AIRFRESH

Newsletter #8

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

Project objectives and main actions

In 2020-2024, AIRFRESH aimed to: 1) measure the air pollution removal capacity by trees within a reforested test area in two Mediterranean cities (Aix-en-Provence - France, and Florence - Italy); and 2) estimate and quantify the environmental benefits provided by urban trees at city scale in both cities .

Two test areas were implemented in January 2022 (400 fast-growing trees, mix of species, > 3 m tall, 1ha). Continuous measurements of air pollution concentrations and meteorology were carried out in and around the area, above and below the canopy, before and after tree planting using AirQino sensors.

Before   **After**

Fig. 1 - Test area in Aix-en-Provence: tree planting in january 2022, 400 fast-growing trees, mix of species, > 3 m tall, equivalent to 1.2ha with AirQino sensors set-up above/below tree canopy, inside/outside test area.

<u>**Air Pollution removal capacity**</u>: test area

The **400 adults trees** have eliminated in 2023: 1.5 tons O_3, 170 kg NO_2 (*40 cars* *), 150 kg PM_{10} (*220 cars* *), 21 tons CO_2 (*13 cars* *) and increase carbon stocks (2.6 tons). Ambient air 1.5°C cooler compared to surrounding area. In summer, we observe a reduction of 55% of O_3 peaks at tree level.

* emissions of private cars registered in France which has driven an average of 12,200 km during the year with an average speed of 70 km/h.
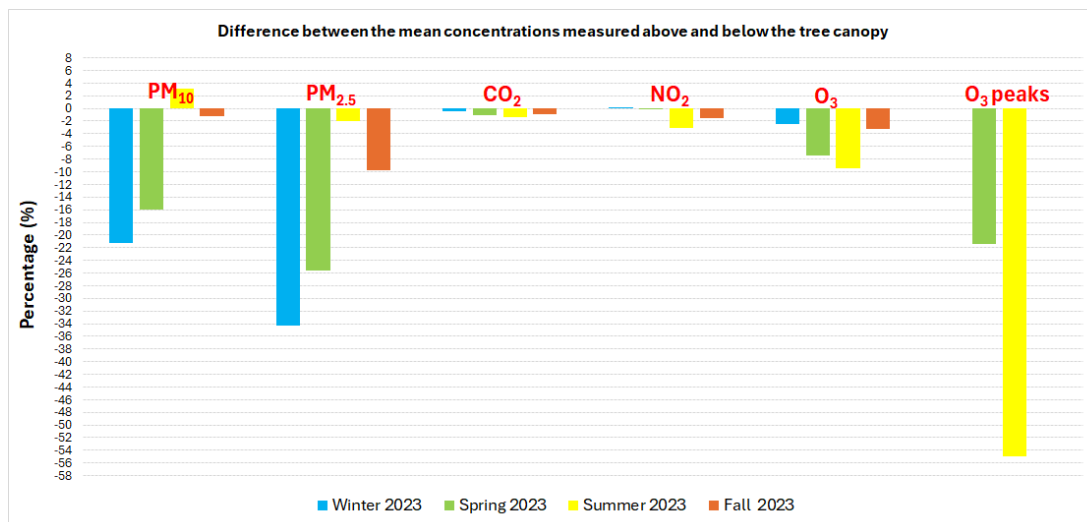
Fig. 2 - Difference of seasonal mean concentrations above and below tree canopy within the test area of Aix-en-Provence for the year 2023.

Air Pollution removal capacity: city scale

In Aix-en-Provence, the **414,000 adults trees** have eliminated in 2023: 225 tons O_3 (formation: 9 tons, removal: 234 tons), 41 tons NO_2 (*6,600 cars* *), 97 tons PM_{10} (*147,400 cars* *), 16,560 tons CO_2 (*10,400 cars* *) and lawns/herbaceous have eliminated 423 tons CO_2 (ab. 2.6%).
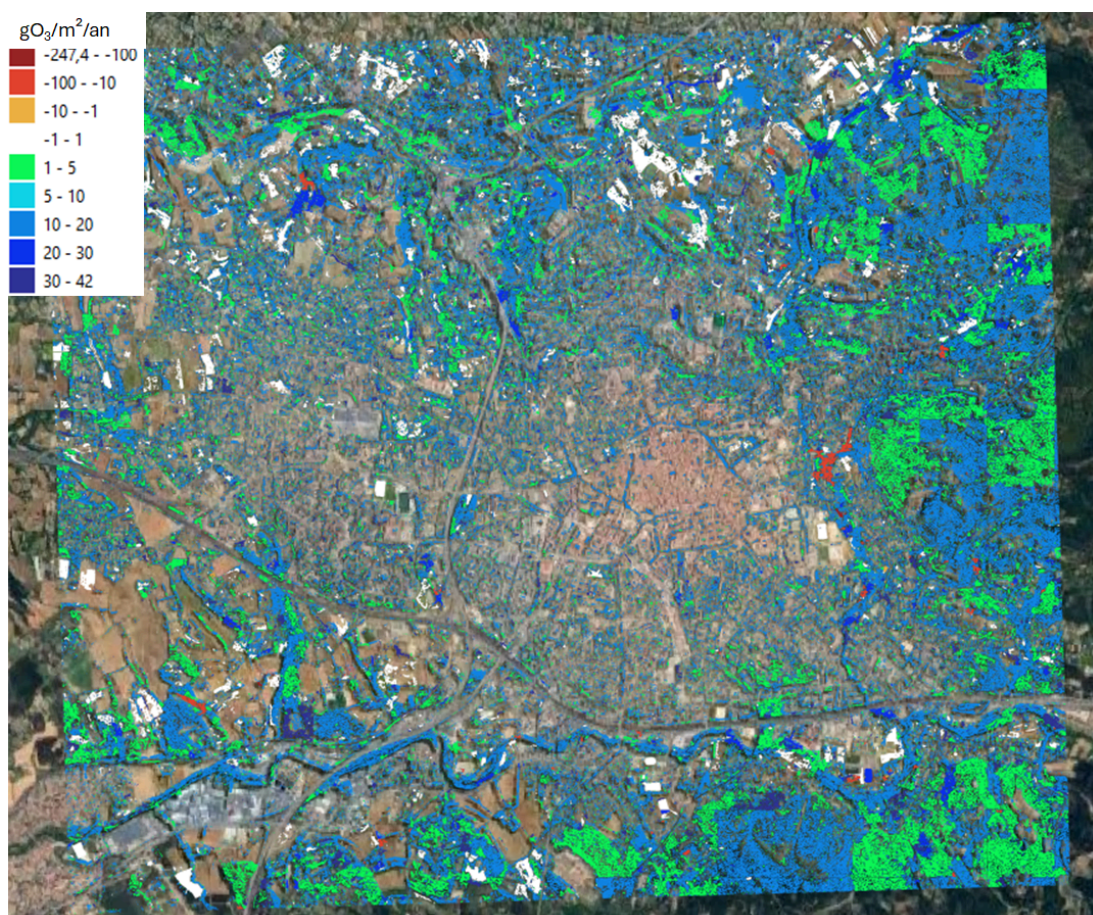

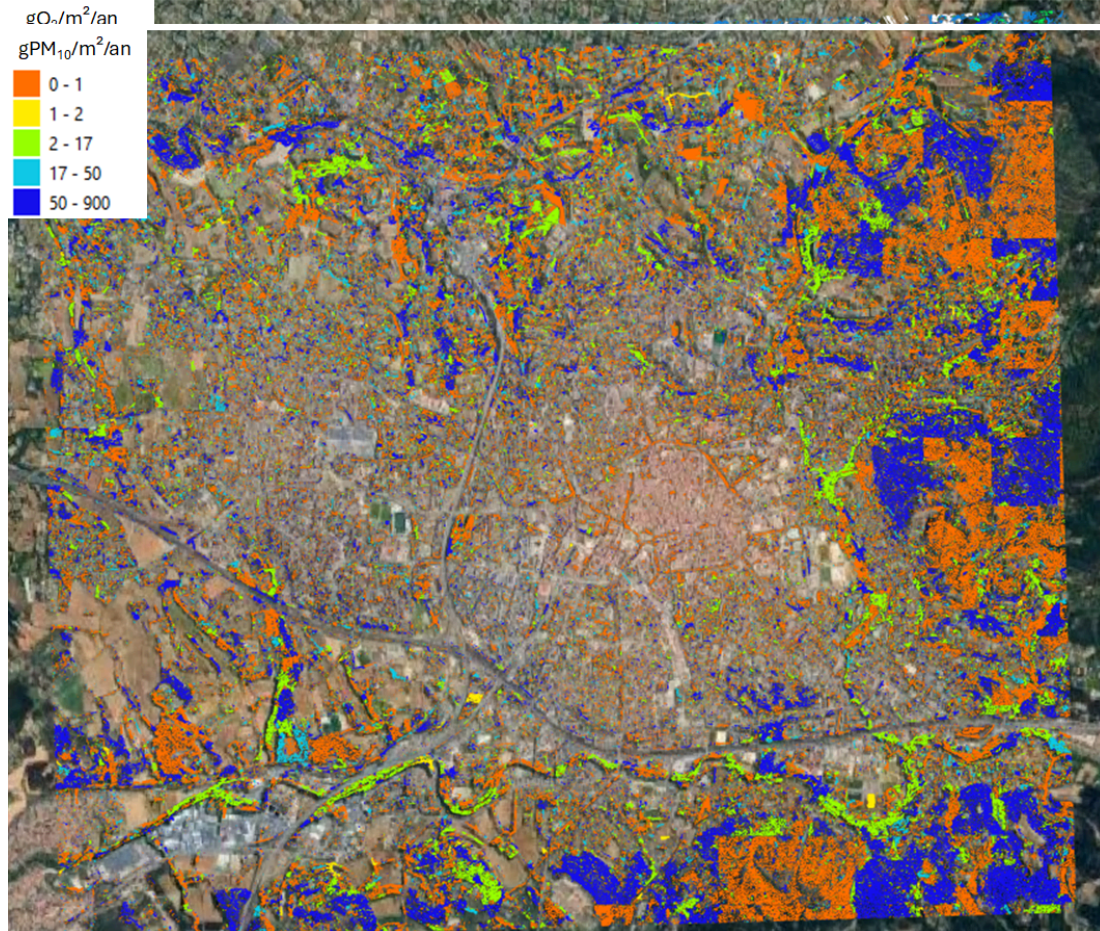Fig. 3 - Mapping of the removed ozone amount by each individual tree (g per m² of leaf area per year)

gO₂/m²/an

Legend (gPM₁₀/m²/an):
- 0 - 1 (orange)
- 1 - 2 (yellow)
- 2 - 17 (green)
- 17 - 50 (cyan)
- 50 - 900 (blue)

Fig. 4 - Mapping of the removed PM_{10} amount by each individual tree (g per m² of leaf area per year)

gO₂/m²/an

Legend (gNO₂/m²/an):
- 0 - 1 (red)
- 1 - 1,5 (orange)
- 1,5 - 2 (green)
- 2 - 3 (light green)
- 3 - 5 (blue)
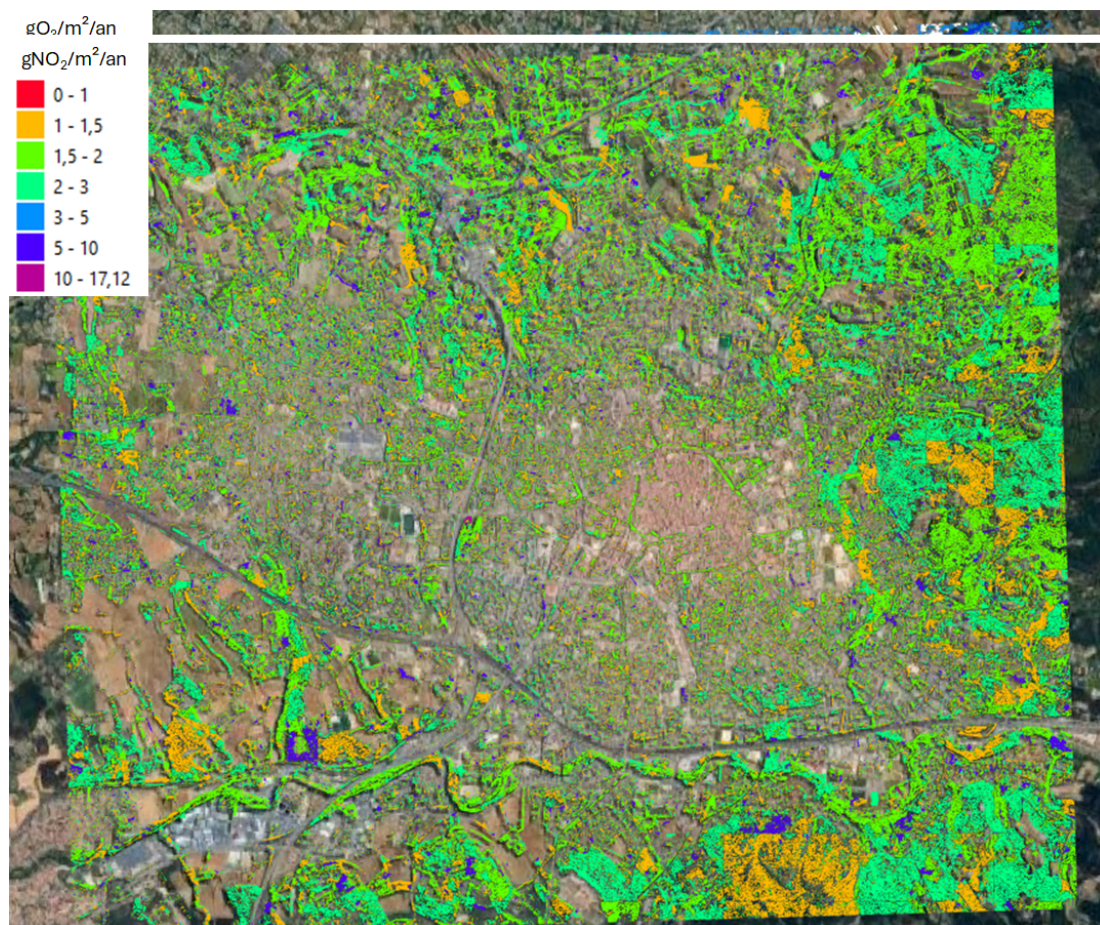- 5 - 10 (dark blue)
- 10 - 17,12 (magenta)

Fig. 5 - Mapping of the removed NO_2 amount by each individual tree (g per m² of leaf area per year)

Fig. 6 - Mapping of the removed CO_2 amount by each individual tree (g per m² of leaf area per year)
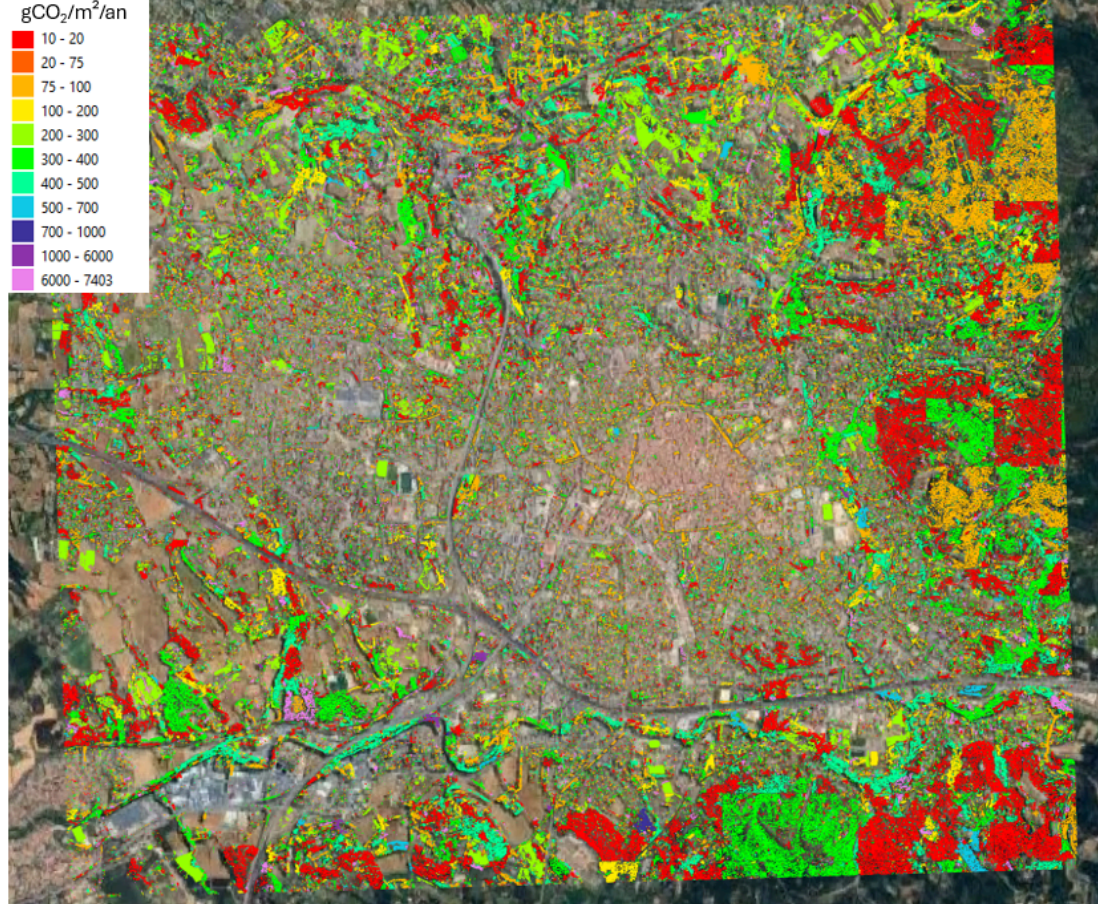
Upcoming events

International conference IUFRO RG8.04
"*Influence of Air Pollution & Climate Change on Forest Dynamics*"
1-5 September 2025
Split, Croatia
https://www.iufro-split2025.com

European Forum on Urban Forestry
3-7 June *2025*.
Zürich, Switzerland
https://efuf.org

Partners

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