

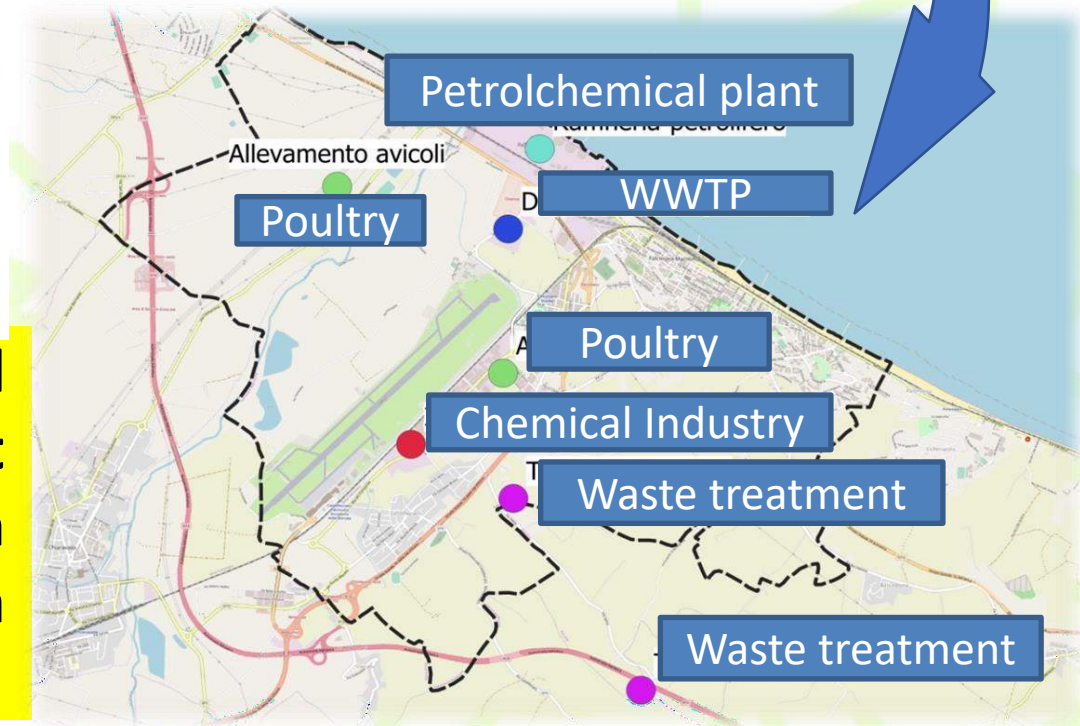
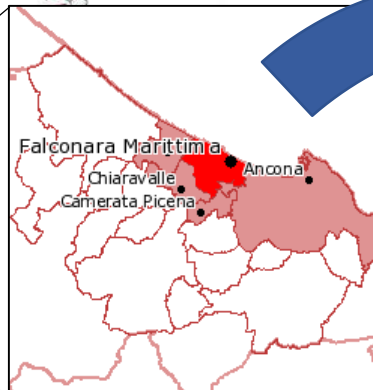
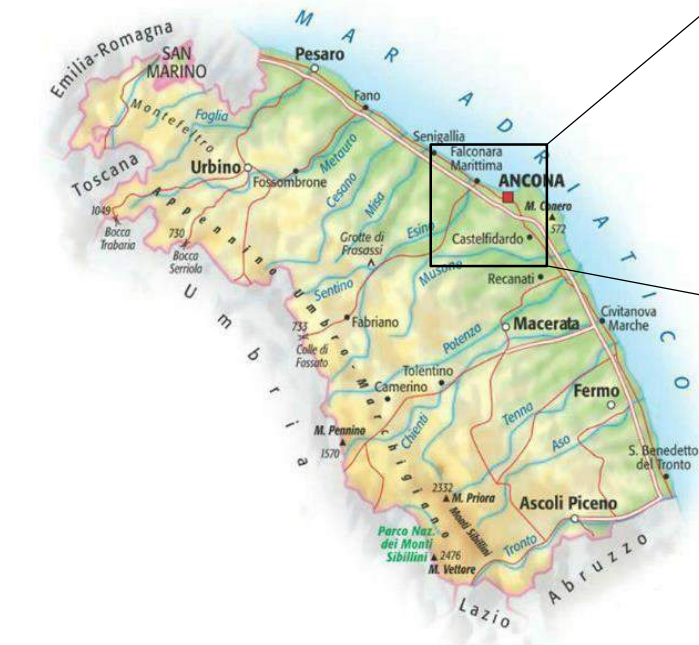


odor.net:

project for monitoring olfactory
phenomena in the municipality of
Falconara Marittima

Dr. Cesare Rossini International Business Development Manager
Lab Service Analitica srl (by concession of ARPAM)

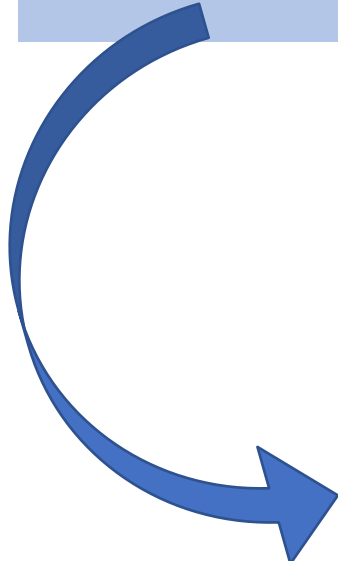




The ARPAM is the local authority for Enviroment in the MARCHE region (ITALY) : case of Falconara Marittima.

Different environmental pressures of anthropogenic origins

- relevant infrastructures: Adriatic railway line, the State Road «Adriatica» and Civil Airport « Raffaello Sanzio»
- Relevant industrial activities subject to National, Regional and Provincial Authorizations (Petrochemical plant, WWTP, etc).



Target:

Enrich and integrate the knowledge on air quality in the Municipality of Falconara Marittima with a monitoring system for pollutants related to olfactory nuisances and Volatile Organic Compounds (VOC).

Citizens have long been concerned about the presence of odors **and the related discomfort.**

Telephone reports were collected by the municipal administration and police and were not **treated in a *systematic manner*** regarding entity and type of perceived odors , weather conditions , wind direction.



STARTING POINT

The fixed positions of Falconara **have not shown** critical trends or higher levels of attention in recent years

There are 3 Air Quality monitoring Stations in Falconara Marittima area managed by ARPAM (according to D.Lgs 155/2010, European directive):





ARPAM was invited by the Municipality of Falconara Marittima, to **prepare a monitoring and control plan** for emissions related to "odorous" events impacting the area.

This Plan is based on the computerized and geo-referenced management of complaints of olfactory harassment by citizens and allows you to activate immediate interventions capable of answering the **following questions**:

Which area of the city is most affected by odorous events?

What are the tracer substances present in the air? and at what concentrations?

What is / are the source (s) of emission?

..... **This plan** takes into account citizens, transparency and communication (**citizen science**).

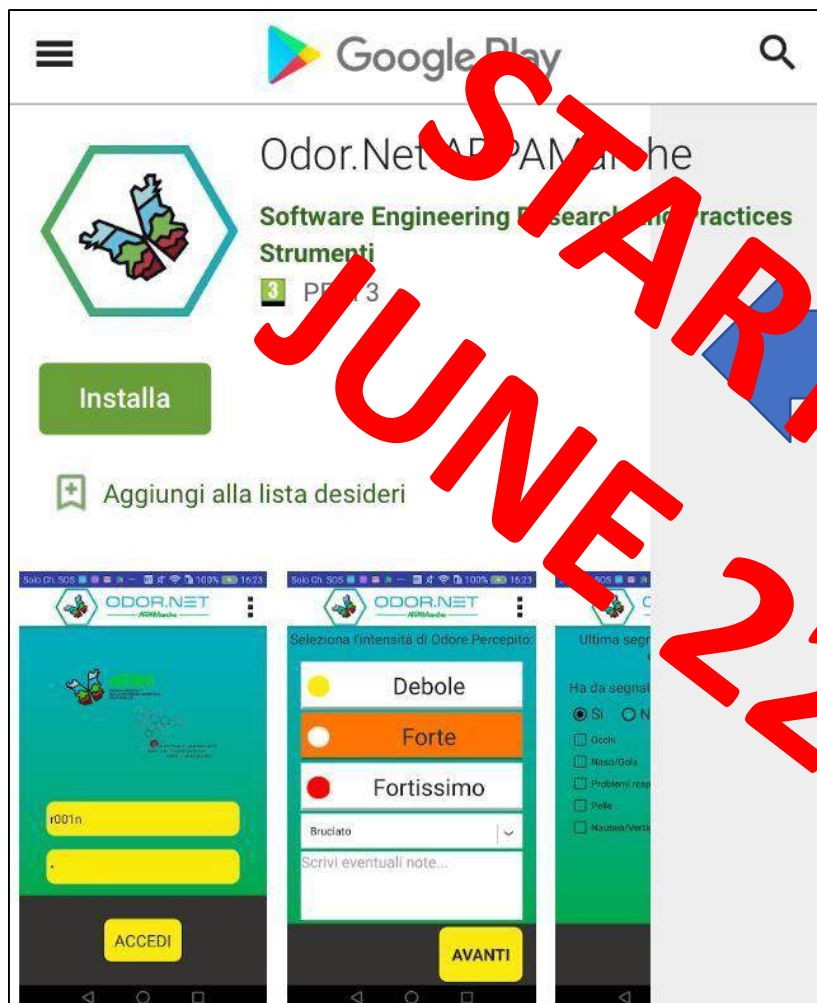
The monitoring system:

a. Smartphone application for the systematic and computerized management of reports.



b. Installation of sampling systems on request for timely and unattended sampling of ambient air with remote activation when a certain number of reports received via APP are exceeded (activation threshold).





ODOR.NET ARPAMarche APP.
available on Google Play and AppStore.



<https://www.youtube.com/watch?v=GPABK-m9-fQ>

Odor.net ARPAMarche is a platform for
the collection of digitalized reports

Some results:

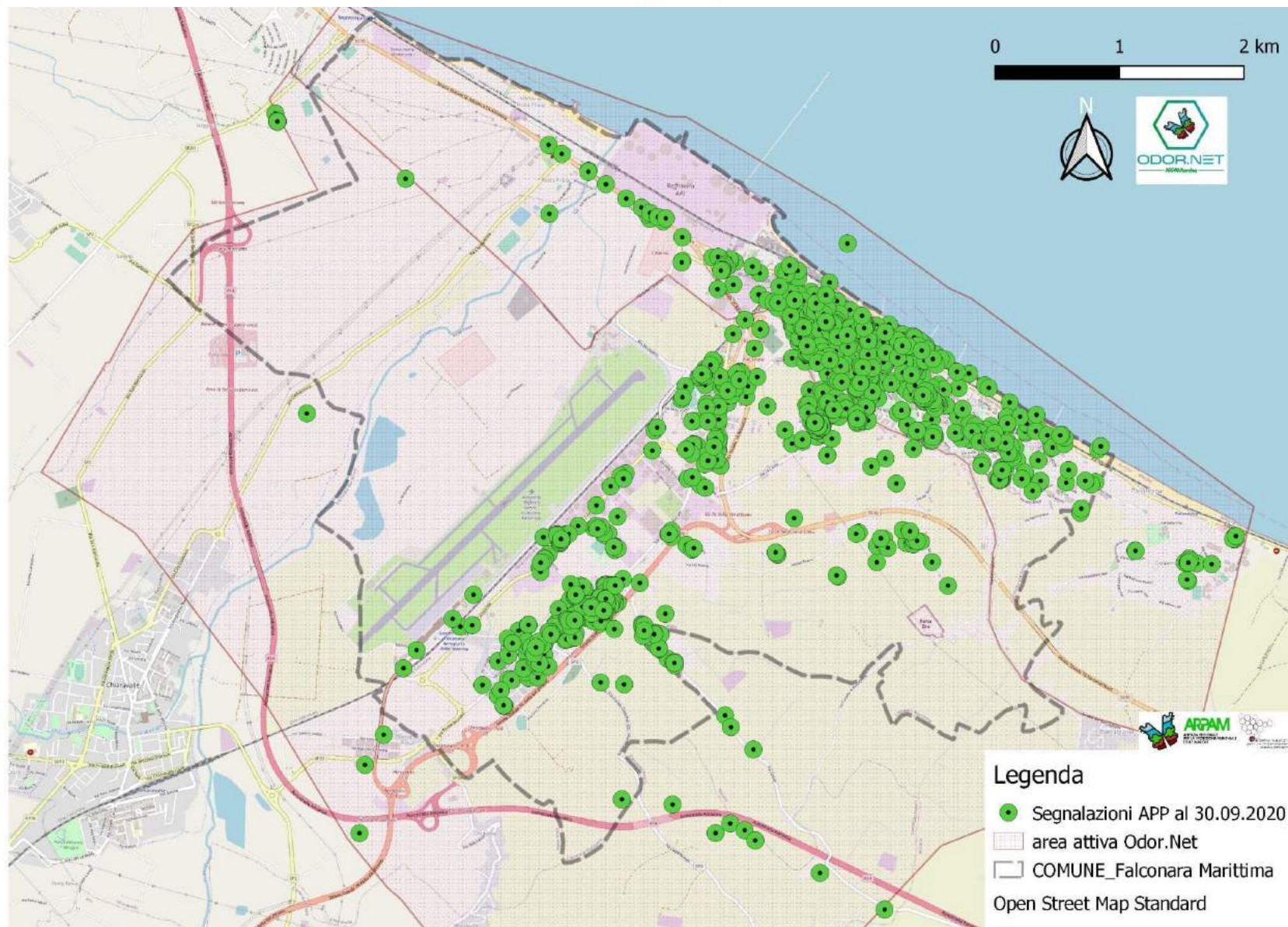
Period:
from the 22nd June 2019 to the
30th September 2020

RESULT



Results



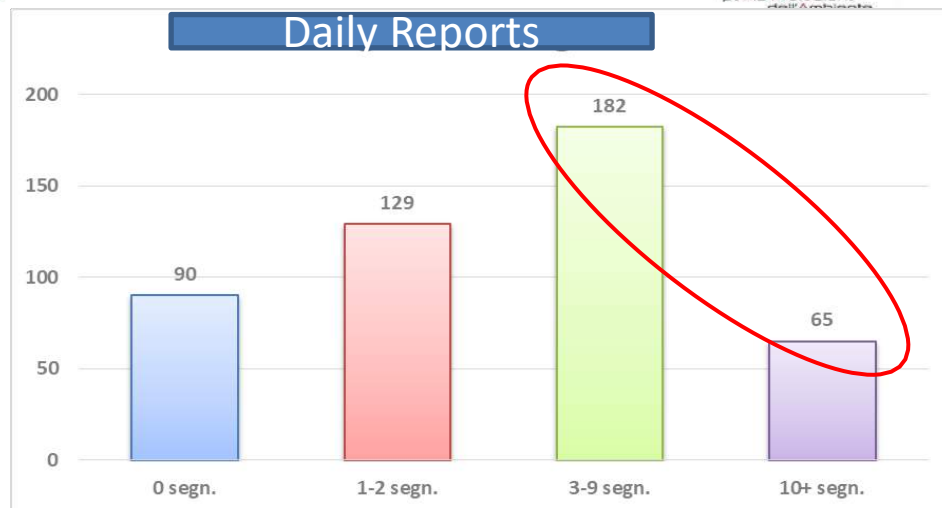


Daily Reports



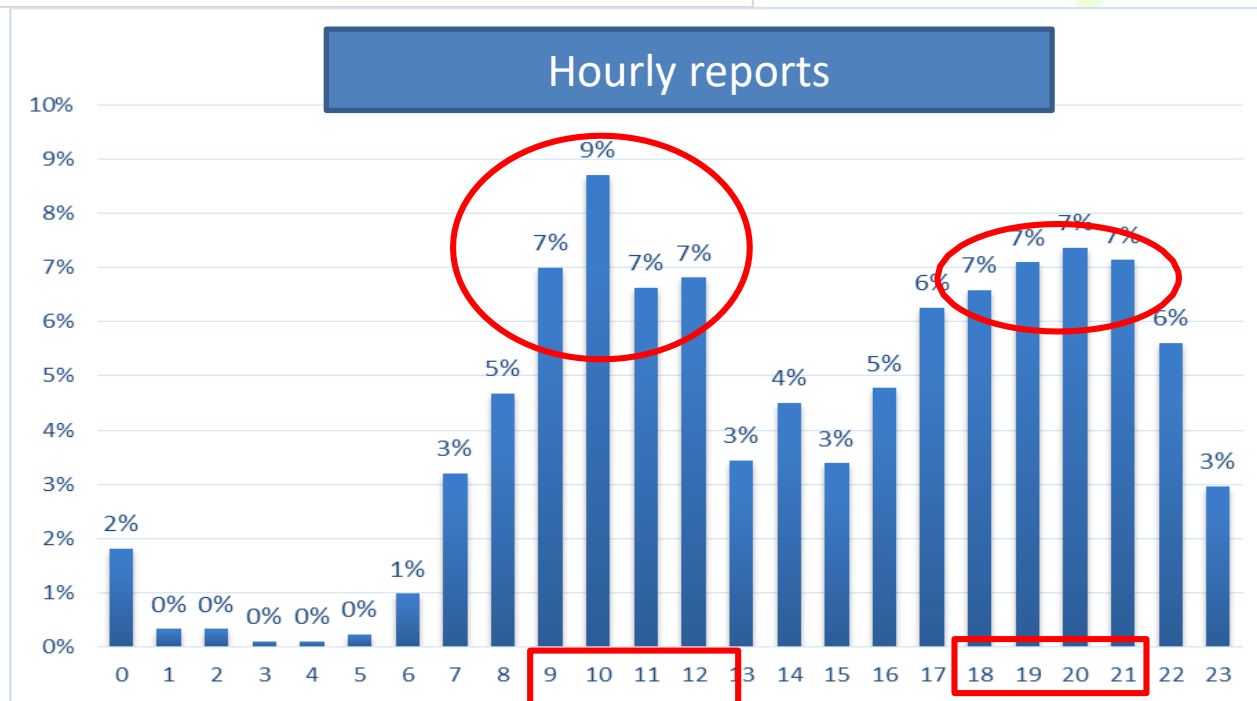
Monthly Reports



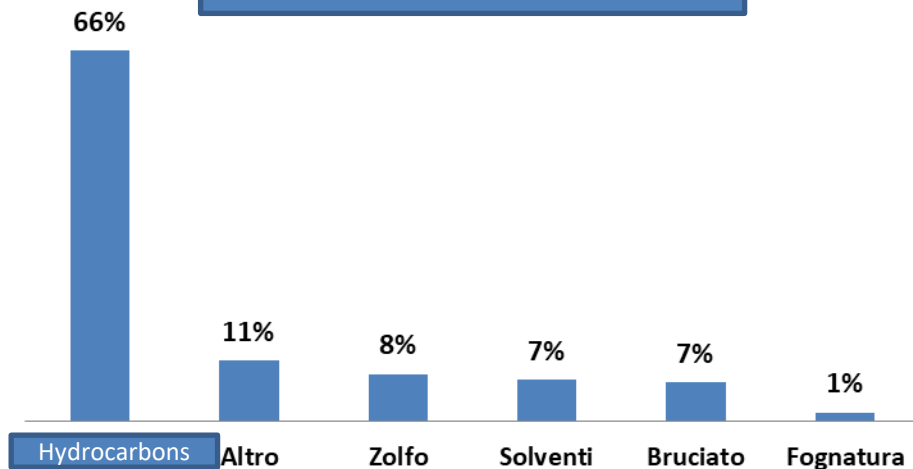


247 days with at least
3 odor reports.

of which **65** with at
least 10 reports



Type of perceived odors



66% of odor reports indicate the presence of hydrocarbon-like odors

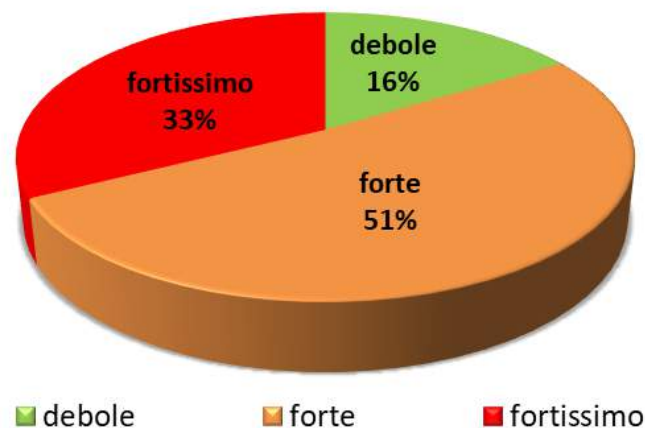
84% of odor reports indicate strong or very odor intensity perception:

Very strong

Strong

Weak

Perceived odor intensity %

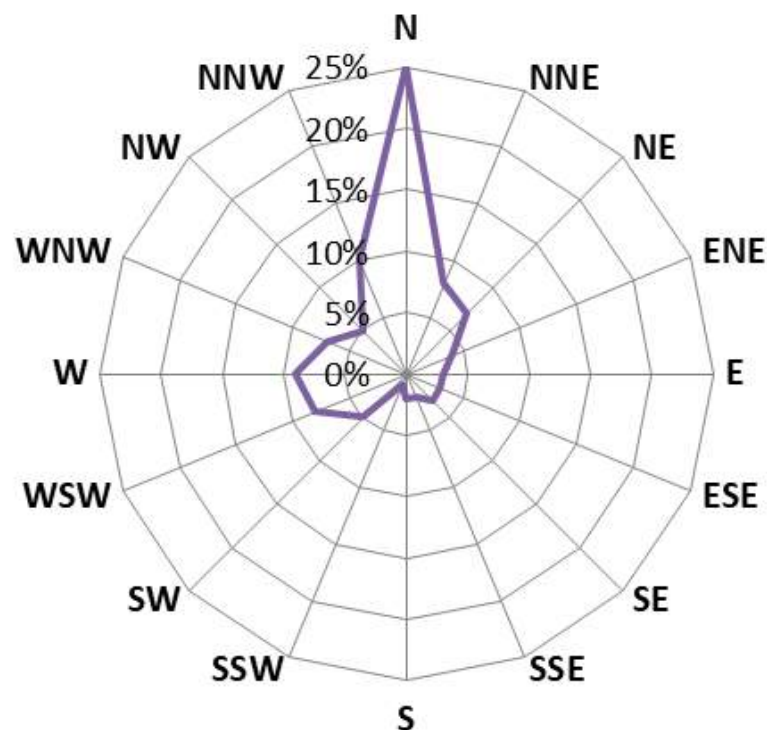


25% of reports : wind from
North

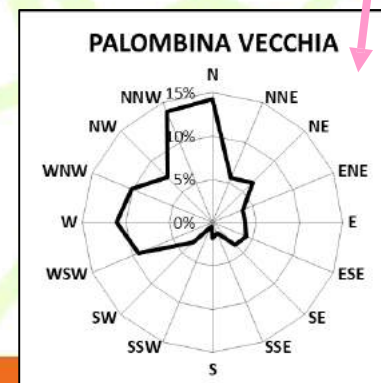
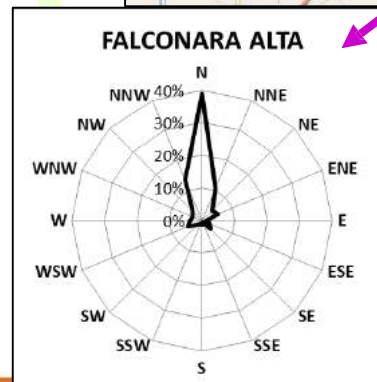
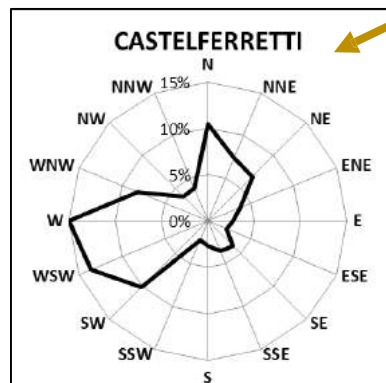
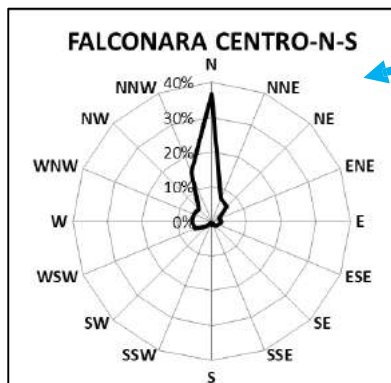
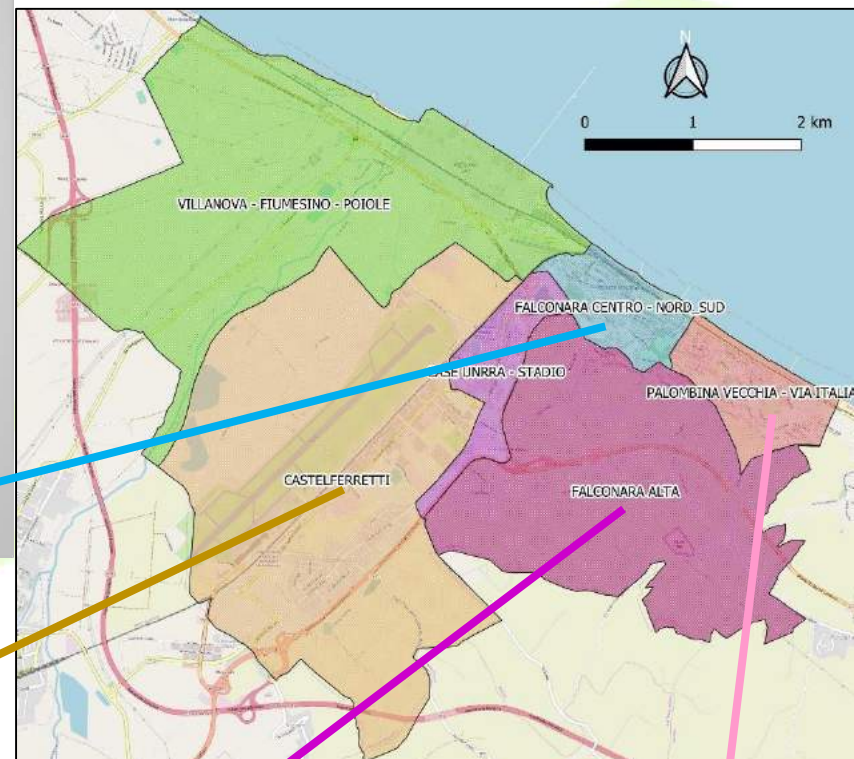
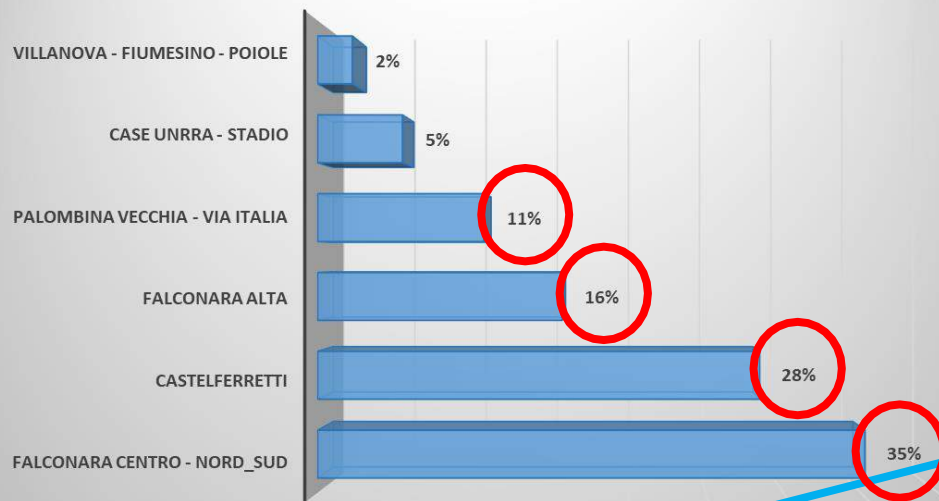
43% of reports wind
between NNW - N - NNE

24% of reports wind
between WSW-W-WNW

Wind directions vs reports



Reports in urban areas



The sampling network of Odorprep

<https://www.arpa.marche.it/progetti-aria>



It is essential to place the sampling devices in the most appropriate positions; activation took place via human triggering (the alternative path via sensors is also possible).

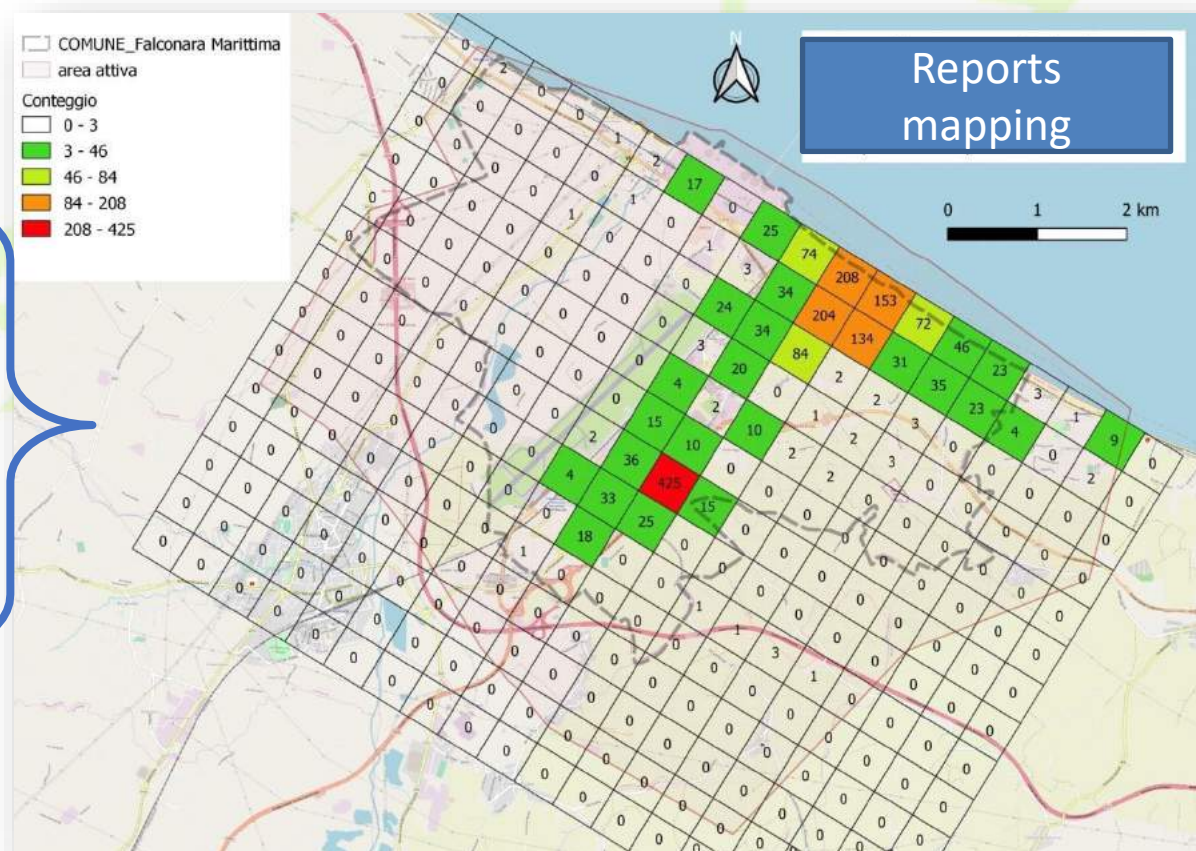


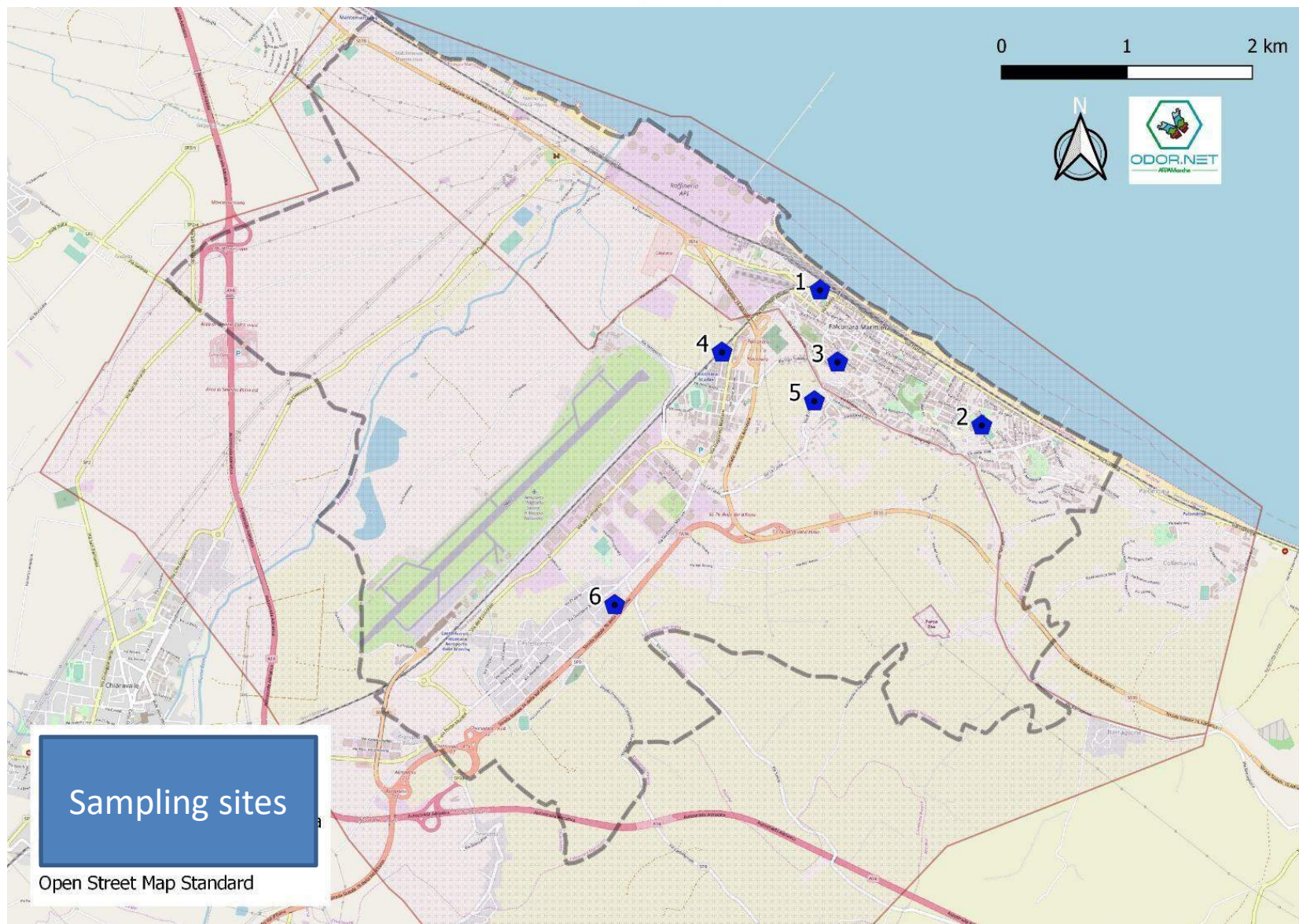
The systematic collection of reports via APP until September 2019, in combination with the historical ones received by telephone recorded by the Municipal Administration, **identified the most suitable sites** for the installation of the sampling systems.

Reports via APP.
(from June to September 2019)

+

Telephone reports
(from 2017 to September 2019)





- ❑ Each sampling station consists of:
 - **On-demand sampling system "ODORPREP"** : Nalophan bags and chemical cartridges.
 - **«PID» analyzer for real-time monitoring** of the total VOC compounds present in the air
 - **Weather station**

- ❑ Chemical cartridges and Nalophan bags will be analyzed for the **identification and quantification** of the present compounds.

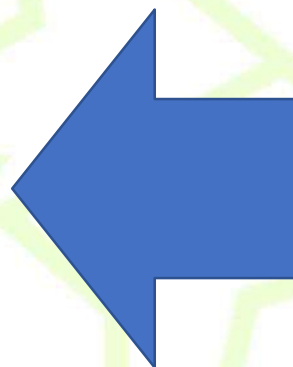
- ❑ The investigated substances will be volatile organic compounds (**VOCs**), including **aromatic hydrocarbons, aliphatic hydrocarbons**, as well as some solvents and sulfur compounds.



Odor.net Network Activation

Till 30.09.2020

- JULY 8°
- JULY 14°
- AUGUST 7°
- AUGUST 8°
- SEPT. 11°
- SEPTEMBER 13°
- SEPTEMBER 16°
- SEPTEMBER 18°
- SEPTEMBER 19°
- SEPTEMBER 29°



**10
EVENTS**



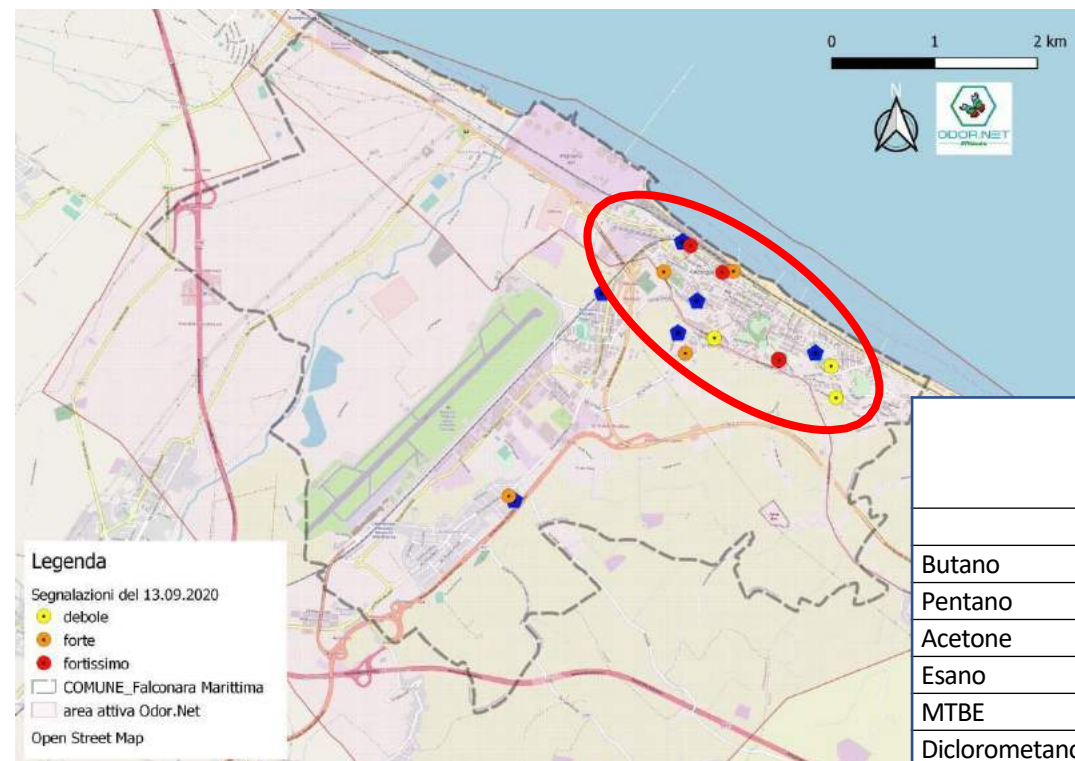
Odor.net

Network Activation

91 substances investigated

50 quantified

20 substances > $1\mu\text{g}/\text{m}^3$



EVENT OF 13/09/2020

Time: 7-8 pm

Wind Direction: NNW-N

Average speed: 3-4 m/s

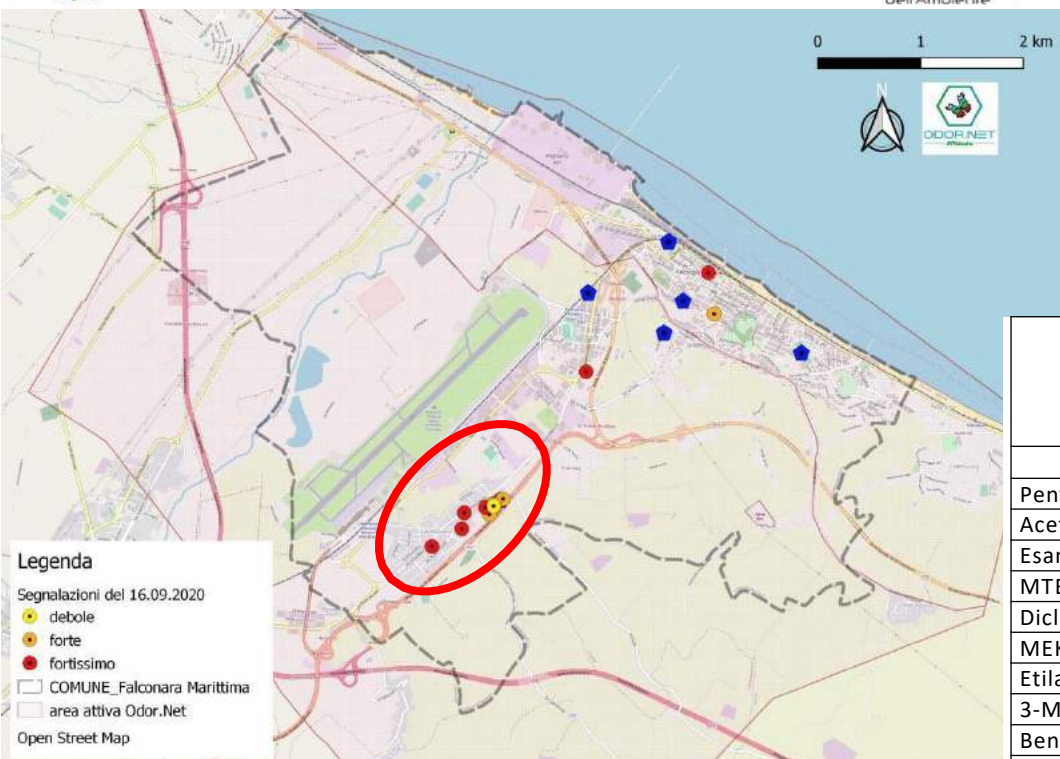
	Site 1 -Binari centro	Site 2 - Scuole	Site 3 -Palazzo bianchi
	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$
Butano	2,3	3,4	<0,1
Pentano	18,3	82,8	<0,1
Acetone	69,2	47,0	42,6
Esano	54,7	21,0	27,3
MTBE	4,7	2,5	1,9
Diclorometano	28,7	6,6	14,7
MEK	3,8	114,2	2,6
Etilacetato	4,0	<0,1	3,0
Cicloesano	2,0	<0,1	<0,1
2,3-Dimetilpentano	2,1	<0,1	<0,1
Carbonio Tetracloruro	2,3	1,3	1,3
Benzene	3,1	1,2	2,1
Eptano	1,5	1,1	0,9
Toluene	5,0	3,4	5,4
2-Butossietanolo	7,8	3,7	4,9
Cicloesanone	1,1	0,6	0,8
1,2,4 - Trimetilbenzene	1,1	0,6	0,8

Network Activation

91 substances investigated

50 about quantified

20 about $> 1\mu\text{g}/\text{m}^3$



EVENT OF 16/09/2020

Time:19-20

Wind direction: WSW-SSW

Average speed: $< 1 \text{ m/s}$

postazione	Site 4_ case Unrra	Site 5_ Falconara Alta	Postazio ne6_ Castelfer retti
	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$
Pentano	20,6	$<0,1$	$<0,1$
Acetone	26,5	23,2	21,9
Esano	5,9	9,0	11,1
MTBE	9,6	1,4	3,2
Diclorometano	6,9	12,0	8,3
MEK	2,4	1,6	1,1
Etilacetato	2,9	2,2	2,3
3-Metilesano	$<0,1$	60,8	49,3
Benzene	2,6	0,6	1,1
Isoottano (2,2,4trimetilpentano)	3,2	$<0,1$	$<0,1$
Eptano	3,1	0,5	1,1
Metilcicloesano	1,9	$<0,1$	$<0,1$
3-Metileptano	1,6	0,2	0,3
Toluene	15,1	2,1	4,5
Etilbenzene	2,7	0,9	0,9
(m,p) - Xilene	4,1	0,5	1,6
n-nonano	2,3	$<0,1$	0,2
Orto xilene	3,0	0,4	1,3
2-Butossietanolo	0,7	1,2	1,6
3-etiltoluene	1,6	0,2	0,7
n-decano	4,4	0,3	0,3
1,2,4 - Trimetilbenzene	2,1	0,4	1,0
n-undecano	2,3	0,5	0,4

..... DEVELOPMENT PROSPECTS

- By increasing the number of results and cases available over time, statistical analyzes can provide us with more information on the characterization of odorous events in order to also associate them with the various production processes.
- Transparency with citizens (newsletters, reports ..) and with companies (access to the odor.net web platform).
- Virtual dialogue table between the different parties for the promotion of proposals, solutions and actions to improve the environmental conditions of the territory in question.

*“He who dominates
smells dominates the
hearts of men.
Patrick Suskind.”*

