



Concentration of nanoparticles in different outdoor environments under Mediterranean weather conditions

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Fourth Stakeholders' Day, Lancaster Sept. 2018





## Outline

Introduction

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**Outdoor Scenarios** 

Results



#### Fourth Stakeholders' Day, Lancaster Sept. 2018

NanoMONITOR is partly funded by the European Commission Life14 with grant agreement LIFE14 ENV/ES/000662



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## To characterize outdoor airborne nanoparticle concentrations in four different environments under typical weather conditions in a Mediterranean region



#### Valencia Region (Spain)



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Sampling site:

**Emission variability:** 

Meteorological key variables:

Dependence on Meteorology:





In our case, we selected four different environments according to the historical data recorded by the Valencia Regional Air Quality Network

- I. Urban-Traffic
- II. Suburban-Traffic
- **III. Urban-Industrial**
- **IV. Rural-Background**



## Outdoor Scenarios Spain : Comunitat Valenciana









- Sampling site: Selection of four representative outdoor environments attending to historical data recorded by surveillance stations of the Regional Air Quality Network
- **Emission variability:**

Meteorological key variables:

#### Dependence on Meteorology:



#### Outdoor Scenarios Installation in different stations of the regional Air Quality Network





# Air Quality stations monitor different atmospheric Pollutants, including PM10 and PM2.5 (but not PM0.1)



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#### Outdoor Scenario: Urban - Traffic







#### Outdoor Scenario: Urban - Traffic



## Location







Outdoor Scenario: Urban - Traffic



# **Characteristics of the cabin**



- Close to Valencia city center
- Street with high traffic density
  - Highest concentration of pollutants in the whole Air Quality network



#### Outdoor Scenario: Urban - Traffic --- Typical Winter daily cycles





URBAN - TRAFFIC ENVIROMENT - Average winter week

Monthly average values for January (typical winter situation) in the Air Quality station of Pista de Silla





#### Outdoor Scenario: Urban - Traffic --- Typical SUMMEr daily cycles



Monthly average values for July (typical summer situation) in the Air Quality station of Pista de Silla



### Results Outdoor Scenario: Suburban - Traffic







#### Outdoor Scenario: Suburban - Traffic --- Typical winter daily cycles





- Main contribution expected: Traffic (highway).
- It is expected to identify human activity in terms of winter/summer, workdays/weekend or time of the day.





### Outdoor Scenario: Suburban - Traffic --- Typical Winter daily cycles



#### Monthly average values for January (typical winter situation) in the Air Quality station of Paterna



#### Outdoor Scenario: Suburban - Traffic --- Typical **SUMMER** daily cycles





#### Monthly average values for July (typical summer situation) in the Air Quality station of Paterna



#### Outdoor Scenario: Urban - Industrial







#### Results Outdoor Scenario: Urban - Industrial



## Location





#### Outdoor Scenario: Urban - Industrial



#### Characteristics of the cabin



- Several industrial areas nearby, as well as the city of L' Alcora
- Their main activity is fabrication of ceramics: high concentration of particulate matter
- Air Quality cabin locates downwind the industry or the city, depending on wind conditions
- Different concentration time profiles expected in winter or summer due to the typical seasonal meteorological conditions in this area.



#### Outdoor Scenario: Urban - Industrial --- Typical Winter daily cycles





Weekly average values for January (typical winter situation) in the Air Quality station of L'Alcora



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#### Outdoor Scenario: Urban - Industrial --- Typical SUMMEr daily cycles



Weekly average values for July (typical summer situation) in the Air Quality station of L'Alcora



#### Outdoor Scenario: Urban - Industrial













#### Outdoor Scenario: Rural - Background







#### Outdoor Scenario: Rural - Background







#### Outdoor Scenario: Rural - Background --- Typical Winter daily cycles



#### Weekly average values for January (typical winter situation) in the Air Quality station of Coratxar





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#### Outdoor Scenario: Rural - Background --- Typical SUMMEr daily cycles



#### Weekly average values for July (typical summer situation) in the Air Quality station of Coratxar



#### Summary

#### Summary for the outdoor scenarios under Winter met. contions







#### Summary

#### Summary for the outdoor scenarios under SUMMER met. contions





URBAN - INDUSTRIAL ENVIRONMENT Average Working Day - Summer



#### URBAN - TRAFFIC ENVIRONMENT Average Weekend - Summer



URBAN - INDUSTRIAL ENVIRONMENT Average Weekend - Summer



SUBURBAN - TRAFFIC ENVIRONMENT

Average Weekend - Summer

	Num. Particles/cm – SUMINIER TIME			
ENVIROMENT	Max. Mean Hourly Value	Min. Mean Hourly Value	Daily Mean Hourly value (Working Day)	Daily Mean Hourly Value (Weekend)
rban-Traffic	20.310	3.359	8.641	6.083
rban-Industrial	47.303	2.606	12.721	14.333
ıburban-Traffic	11.923	1.449	4.380	3.160
ural-Background	6.027	311	1.796	1.630

SUMMER TIME				
	Non-Working/Working			
ENVIROMENT	(% Reduction)			
Urban-Traffic	30%			
Urban-Industrial	-13%			
Suburban-Traffic	28%			
Rural-Background	9%			

#### SUBURBAN - TRAFFIC ENVIRONMENT Average Working Day - Summer



RURAL - BACKGROUND ENVIRONMENT Average Working Day - Summer



RURAL - BACKGROUND ENVIRONMENT

4:00 6:00 8:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00

Hour (Solar Time)

Average Weekend - Summer





35000

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35000

30000

25000

20000

15000

10000

5000

0:00 2:00



# Thanks for your attention!

