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*Programas de Actividades de I + D  
entre grupos de investigación de la  
Comunidad  
de Madrid en Tecnologías 2018*



# AIRTEC-CM

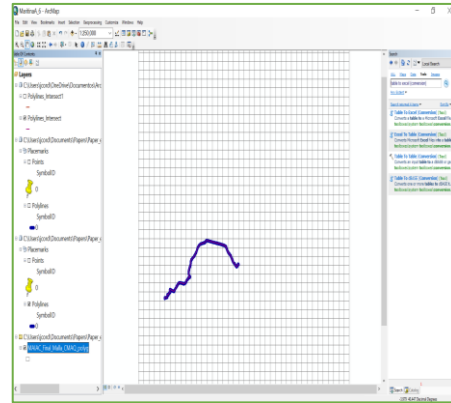
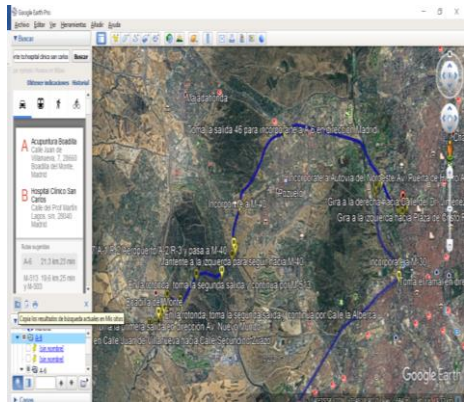
Avances análisis de exposición y microbiota intestinal  
(TARINDUSTRIAL/IdISCC)

S2018/EMT-4329

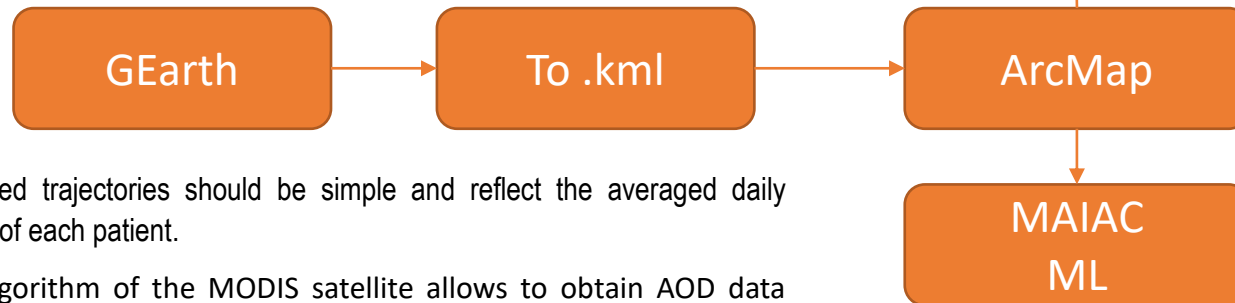
**4ª Reunión del Comité Científico-Técnico**

12 Enero 2023, UCM, Madrid

# Data processing from trajectories

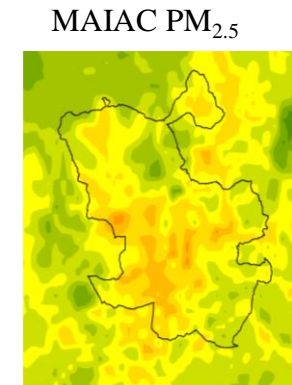
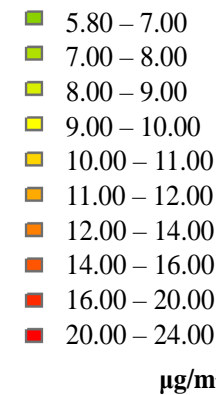
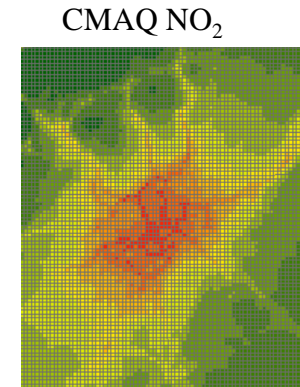
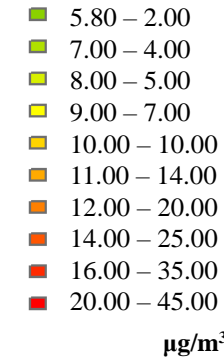


**ArcMap**



The above-mentioned trajectories should be simple and reflect the averaged daily working day routine of each patient.

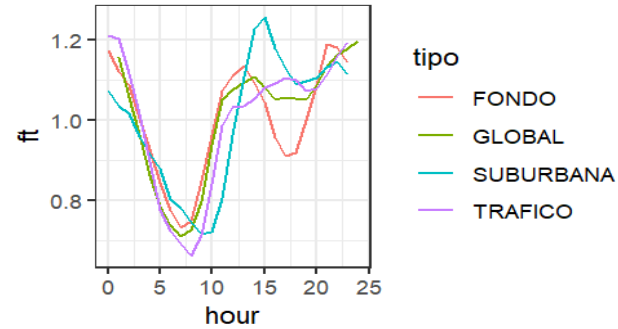
1. The MAIAC algorithm of the MODIS satellite allows to obtain AOD data with the desired 1kmx1km resolution that can be related to ground PM<sub>2.5</sub> observations by ML algorithms. Then, these trained models are used to compute the PM<sub>2.5</sub> at each grid cell.
2. CMAQ is a chemical multiscale transport model capable of reaching the resolution of 1kmx1km or even higher. It allows to simulate the concentrations of diverse pollutants. We have used it for ground PM<sub>2.5</sub> and NO<sub>2</sub>.



# Calculation of averaged exposure to PM<sub>2.5</sub> and NO<sub>2</sub>

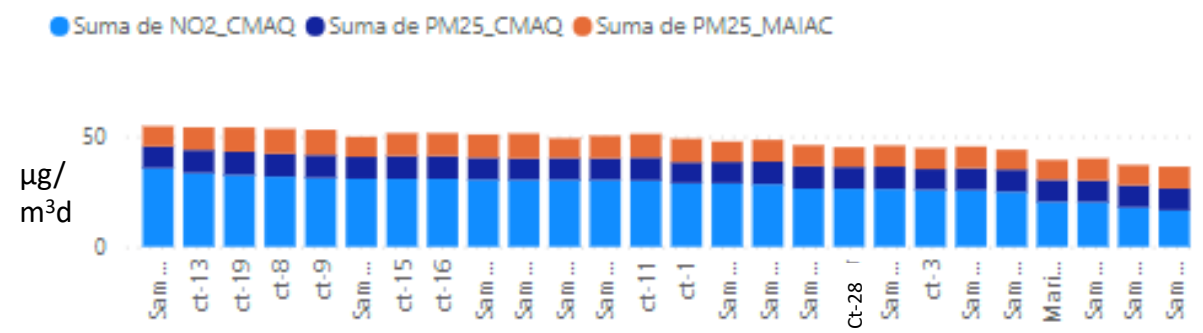
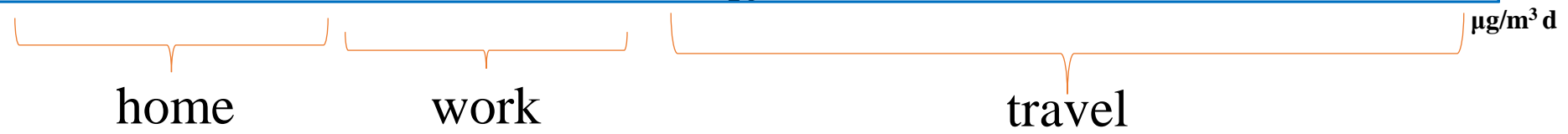


- Following calculus of the exposure for each patient has essentially three exposures to consider:
- 1-The time the patient is at home.
  - 2-The time the patient is moving from home to work and vice versa.
  - 3-The time the patient spends at work.



$$ft = \frac{C_{PM2.5,Perfil}}{C_{globalmean}}$$

$$Exposure = \frac{\left[ \sum_i^{1:9,21:24} (C_{PM2.5}) (f_{t,i}) * 1h + \sum_i^{11:19} (C_{PM2.5}) (f_{t,i}) * 1h + \left( \sum_{i=2}^{N-2} (C_{PM2.5}, i) (f_{t,10}) \frac{time_{s,i}}{t_{mov}} \right) 1h + \left( \sum_{i=2}^{N-2} (C_{PM2.5}, i) (f_{t,20}) \frac{time_{s,i}}{t_{mov}} \right) 1h \right]}{24}$$



PM2.5 in µg/m <sup>3</sup> d				
Assuming no daily variations in the PM2.5 concentrations				
Global		Home		
9.10		8.97		
Introducing daily variations in the PM2.5 concentrations with ft				
Global	Traffic	Background	Suburban	Home
9.01	9.01	9.23	9.21	8.96



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