

## USE GUIDE

This viewer has the objective of providing the visualization of air quality data with a representation that facilitates the understanding of differences, similarities and allows correlations between the information represented. The data used in this display is described below.

### **1) Information in point mode of the levels of nitrogen dioxide (NO<sub>2</sub>) in the air, using data from the reference stations of the Barcelona City Council's open data service:**

The network of reference stations for air quality in the city of Barcelona is made up of seven stations that provide specific NO<sub>2</sub> data (among others) every hour.

The data presented in this viewer was downloaded from the Open Data Barcelona website, from which NO<sub>2</sub> monthly averages were calculated for three days a week, Tuesday, Friday and Sunday, during the period from July 2019 to September 2020.

During the analyzes, it was verified that at 10 a.m. is when NO<sub>2</sub> levels are highest in the air, therefore, all data is presented at this time, with the aim of making it possible to visualize the days and regions with the highest and lowest air pollution by NO<sub>2</sub>.

### **2) Information on NO<sub>2</sub> levels in the air captured in dynamic mode, with low-cost sensors, named AirCrowd:**

AirCrowd sensors were developed in the Crowd-sourced Air Quality Monitoring System (C-AQM) project (Parés, et al., 2018), with the aim of providing NO<sub>2</sub> data to generate air quality maps, by combining measurements provided by sensor nodes and data from official air quality reference stations.

The data from the AirCrowd sensors have a data reception frequency of 1 point, every 6 seconds, submetric spatial precision and the possibility of data capture in static and dynamic mode.

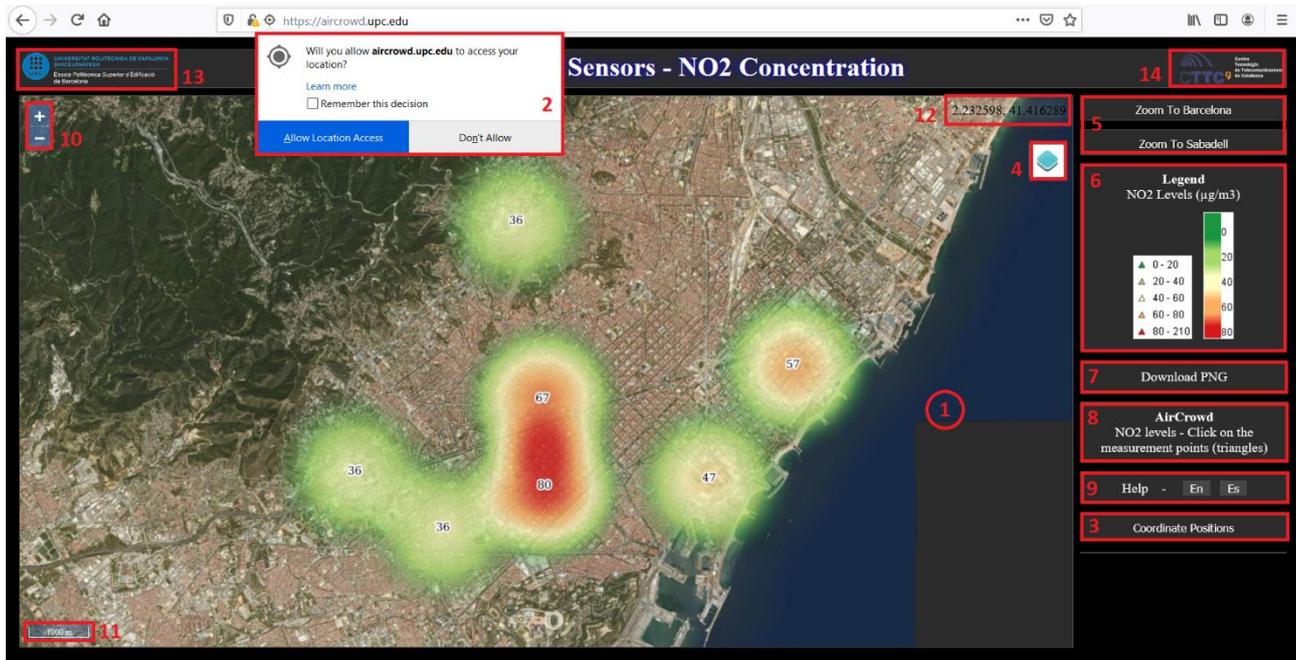
In this viewer, data captured in dynamic mode in the city of Barcelona is presented, where the analyzed area was defined based on the location of the official station for measuring air quality in *Parc de la Ciutadella*. The data was captured on 07/26/2019, a Friday at 10 a.m.

It also presents data captured in dynamic mode in the city of Sabadell, the analyzed area was also defined based on the location of the official station for measuring air quality in the city of Sabadell. The data was captured on 11/21/2019 (Thursday) and 11/23/2019 (Saturday), both days at 7 a.m.

Together with each data from the AirCrowd sensors, the data from the official air quality stations is presented at the time of data capture.

**More information about the AirCrowd project:** Parés, M. E., Garcia, D., Vázquez-Gallego, F. MAPPING AIR QUALITY WITH A MOBILE CROWDSOURCED AIR QUALITY MONITORING SYSTEM (C-AQM), International Society for Photogrammetry and Remote Sensing – ISPRS. (Nice, France), 2020.

The parts that make up the display are:



1. Map display area.
2. For the viewer to load the network location where the user's computer is connected, the browser asks if access to the computer location is allowed. This information also makes it possible to know the coordinates of the point with its precision.
3. The information of the user's coordinates and the precision of this measurement is enabled by clicking on the button with the text Coordinate Positions.
4. Detachable button, which allows the selection of which layer you want to view. By default, the map is loaded with the orthophoto of Catalonia and data from the reference stations of the Barcelona City Council's open data service.
5. Zoom to Barcelona and zoom to Sabadell buttons, to perform a zoom to each of the data capture areas in dynamic mode, using AirCrowd sensors.
6. Legend of the data represented on the display.
7. Download the map represented at the moment, in png format.
8. Information box that says that for more information about the AirCrowd data, just click on the points (triangles) on the map.
9. Downloading information from the viewer.
10. Zoom in and zoom out buttons, for better visualization of the map.
11. Map display scale bar.
12. Coordinate of the mouse position on the map.
13. Link to the UPC website.
14. Link to the CTTC website.

Work carried out in collaboration between the *Centre Tecnològic de Telecomunicacions de Catalunya* (CTTC) and the *Escola Politècnica Superior d'Edificació de Barcelona* (EPSEB) - UPC.

Developed by:

**Daniel García Santos**  
**M. Amparo Núñez Andrés**  
**M. Eulàlia Parés Calaf**