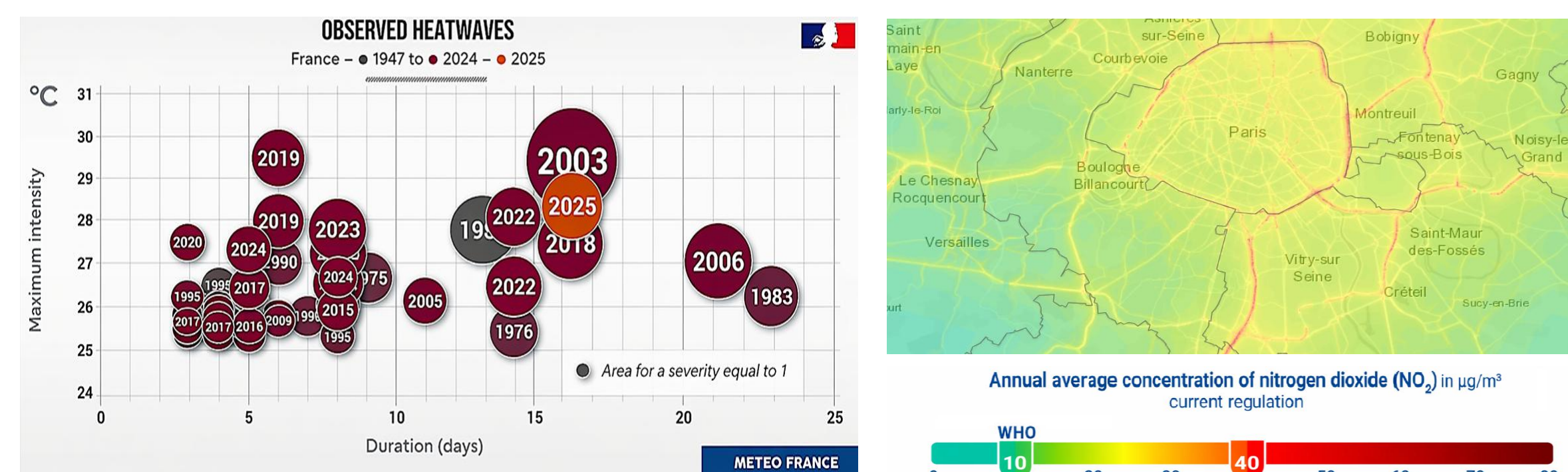




### INTRODUCTION

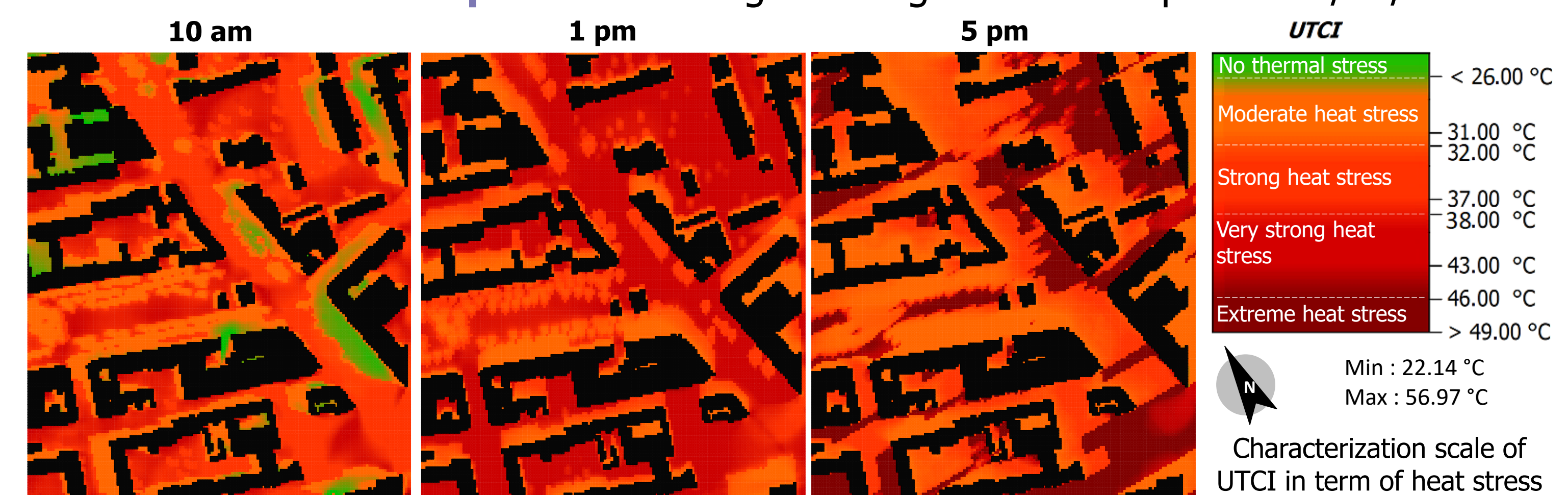
**Urban overheating** (+3.3 °C anomaly in Île-de-France in 2025) and repeated **heat waves** dues to urban expansion + City morphology affecting **pollutant dispersion [1]**; → Need to assess city vulnerability to **support adaptation decisions concerning urban planning projects.**



### RESULTS

#### Thermal Comfort

**UTCI distribution maps** at 1.4 m height during a heatwave period 12/08/2022

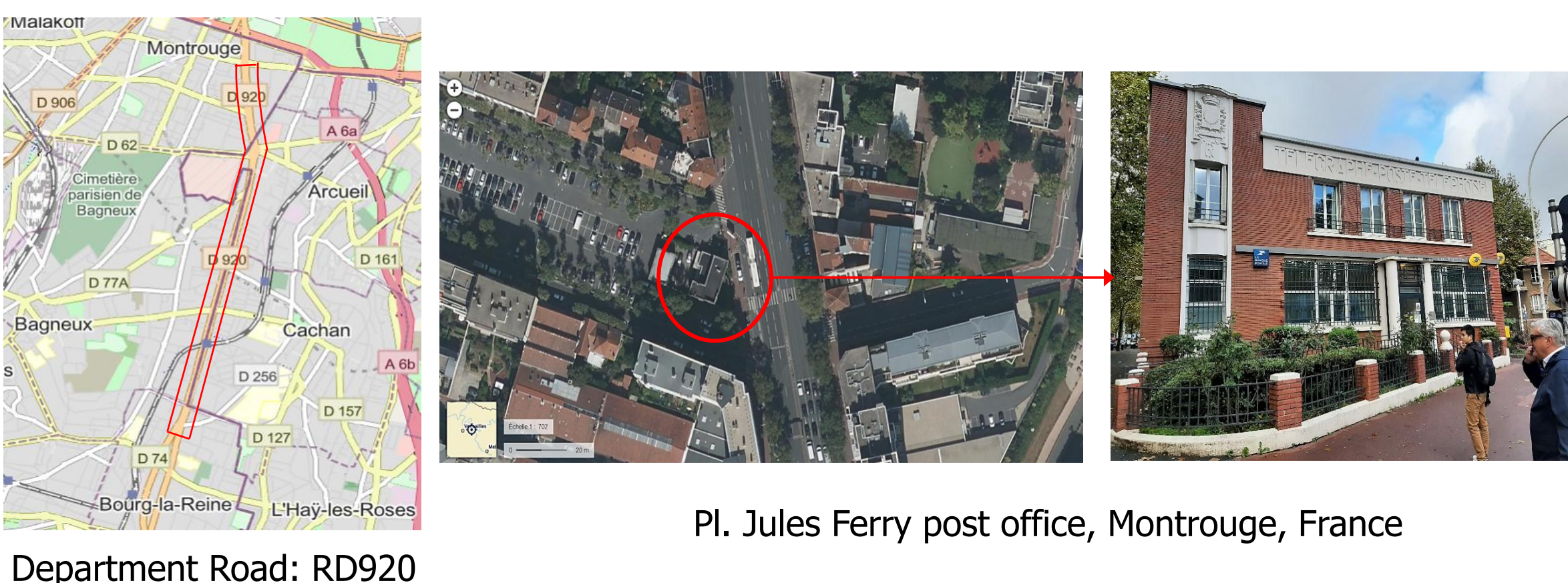


- On exposed mineral surfaces :  $T_{air} \approx 33 \text{ °C}$  and  $T_{mrt} > 60 \text{ °C}$ ;
- UTCI** : exceeded **strong heat stress** threshold for 9 h/day;
- Local vegetation impact at 1 pm:  $T_{air} \downarrow 1 \text{ °C}$  and  $T_{mrt} \downarrow 36 \text{ °C} \Rightarrow \text{UTCI} \downarrow 9 \text{ °C}$ .

### OBJECTIVES

**CityFAB** : ANR research-action project, collaboration between Université Gustave Eiffel and the Hauts-de-Seine (92) department to study outdoor thermal and acoustic comfort and air quality using a digital twin framework;

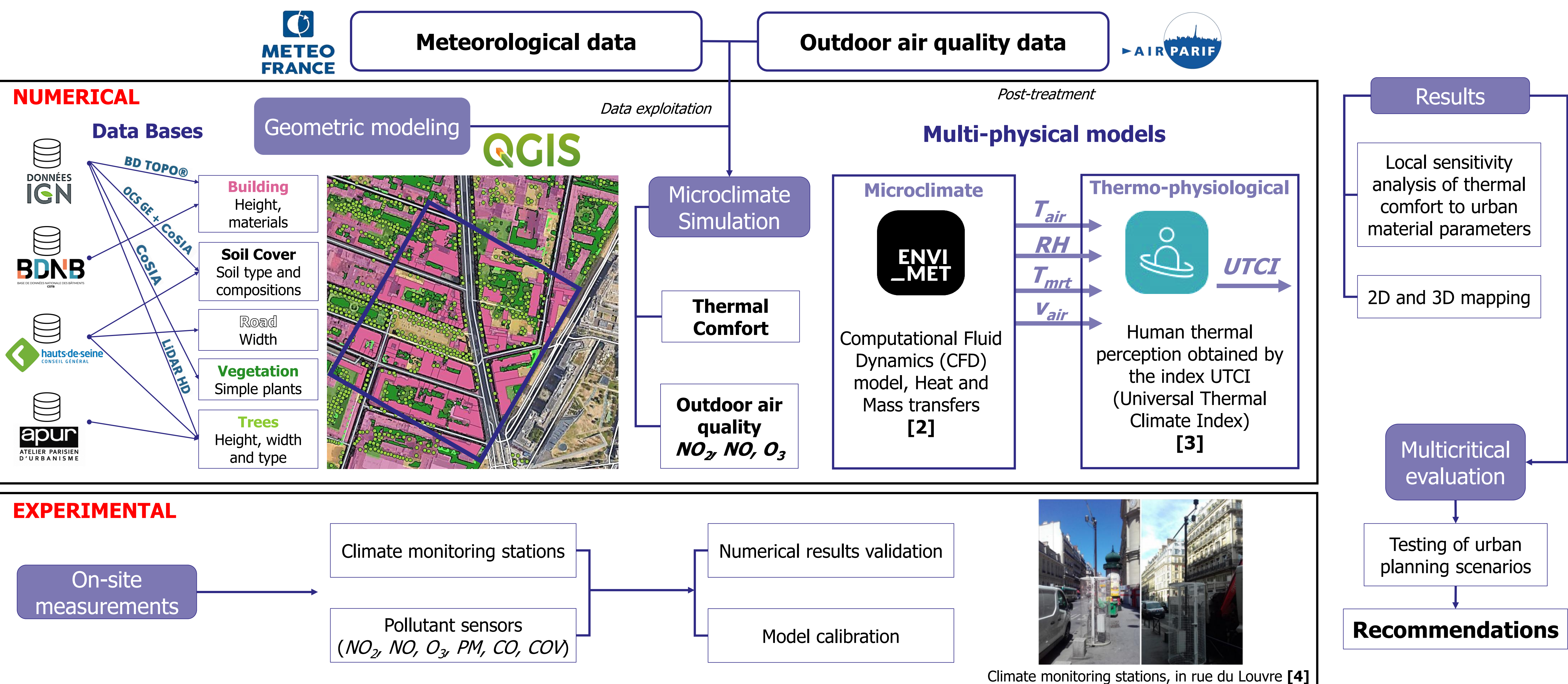
- Co-develop **decision-support tools** connecting technical analysis with social and policy dimensions applied on the RD920 redevelopment project;
- LOT2 : **High resolution description** (spatial and temporal) of the **microclimate** and **pollutant concentrations**.



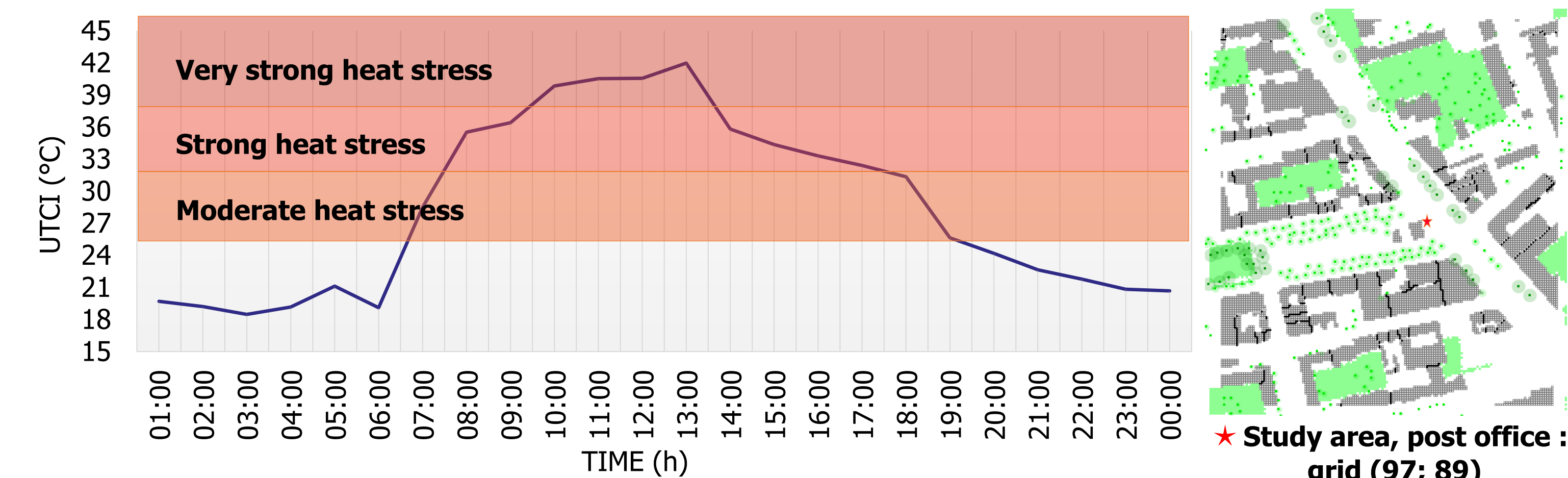
Pl. Jules Ferry post office, Montrouge, France

Department Road: RD920

### METHODOLOGY

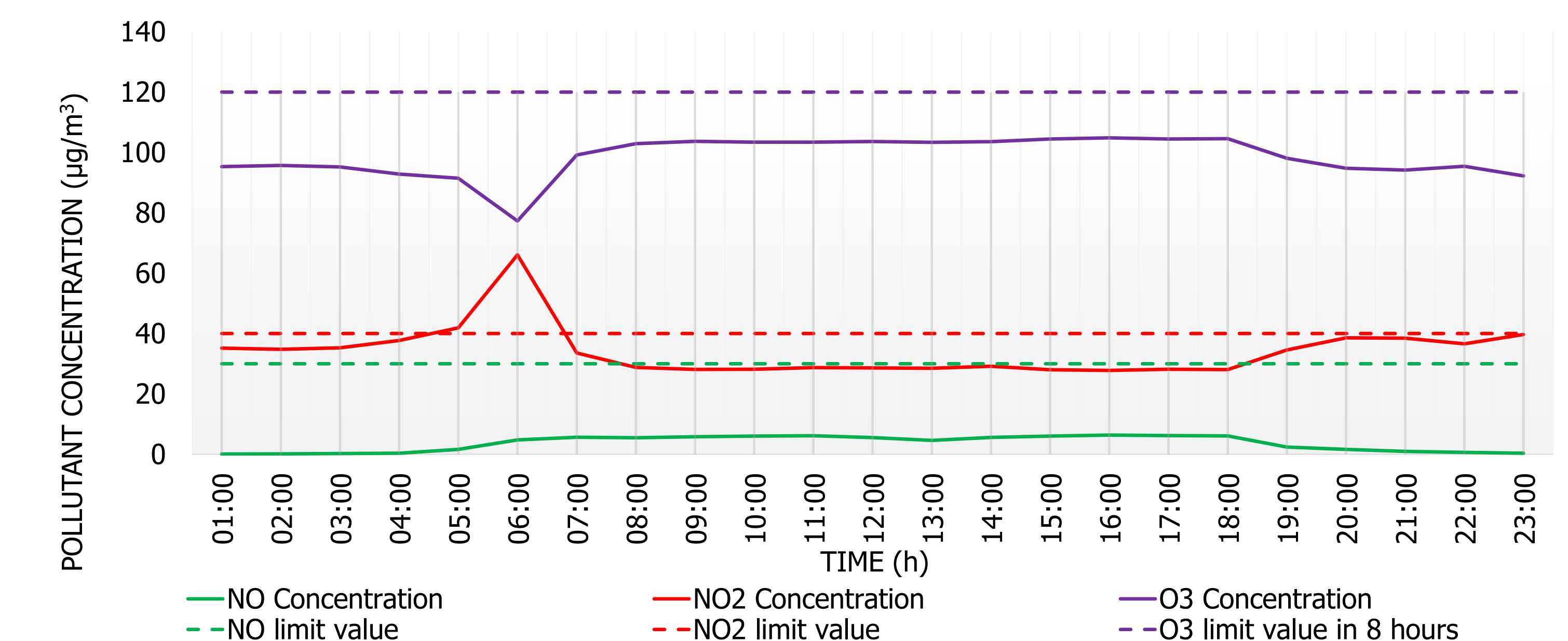


**Time-based evaluation** within the area of interest : Near the post office



#### Air Quality

**Pollutants concentrations** within the area of interest



- $NO_2$  : **health regulatory threshold exceeded** for 2 hours/ day;
- $O_3$  : formation with strong solar radiation;
- Reduction of  $NO_2 \Rightarrow$  production of  $O_3$  and  $NO$ .

### CONCLUSION AND PERSPECTIVES

- Integrated assessment of urban thermal comfort and air quality using 3D numerical modeling;
- Identify and quantify the influence of key urban material parameters (soil and vegetation) on thermal comfort using local sensitivity analysis;
- Deployment of on-site measurement stations by summer 2026;
- Virtual testing of urban planning scenarios;
- Quantitative (UTCI) and qualitative (surveys) evaluation approaches in collaboration with the CityFAB project team.

### BIBLIOGRAPHY

- [1] MétéoParis. Actualités météo : Bilan météo et climatique de juin 2025. MétéoFrance. 2025.
- [2] Michael Bruse. "Simulating microscale climate interactions in complex terrain with a high-resolution numerical model : A case study for the Sydney CBD Area (Model Description)" (1999).
- [3] Dusan Fiala, Kevin J. Lomas et Martin S. "Computer prediction of human thermoregulatory and temperature responses to a wide range of environmental conditions" (2001).
- [4] Parison S., Hendel M., et Royon L. "A statistical method for quantifying the field effects of urban heat island mitigation techniques. Urban Climate" (2020).