



Assessing air quality A successful engagement in citizen science

Francisco Ferreira

Webinar

UNL / ÚNICA

September 24th, 2020



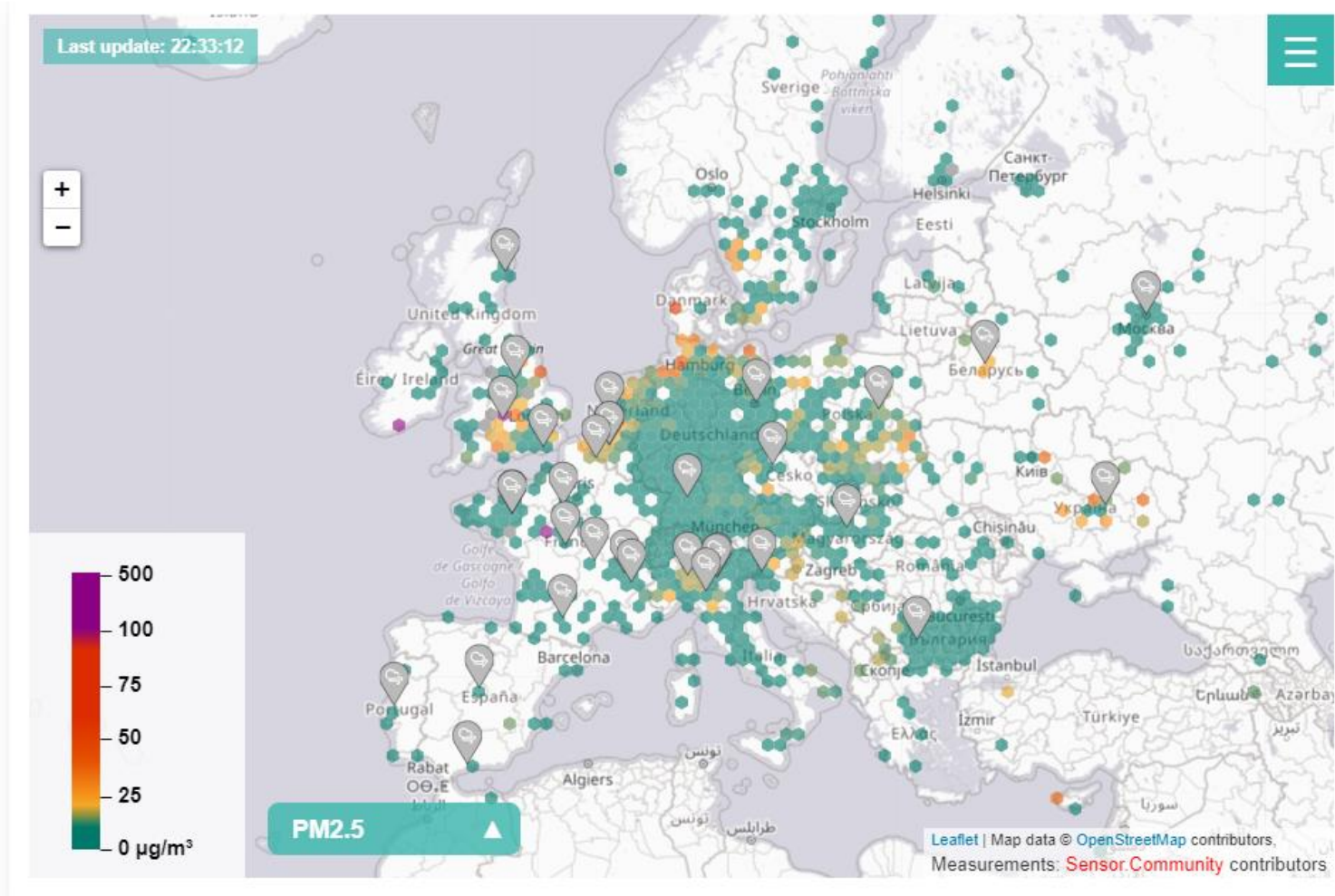
Air quality is key for public health

- > Worldwide, ambient air pollution contributes to 7.6% of all deaths in 2016
- > 412 000 people die prematurely every year due to air pollution in Europe from high levels of fine particles
- > Air pollution is a major cause of premature death and disease, and is the single largest environmental health risk in Europe.
- > Heart disease and stroke are the most common reasons for premature death attributable to air pollution, followed by lung diseases and lung cancer.

How do we measure air quality?

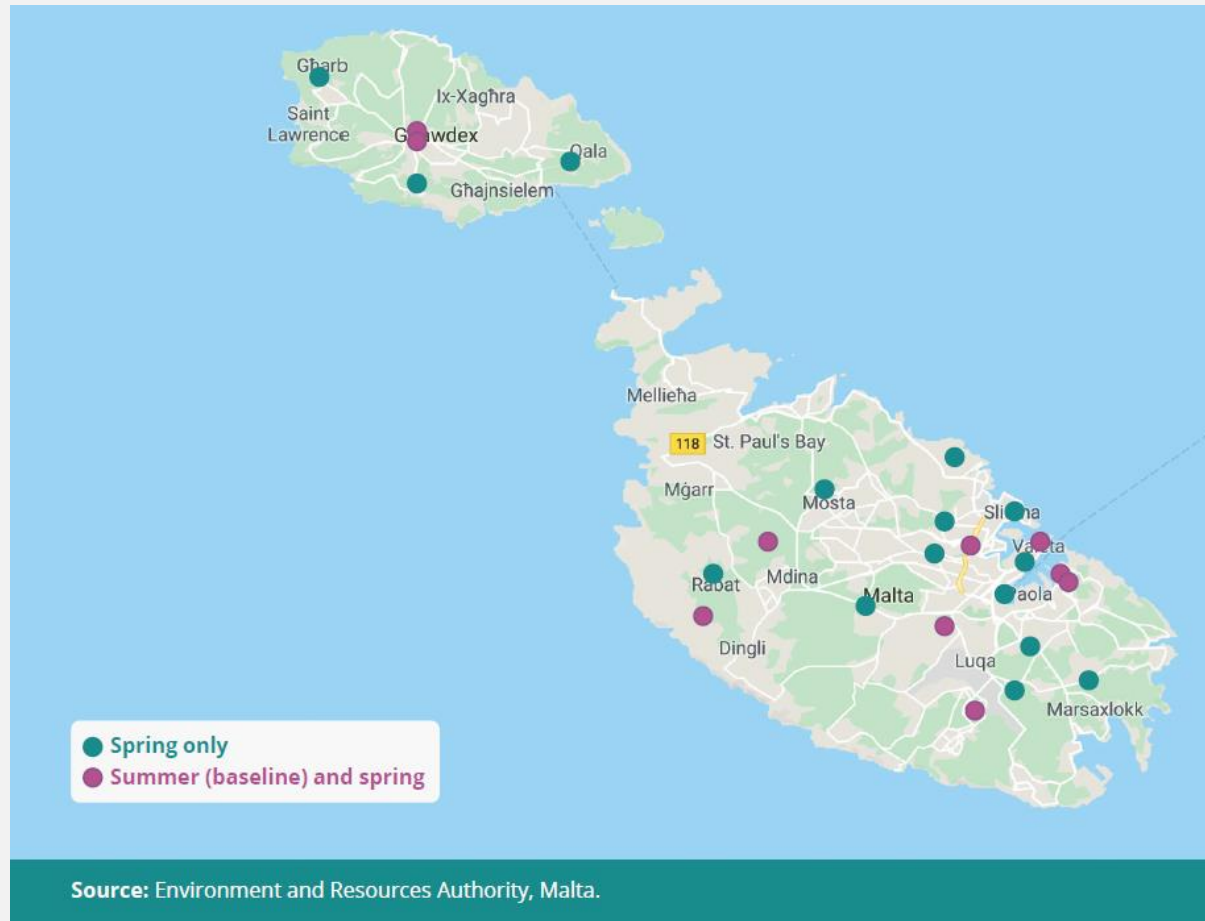
- > Air quality monitoring stations
- > Expensive
- > Just a few locations with different levels of representativeness
- > Data available to the public but not much consulted





Sensor.Community is a contributors driven global sensor network that creates Open Environmental Data.

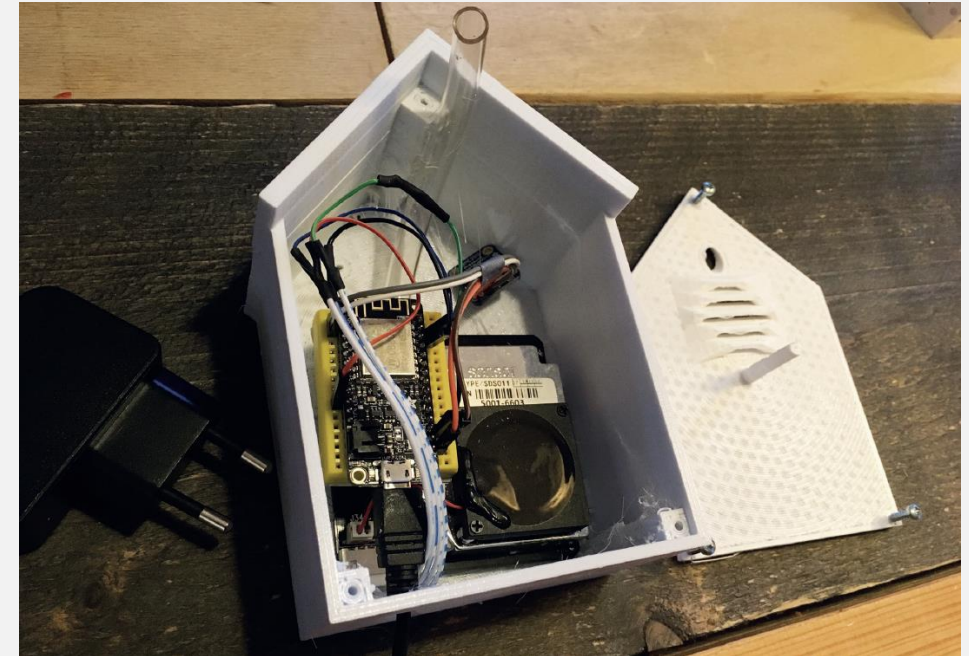
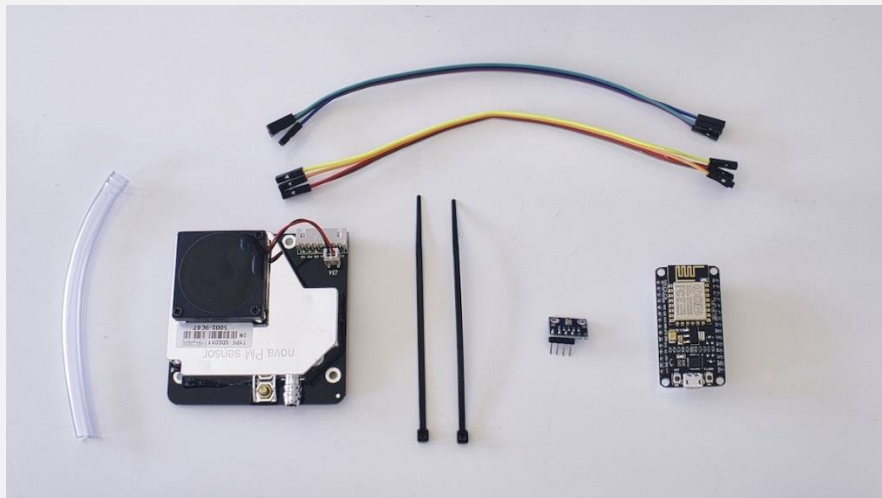
From citizens to a more organized network



- > Citizens
- > Schools
- > Communities
- > Municipalities

Types of sensors

- > Passive air pollutant samplers
- > Electrochemical gas sensors
- > Photoionization sensors
- > Particulate matters sensors



Source: Uif Putters

Different cases of odour pollution

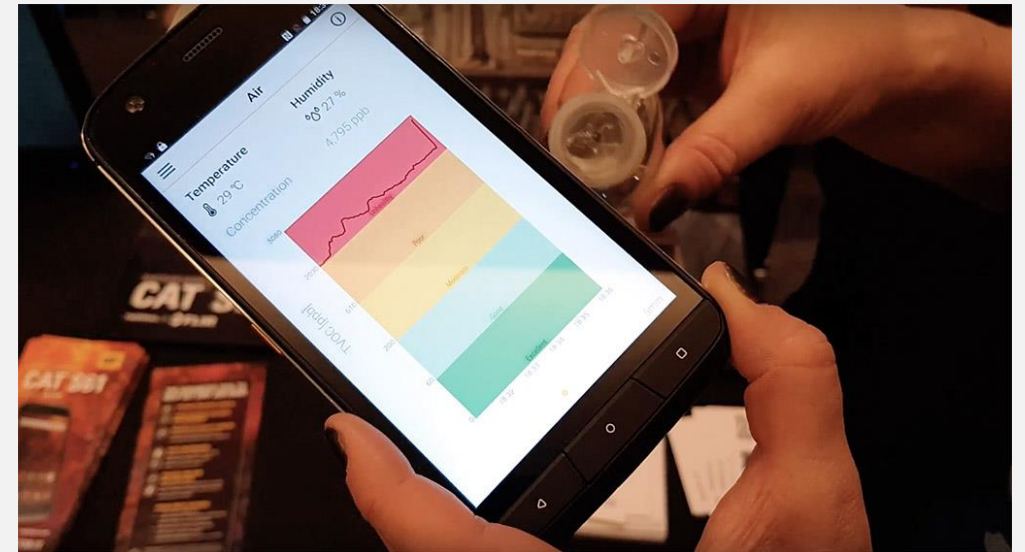


Atmospheric odours are the second cause of environmental complaints at world level (around 30%)



Objectives

- > Information on local air quality and exposure
- > Raising awareness
- > Complementing measurements from official air quality monitoring stations
- > Generating experience on use of low-cost sensors



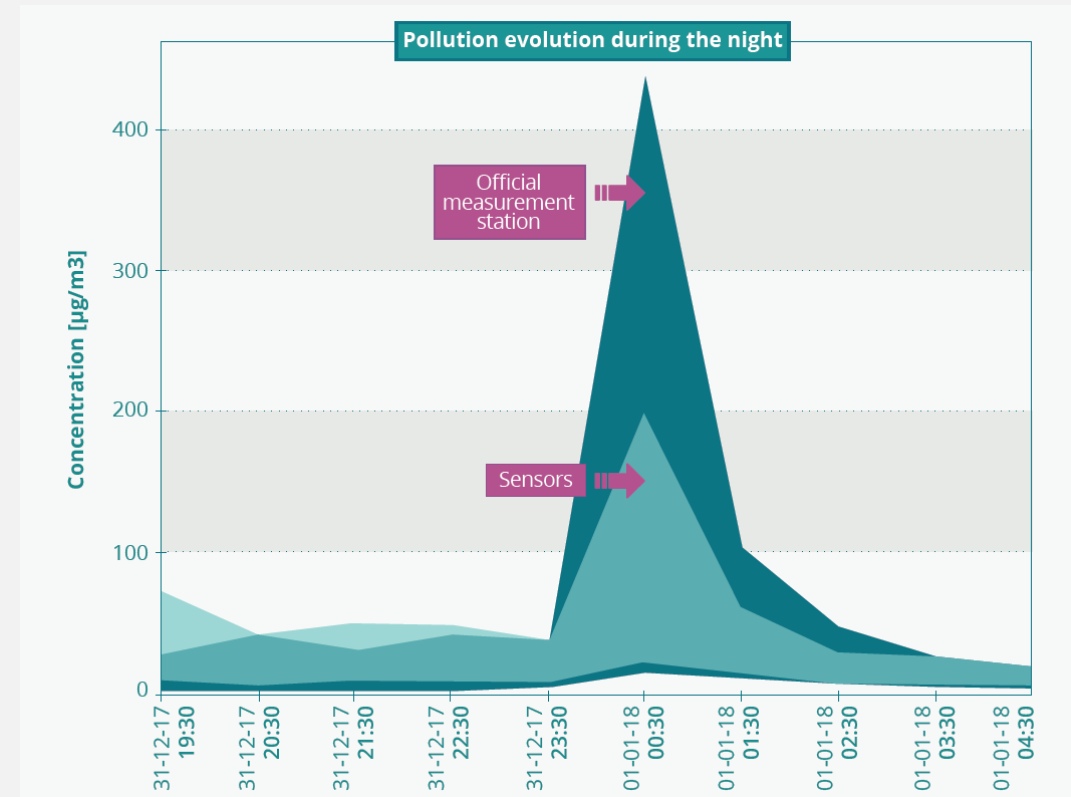
Advantages

- > Easy instalation everywhere
- > Low cost
- > Spatial distribution of the pollutants
- > Temporal resolution
- > Require calibration (by manufacturers and against air quality monitoring stations)



Disadvantages

- > Data quality (sensitivity, selectivity, temporal resolution, reproducibility)
- > Too much data to interpret and integrate (a great challenge 😊)



Source RIVM, 2018

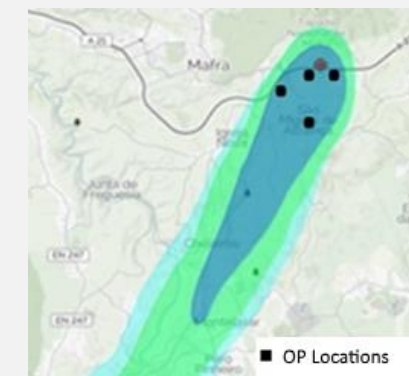
A perspective from the US



Analytic Method

Top-down Approach

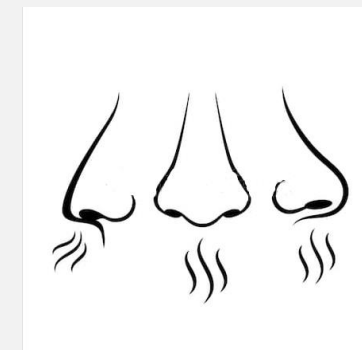
- ✓ Quantitative assesement
- ✓ Dynamic olfactometry
- ✓ Field inspections
- ✓ Atmospheric dispersion modelling



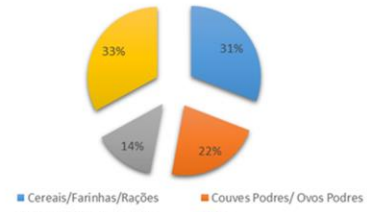
Colaborative

Bottom-up Approach

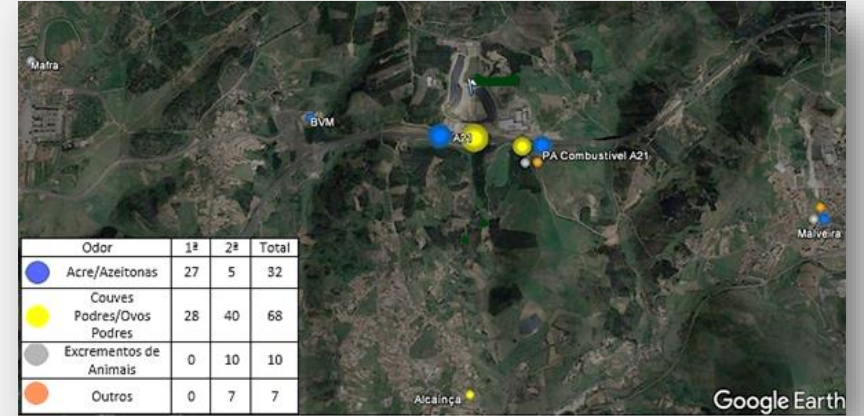
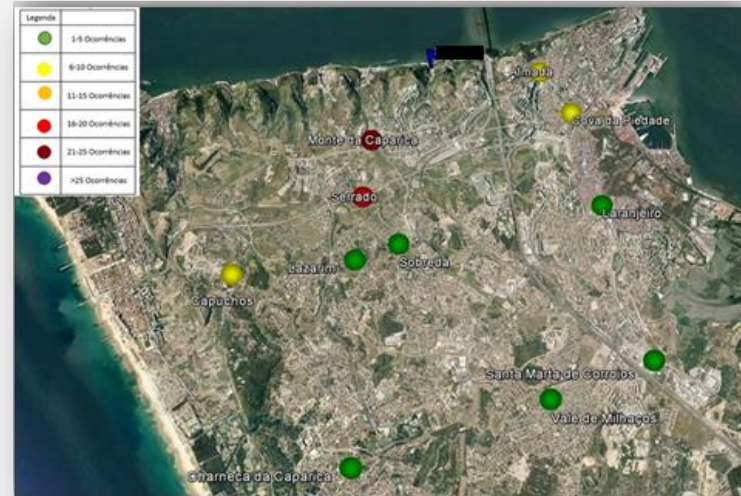
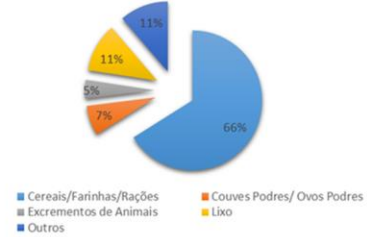
- ✓ Sensorial evaluation (use of human nose as a sensor)
- ✓ Field olfactometry
- ✓ Observers panel



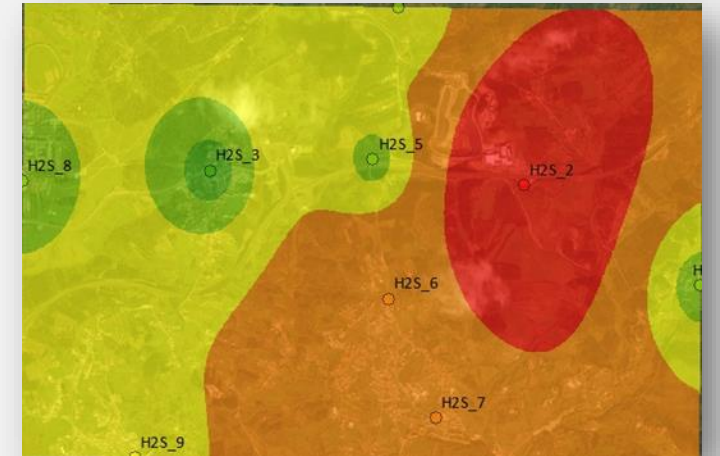
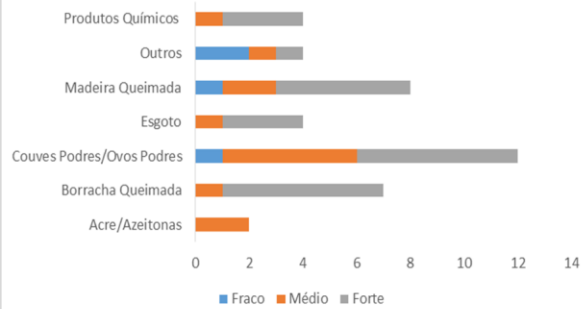
Ocorrências por tipo de odor - 1º Painel de Observadores



Ocorrências por tipo de odor - 2º Painel de Observadores



Intensidade por Tipo de Odor



The role of universities

- > Structuring the citizens monitoring network
- > Develop methodologies for better data collection and reliability
- > Interpret the data and making it useful
- > Analyse the huge amounts of data



Conclusion

- Air quality sensors will become cheaper and more and more disseminated
- Citizens will be a relevant part of the data collection
- Universities should play a role in given credibility to the citizen's involvement
- The environment will benefit from more intensive monitoring, awareness and action

Thank you

@

ff@fct.unl.pt

W

www.cense.fct.unl.pt