AIRFRESH

Newsletter #6

Editorial

We are pleased to present the second Newsletter of the project **AIRFRESH "*Air pollution removal by urban forests for a better human well-being*"**. The main objectives, core actions, and performed activities are presented here.

The Project Team

AIRFRESH: Objectives and Actions

Peri-urban reforestation, near densely populated cities where it is not easy to plant trees, can help **improve air quality** and meet clean air standards in cities. For that, municipalities and city planners need a **quantitative assessment** of the role of urban trees in affecting air quality and a **suitable selection** of tree species.

We have selected two front-runner cities, **Aix-en-Provence** in France and **Florence** in Italy, where human exposure regularly exceeds the World Health Organization protection limits of particles ($PM_{2.5}$, PM_{10}), nitrogen dioxide (NO_2), and surface ozone (O_3).

The project AIRFRESH, which started in September 2020 aims to: 1) estimate the **air pollution removal capacity** by a reforested test area; 2) estimate and quantify the **environmental and health benefits** provided by the urban trees in both cities; and 3) propose recommendations for **reforestation policies** (e.g., number and type of tree species to be planted) for attainment of the air quality standards in both cities.

Activities performed

The 3-30-300 Rule Compliance: A Geospatial Tool for Urban Planning

As the global urban population is expected to reach 70% by 2050, sustainable urban planning is essential for creating resilient and livable cities. Urban trees and green spaces are vital for mitigating climate change and enhancing public health. The 3-30-300 rule, introduced in 2021, mandates that every citizen should see at least three mature trees from their home, live in neighborhoods with at least 30% tree canopy cover, and be within 300 meters of a high-quality green space. Despite its significance, practical methods for measuring and evaluating this rule have been lacking.

To address this gap, we developed a geospatial tool using remote sensing and Geographic Information System techniques to assess compliance with the 3-30-300 rule. The tool employs very-high-resolution satellite imagery for detecting trees and estimating canopy cover and integrates OpenStreetMap data to assess proximity to green spaces. The geospatial mapping and satellite-based approaches to assess the 3-30-300 rule compliance is instrumental in helping cities to develop resilient and climate-neutral Urban Greening Plans.

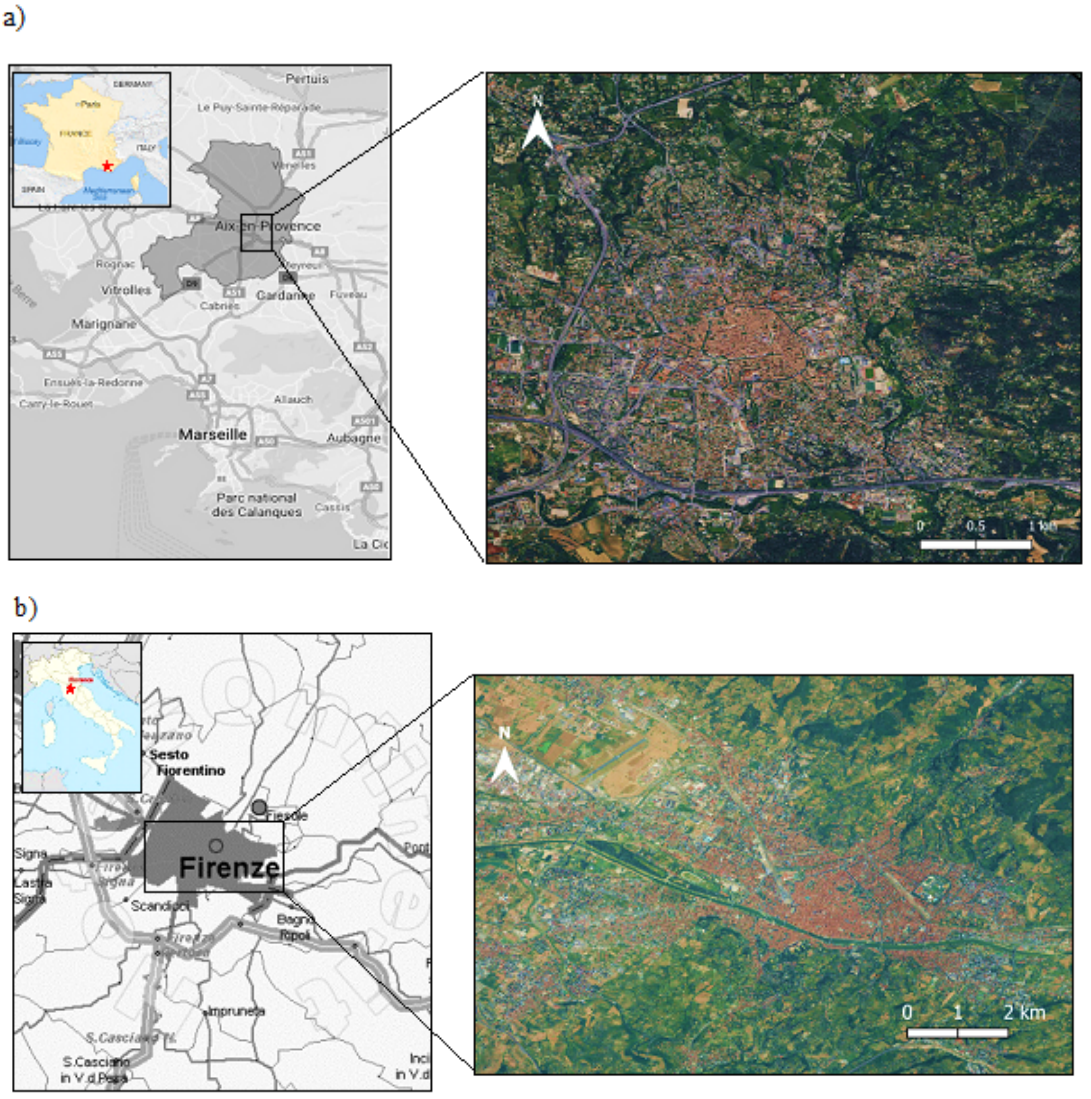

Fig 1 - Localization of the two study areas in both cities: Aix-en-Provence (a) and Florence (b). The study area, covered by the satellite image extends over 35 km² in Aix-en-Provence and 70 km² in Florence.

Flowchart of the methodology

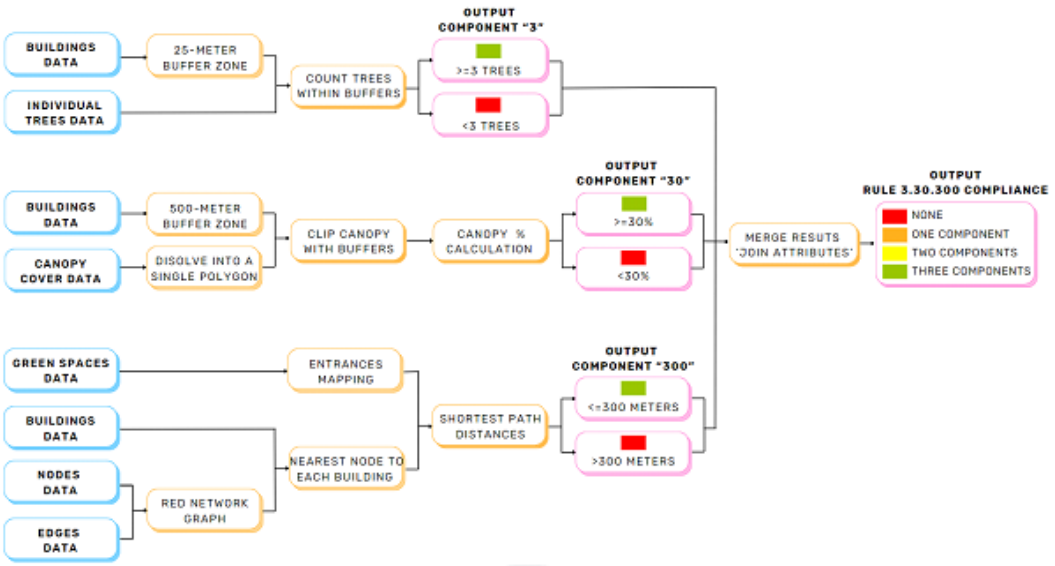

Fig. 2 - Flowchart of the methodology for the algorithm created for Rule 3.30.300 Compliance: Blue sky boxes depict input data, orange boxes denote main processes, and pink boxes denote outputs.

Component 3

In Aix-en-Provence, 16,336 buildings (68%) complied with Component 3, and non-compliance primarily concentrated in the downtown area and scattered around the city's borders (Fig. 3a). Conversely, Florence exhibited the opposite pattern, with only 38% of buildings (14,521) meeting the criteria (Fig. 3b).

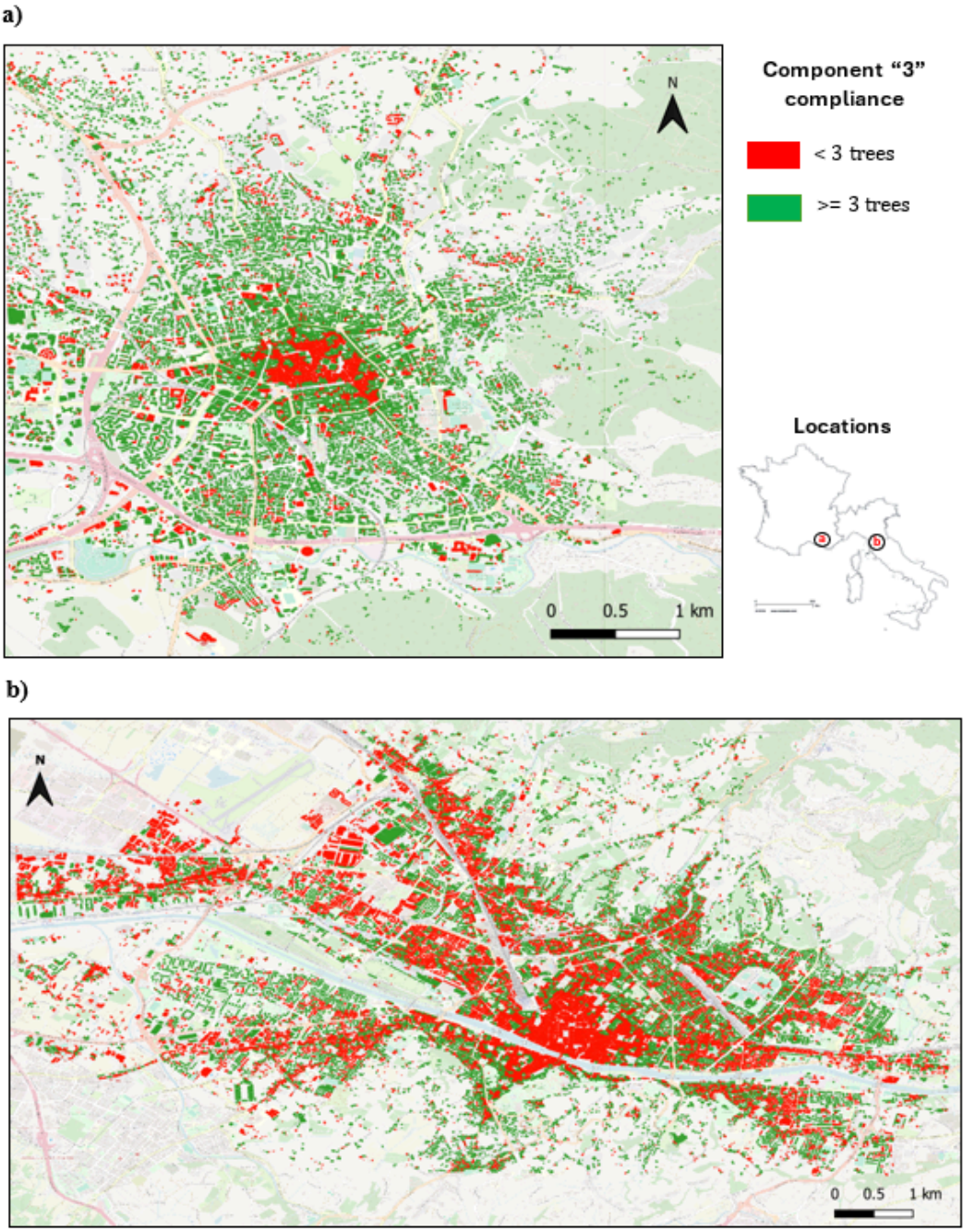

Fig. 3 - Compliance with Component 3 in Aix-en-Provence (a) and Florence (b) - Buildings meeting the requirement of having at least three trees in their surroundings (in green) and those that do not meet this criterion (in red).

Component 30

In Aix-en-Provence, our results showed that approximately 94% of buildings (22,537) complied with Component 30, while non-compliant buildings are predominantly found in the downtown area (Fig. 4a). Florence exhibited a starkly different configuration, with 90% (34,409 buildings) of non-compliant buildings widespread throughout the entire study area (Fig. 4b).

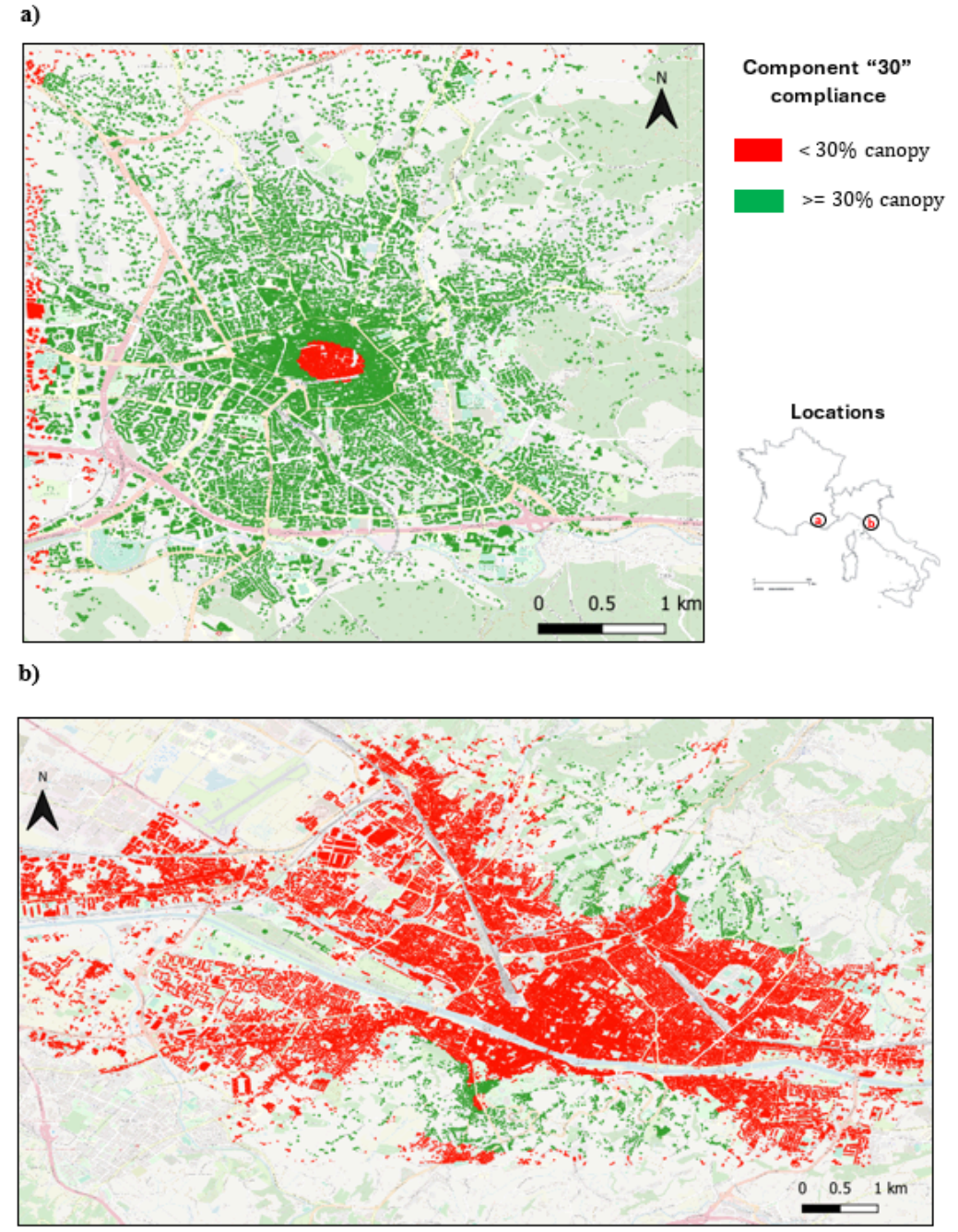

Fig. 4 - Compliance with Component 30 in Aix-en-Provence (a) and Florence (b) - Buildings that have at least 30% canopy cover within their neighborhoods (in green) and those with less than 30% canopy cover (in red).

Component 300

In Aix-en-Provence, 6,414 buildings (27%) complied with Component 300, while 17,606 buildings (73%) are non-compliant scattered throughout the study area (Fig. 5a). In Florence, about 41% of buildings (15,659) complied with Component 300 (Fig. 5b).

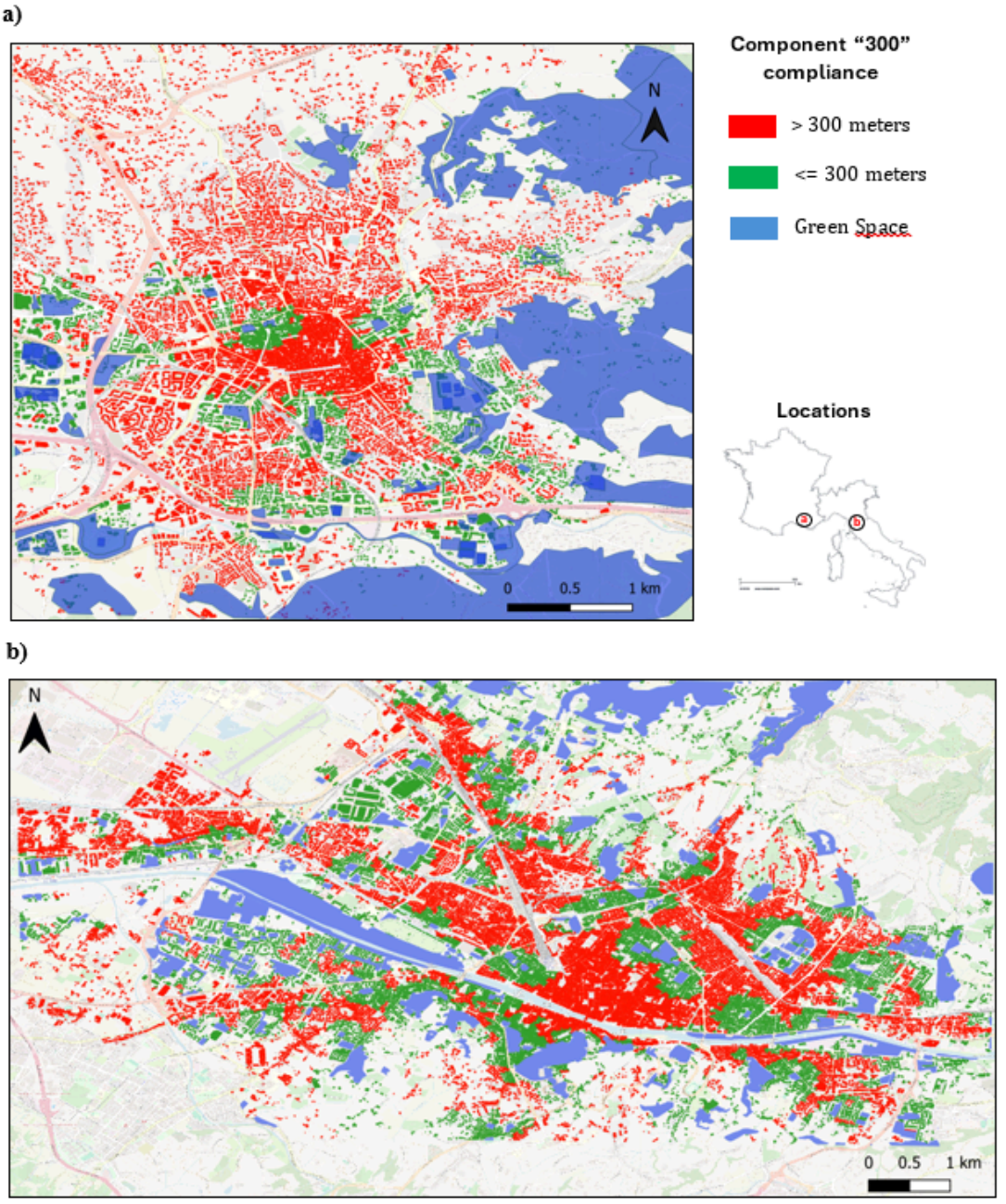

Fig. 5 - Compliance with Component 300 in Aix-en-Provence (a) and Florence (b) – Buildings within 300 meters of a high-quality green space are marked in green, while non-compliant buildings are in red. High-quality green spaces are shown in blue.

Rule 3.30.300 Compliance

In Aix-en-Provence, 4% of buildings are compliant with no component, 22% and 56% of buildings are compliant with one and two components, and 18% are fully compliant (Fig. 6a). In Florence, 37% of buildings are compliant with no component, 40% and 19% of buildings are compliant with one and two components, and only 4% are fully compliant (Fig. 6b).

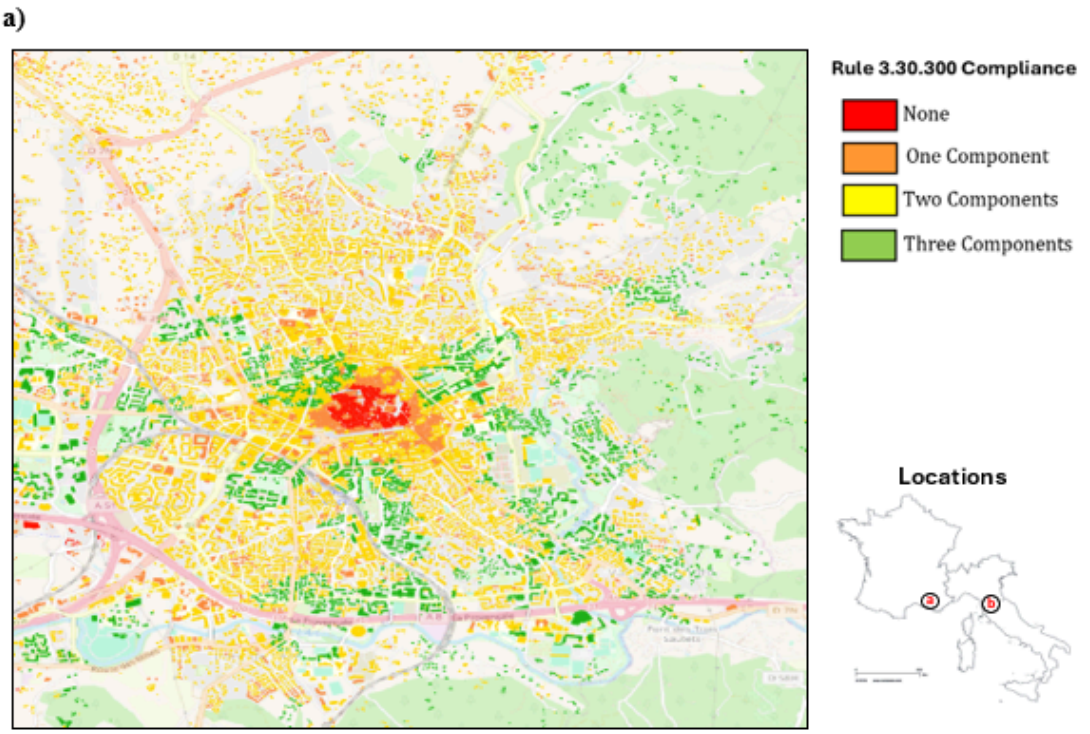

Fig. 6 - Rule 3.30.300 Compliance in the study areas of Aix-en-Provence (a) and Florence (b) combining the three components: red for non-compliance, orange for compliance with one component, yellow for two components, and green for full compliance.

Upcoming events

European Forum on Urban Forestry
17-21 May 2022
Belgrade, Serbia
https://efuf2022.com

Partners

ARGANS

CNR IRET
Istituto di Ricerca sugli Ecosistemi Terrestri

air

ENEA
Italian national agency for new technologies, energy and sustainable economic development

This project has received funding from the European Union - LIFE financial instrument in the framework of the AIRFRESH project (LIFE19 ENV/FR/000086).

Contact
Dr Pierre Sicard
ARGANS
psicard@argans.eu