}(250m) + C * \text{water}(250m)$$

- Predict temperature for region encompassing bicycle trajectory

Summary methodology

Bicycle measurements

↓ Temperature corrections

Corrected temperature

↓

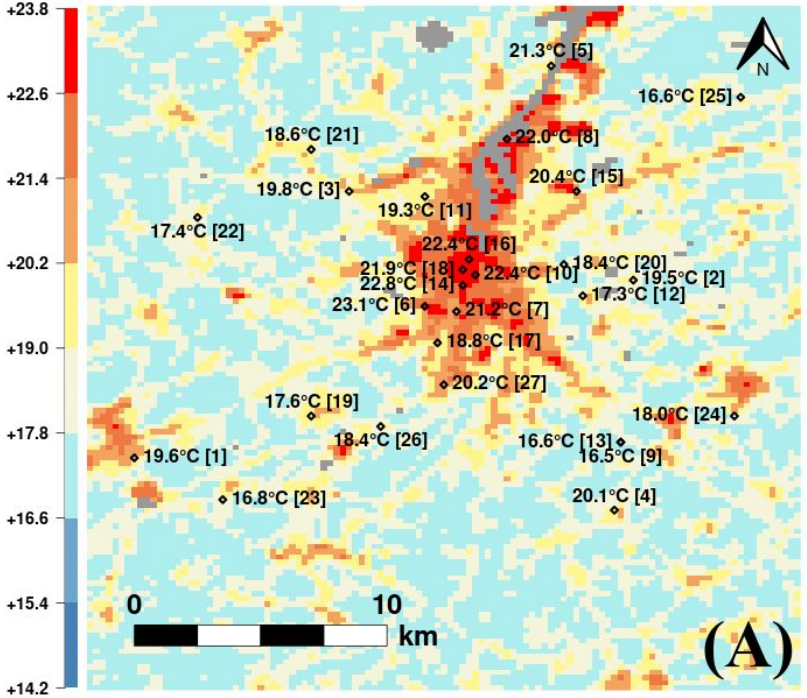
Prediction model

↓

Temperature map

↓

Validation



Conclusion

Advantages:

- Low-threshold
- Flexibility

Disadvantages:

- Limited accuracy

- Accuracy temperature sensor bicycle measurements
- Accuracy temperature sensor in-situ stations
- Simple prediction model
- Temperature corrections

Future improvements:

- More accurate sensors (if possible)
- More complex prediction model
- More measurement campaigns (different cities, multiple campaigns in one city)