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Has Rennes a heat island? From sensors and climate models to remote sensing and ecology issues.

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Has Rennes a heat island? From sensors and climate models to remote sensing and ecology issues.

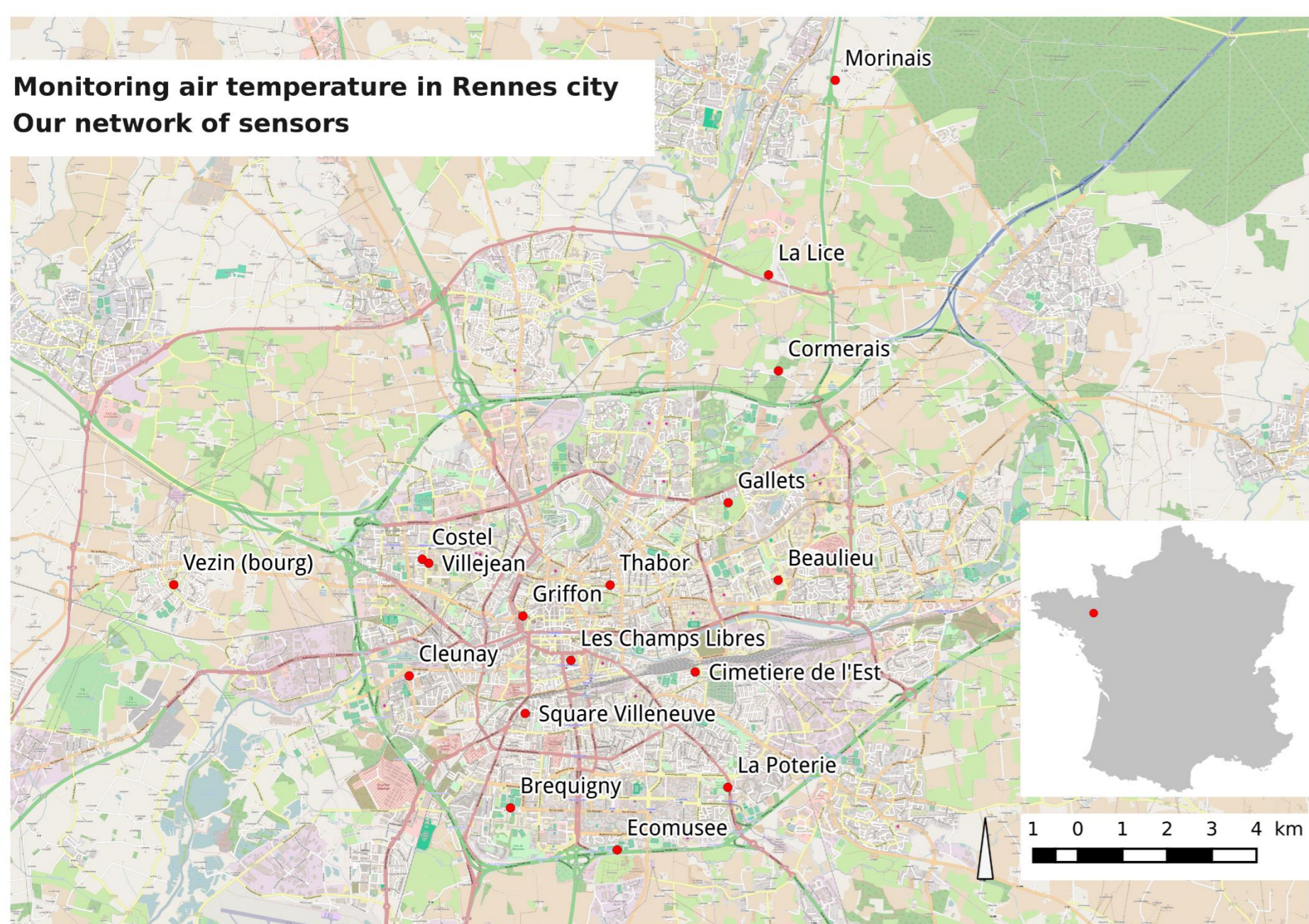
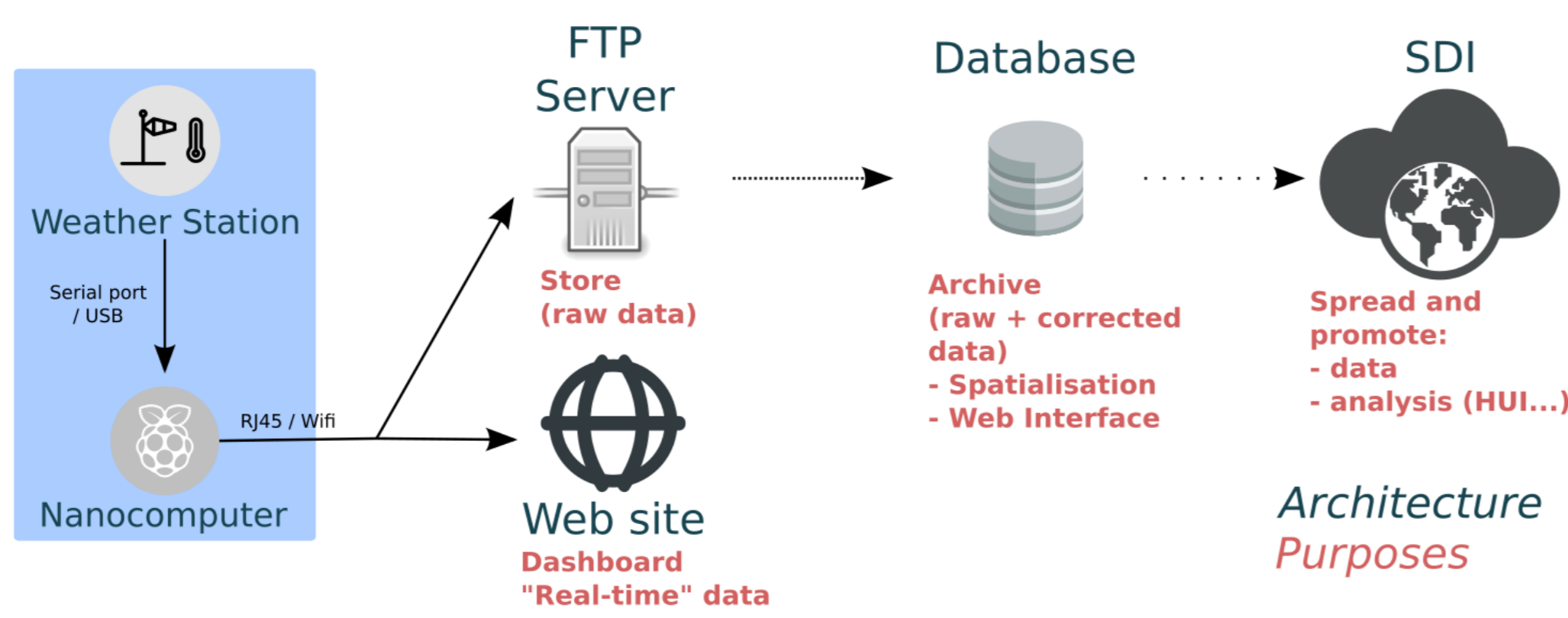
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 Quénol H. Cedex, France.
 Dubreuil V.
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Network of sensors

Air temperature is monitored in Rennes city (Brittany, France, CNRS Zone Atelier Armorique) with 1st measures in 2003.

Our network: ~20 permanent weather stations (+ temporary mobile sensors)

Data collected using cheap nanocomputers



An open-source application to https://bitbucket.org/thomas_a/rpi_meteo/

- check weather station's state
- re-configure station
- gather & store data
- Send data to FTP & website

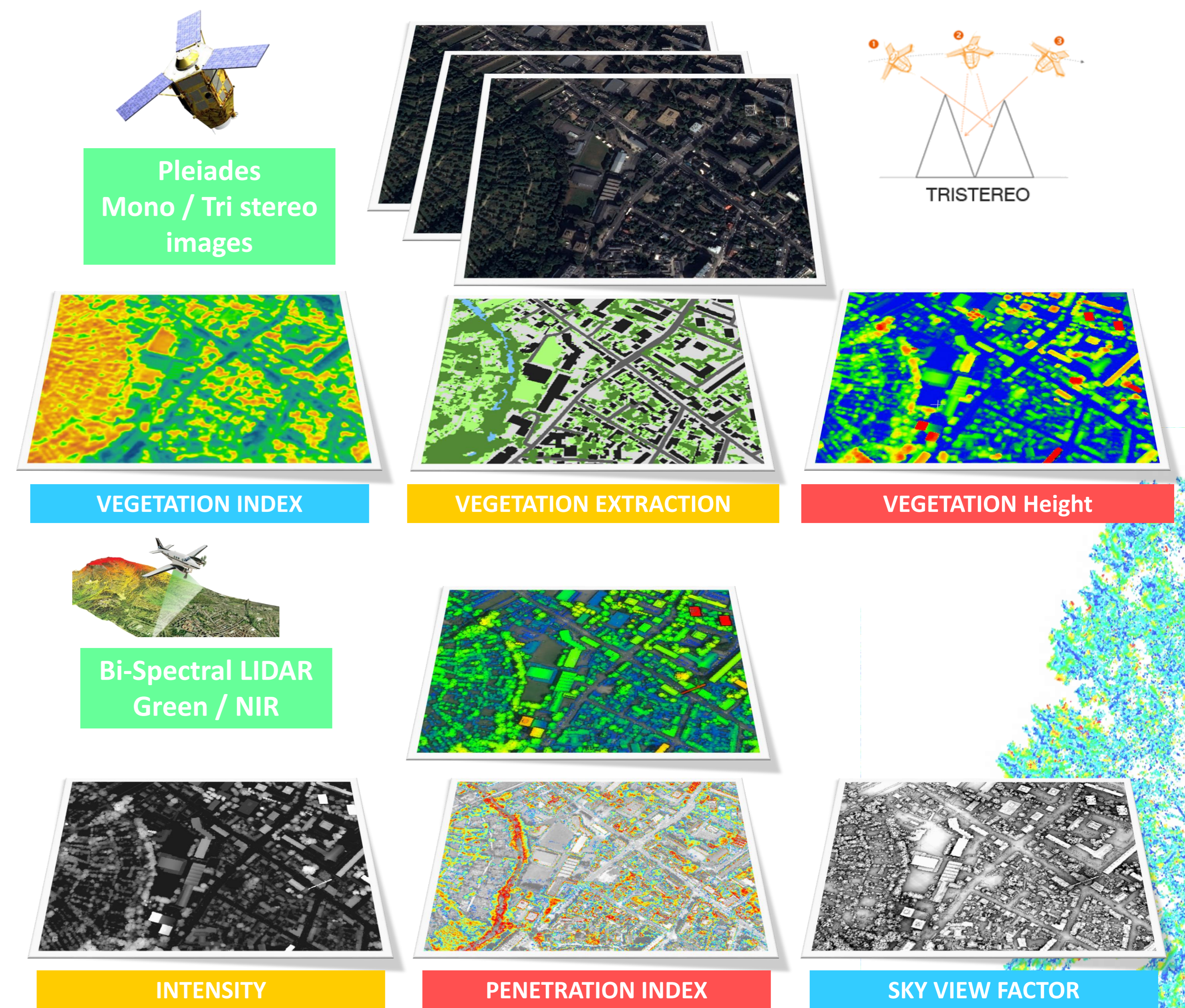
-> improve data quality

Stations throughout the city to illustrate different neighborhood: center, residences, suburban, parks...

Watch out: https://osur.univ-rennes1.fr/meteo_rennes/

Climate & Remote sensing

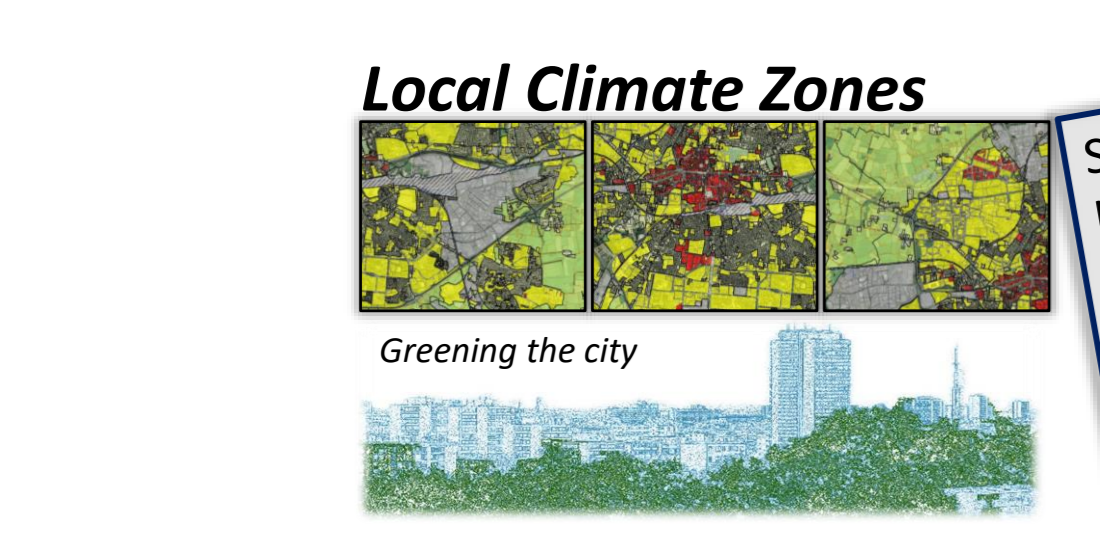
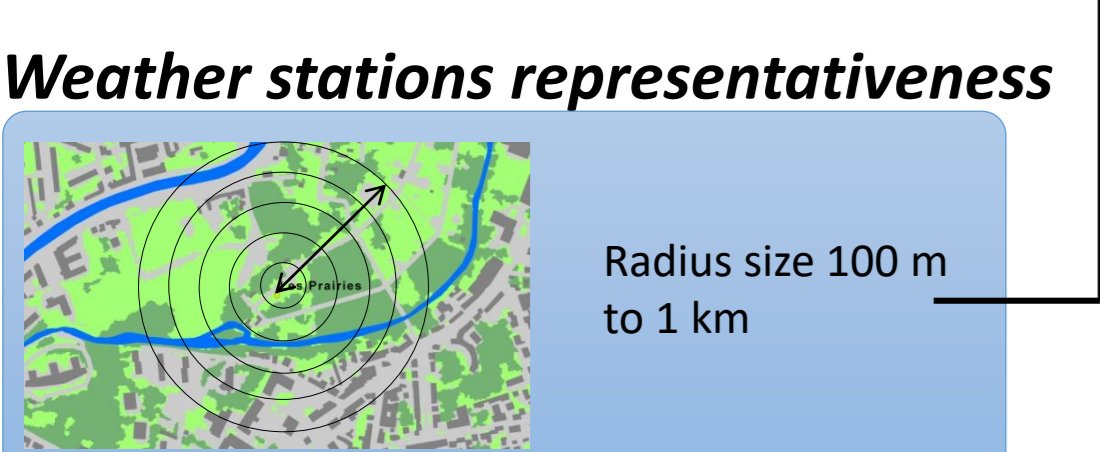
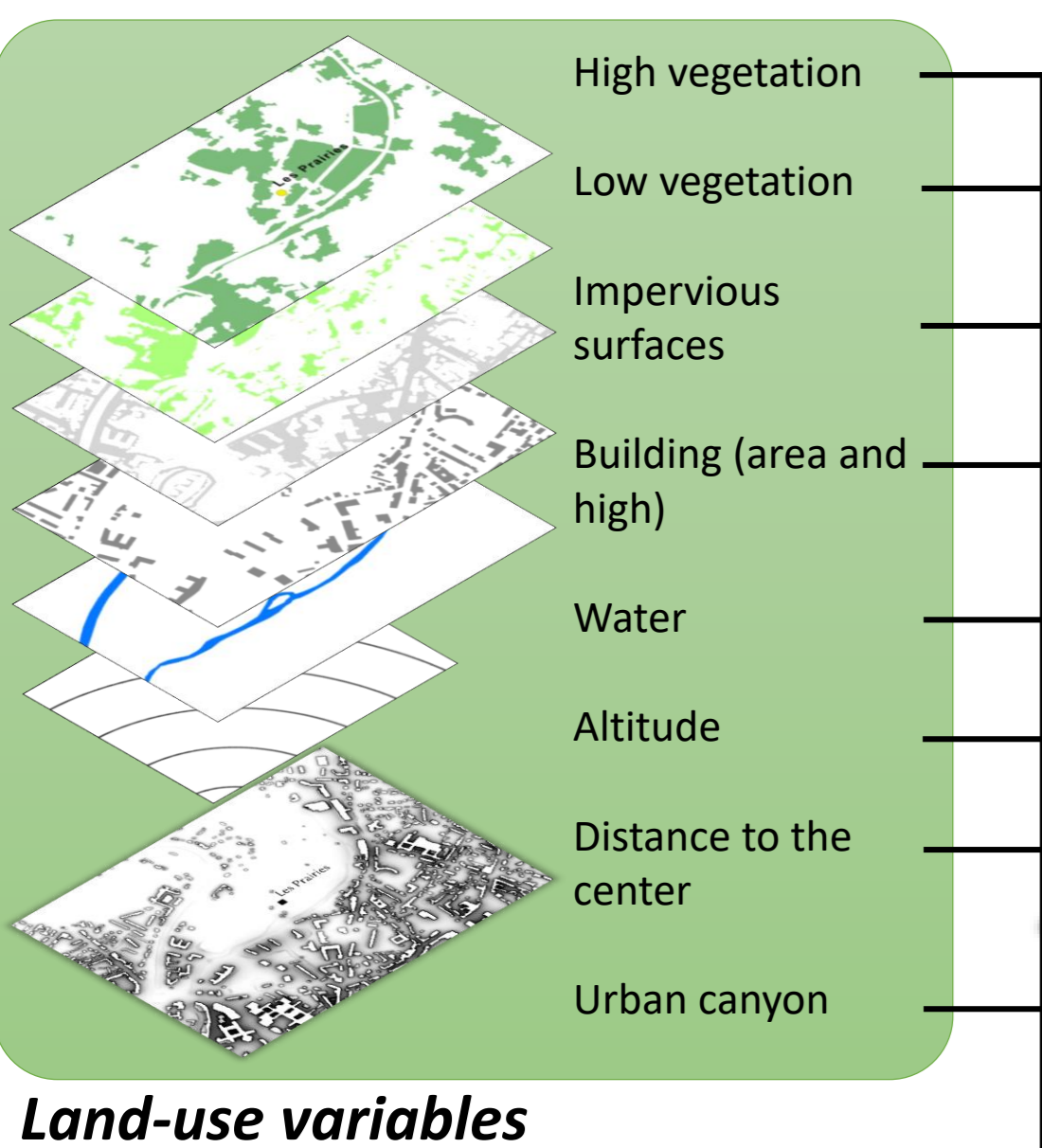
This sensors network was also used to model the local climate at fine scale based on remote sensing data analysis in 2D and 3D.



Linking the UHI observations and the land-use context.

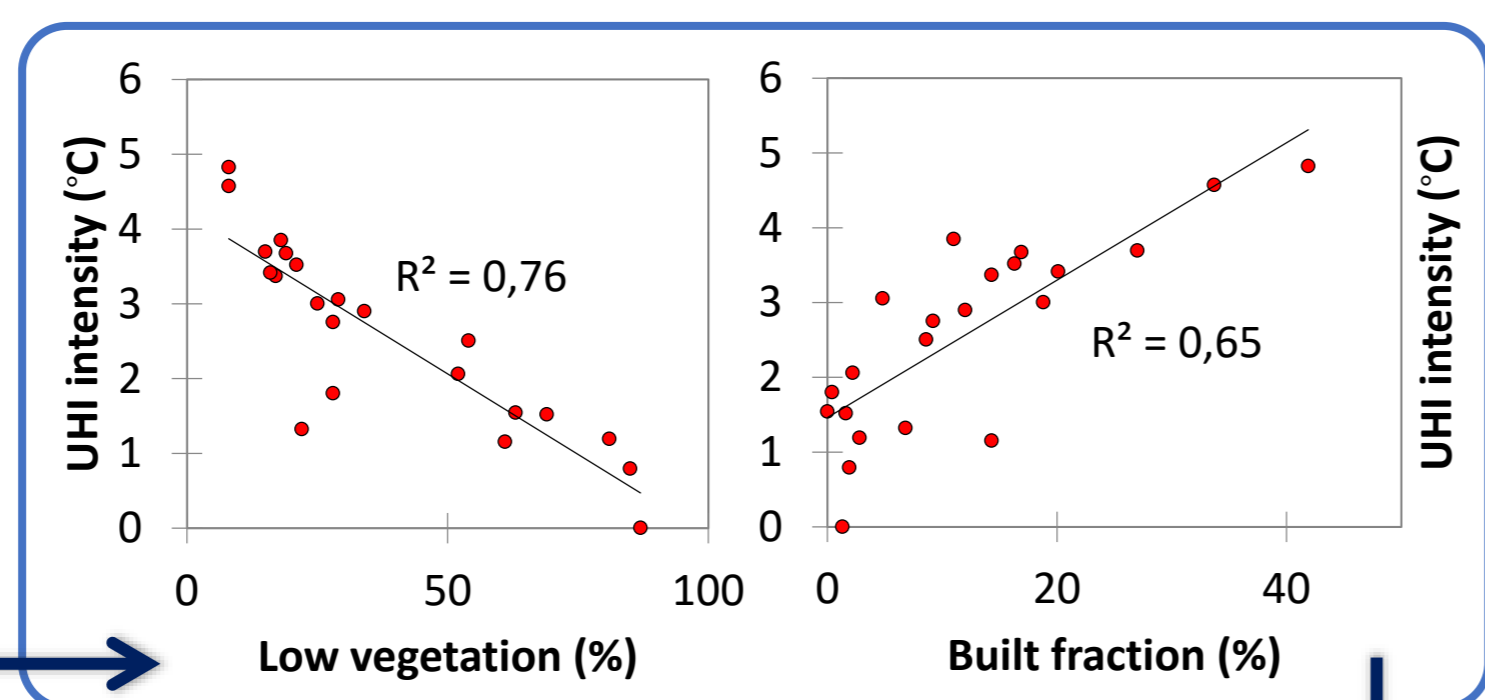
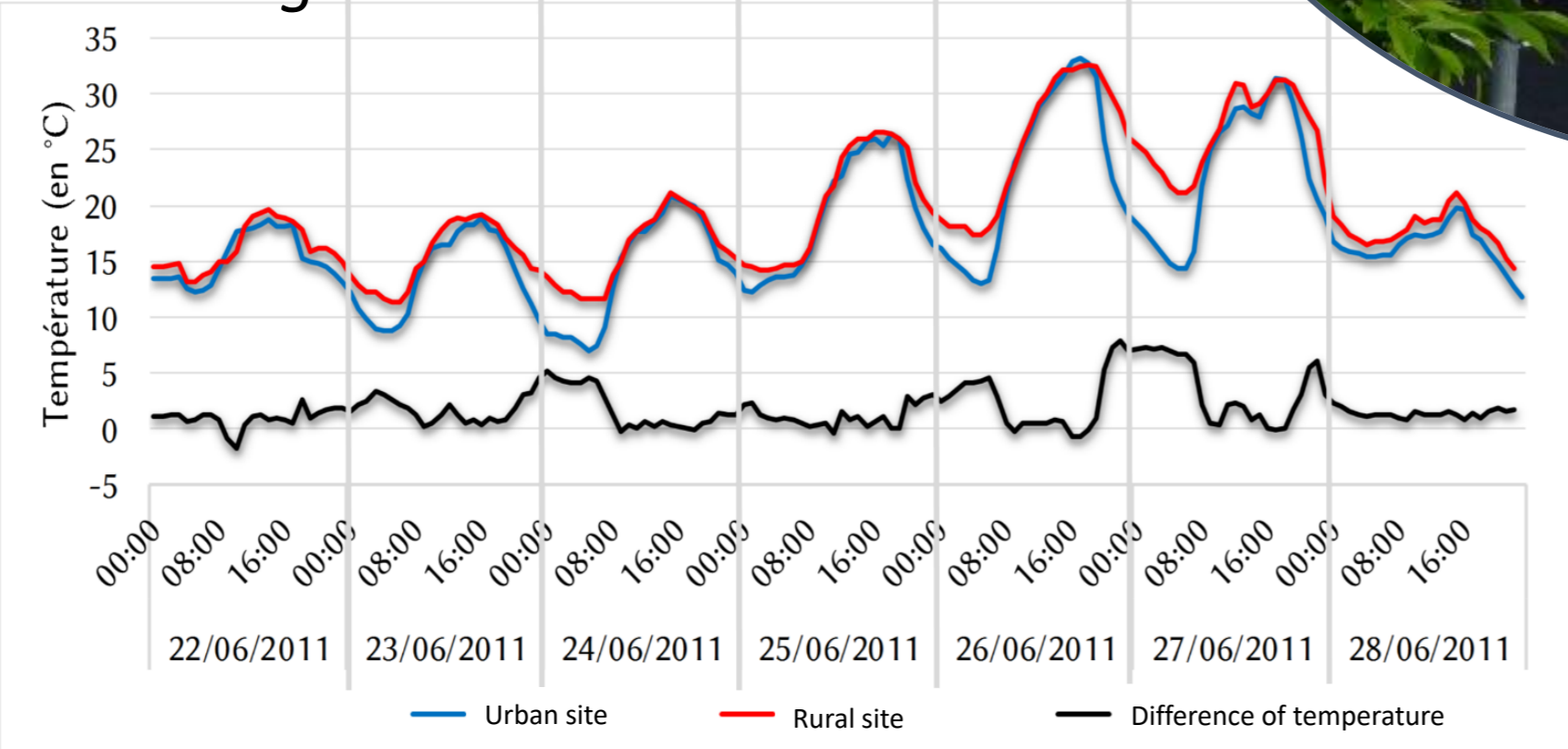
Spatial variability

Multi-criteria method for a spatial modelling of the UHI

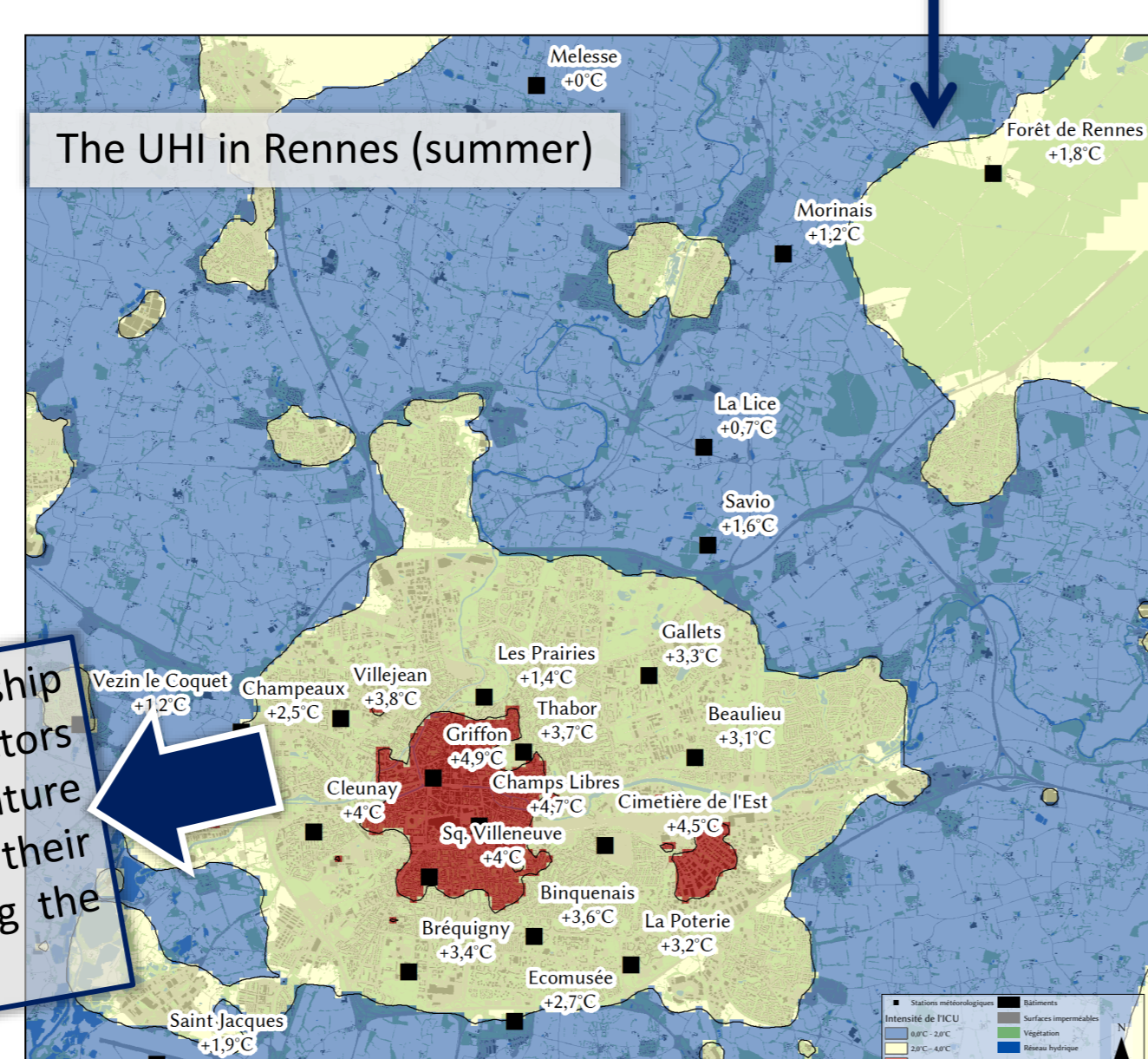


Temporal variability

Analysis of the UHI intensity according to weather conditions



Fitting the model



Applying the model : analysis of the UHI pattern

Climate model

Ecologists and climatologists now explore together the effects of the UHI on carabid beetles species.

Effect on Carabid beetles communities



Data acquisition

In each of the 19 woods distributed from the town-centre to the rural surroundings:

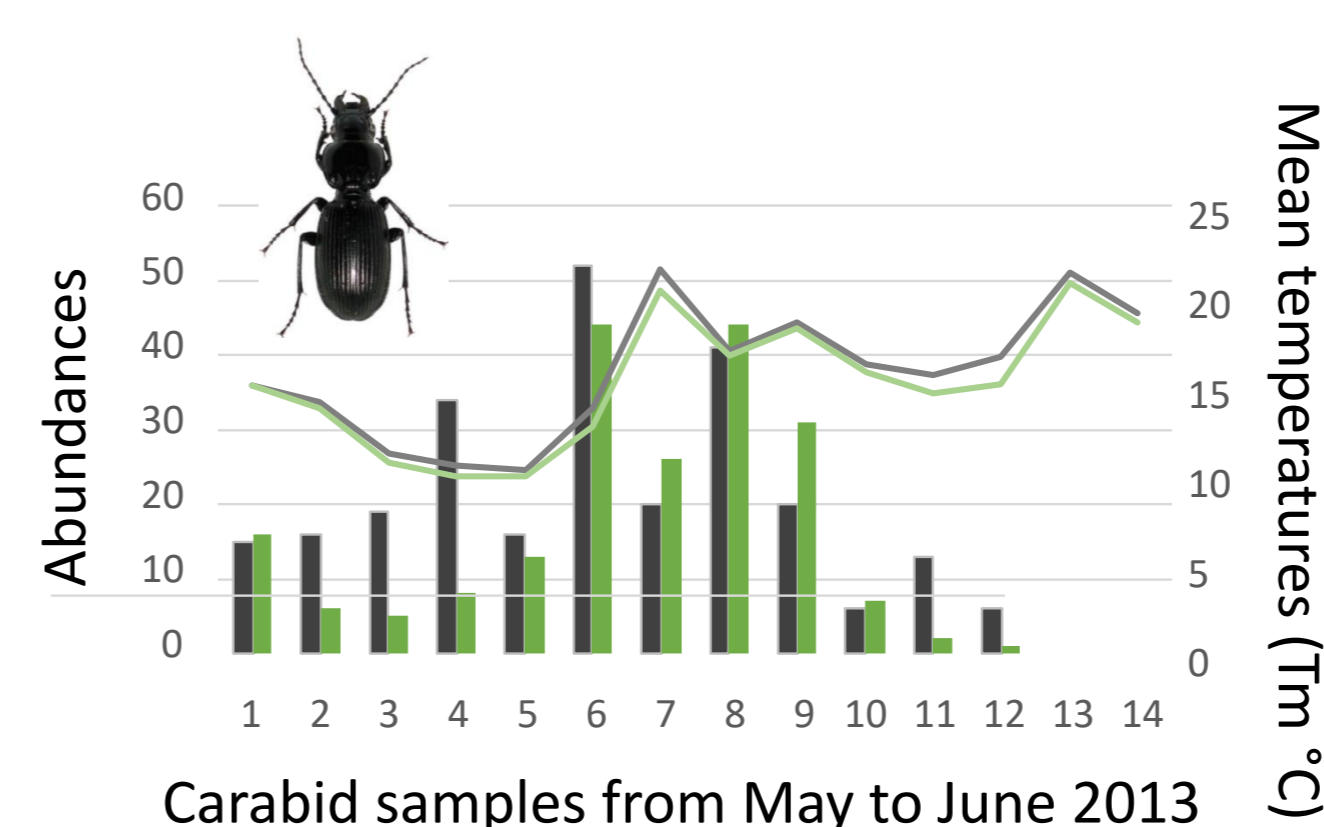
1 Tinytag for air temperature 2m high



6 pitfall traps collected every 5 days from May to July 2013



Effects on one species: Pterostichus madidus



P. madidus seems to be active earlier in urban woods than in rural ones ($\text{Khi}^2 = 29.9, p < 0.001$).
 => Link with climate is being analysed.

Climate & Urban biodiversity

