



**IRTEMS**

H2020-MSCA-IF-2019,  
Grant Agreement 896417

**IRTEMS project closure workshop:**  
Modelling instantaneous road transport emissions  
February 13, 2024



# Other related projects experiences

By: **Rafael Borge**

Laboratory of Environmental Modelling, Universidad Politécnica de Madrid (Spain).

[rafael.borge@upm.es](mailto:rafael.borge@upm.es)



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## AIRTEC-CM (urban air quality and climate change integral assessment)



Research agreement for  
air Quality modelling



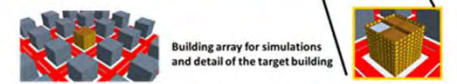
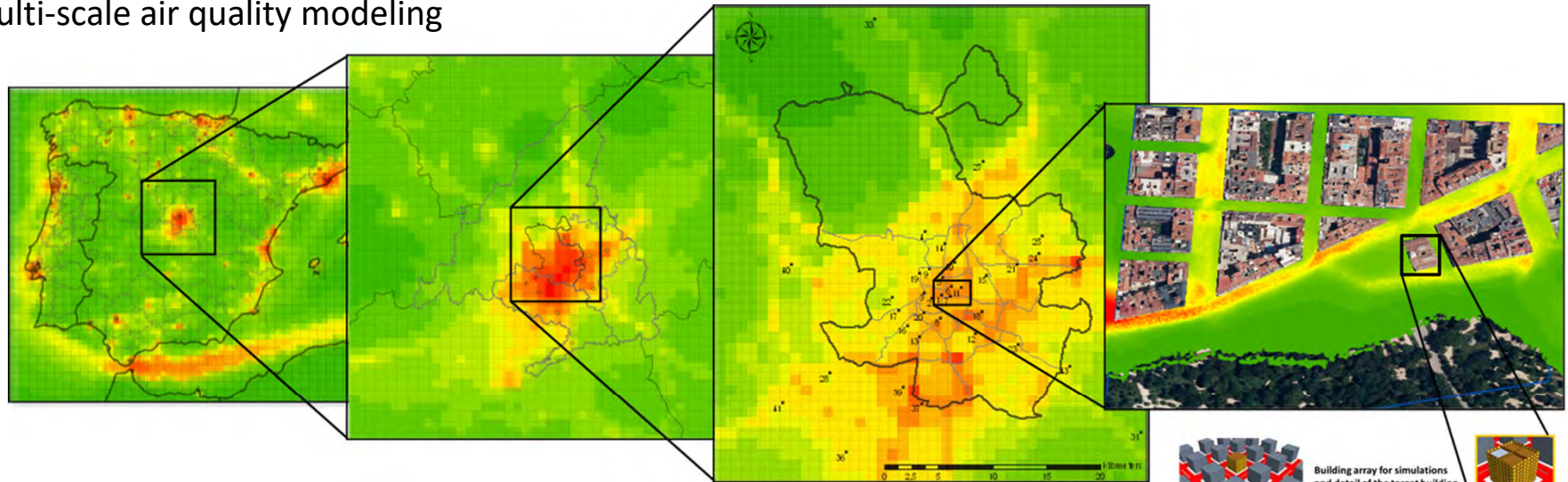


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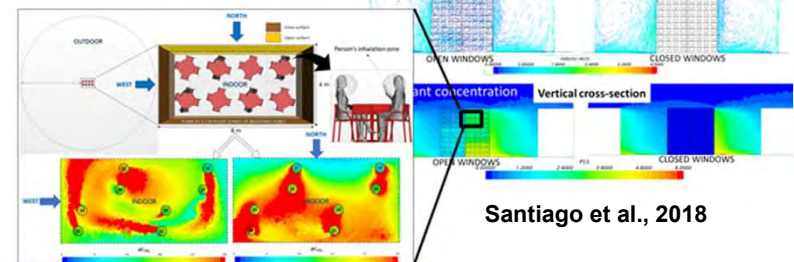


•Objective 2. Multi-scale air quality modeling



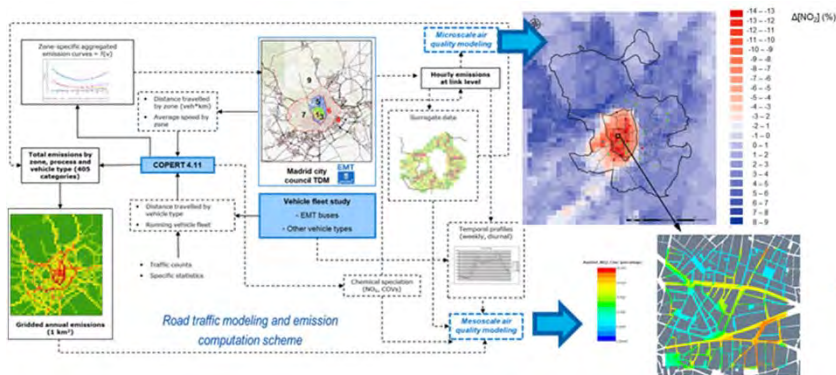
Wind Vertical cross-section

Rivas et al., 2022



Santiago et al., 2018

Borge et al., 2018



→ Consistent description of all relevant scales: from continental to indoor



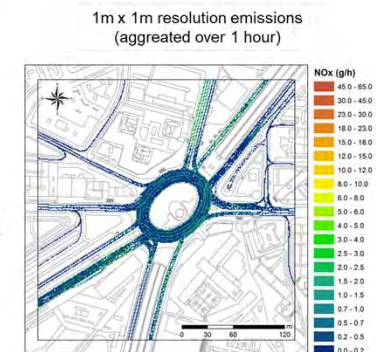
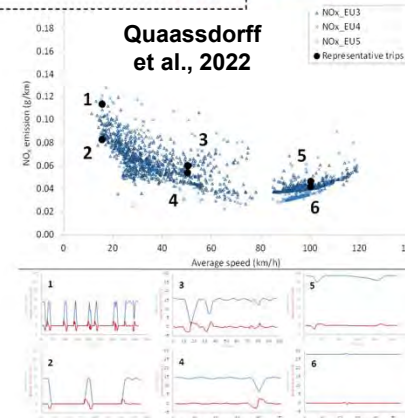
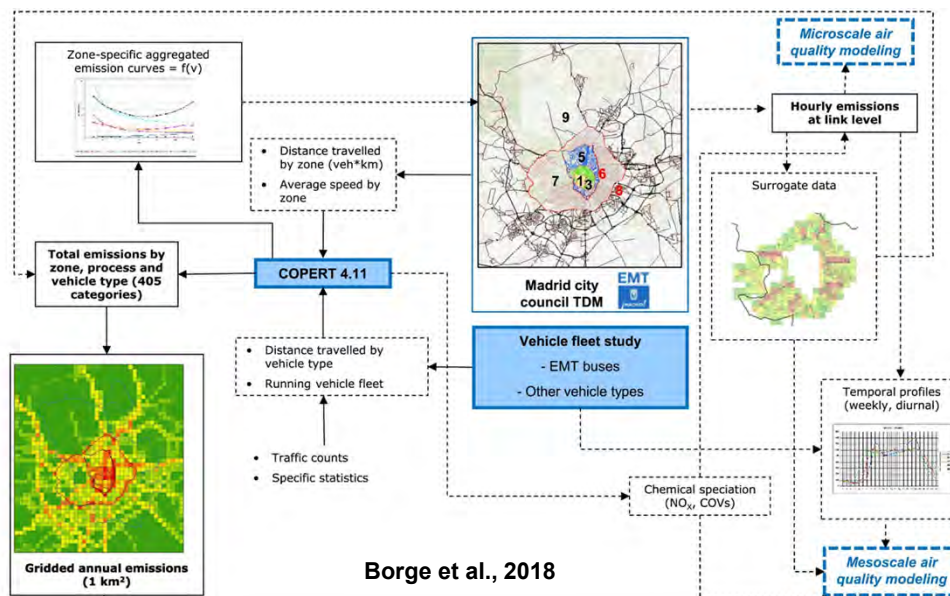


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- Better urban emission inventories and integration across the scales (road traffic emissions)



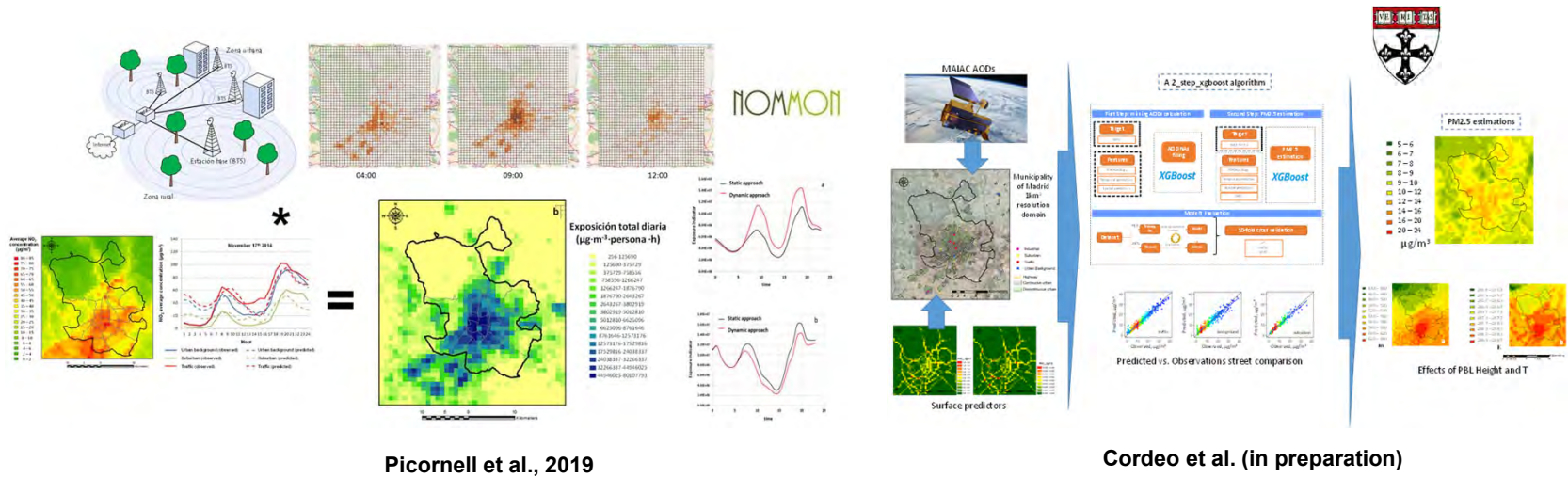


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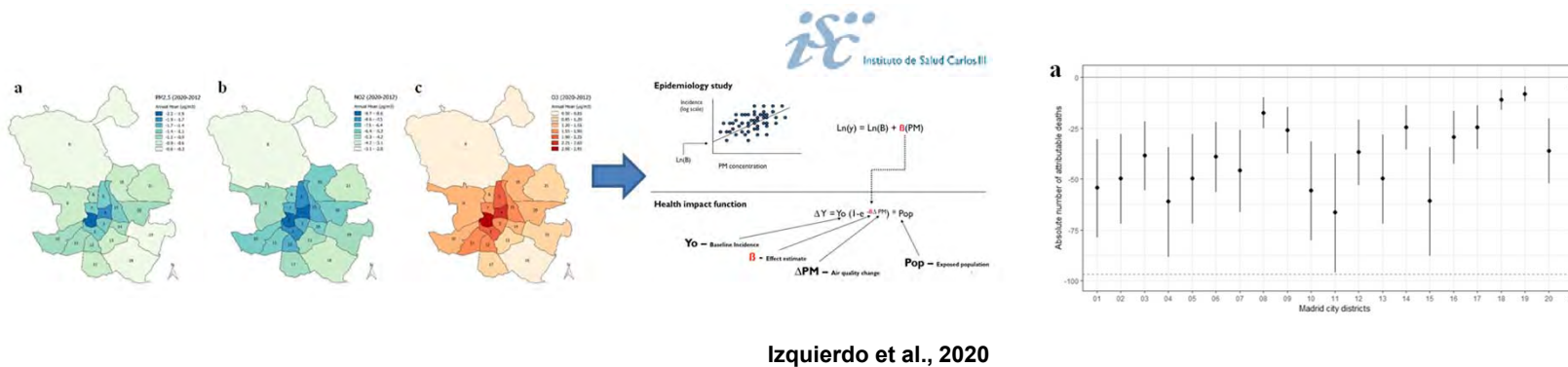
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## Objective 5. Population exposure assessment and health impacts



Urban scale





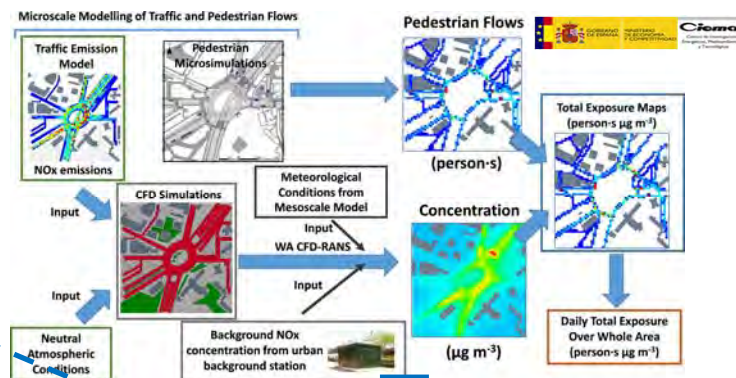
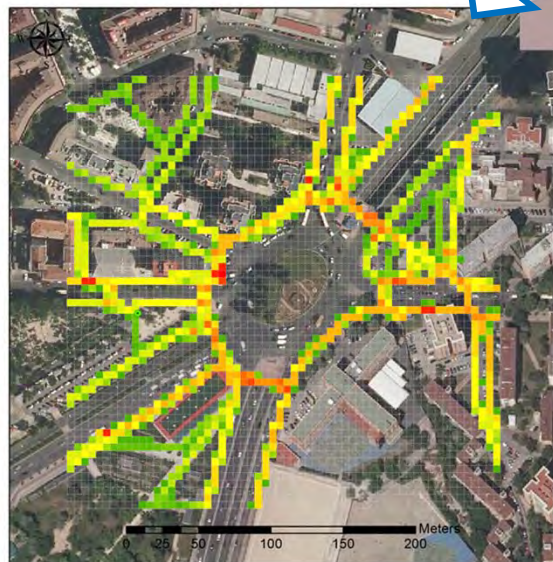
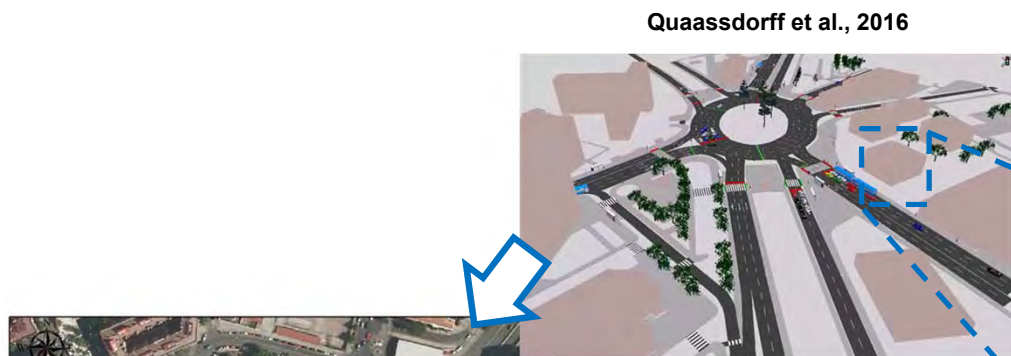


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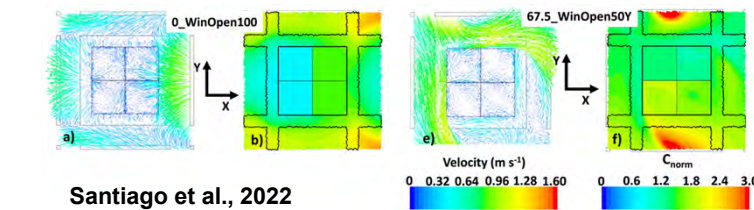
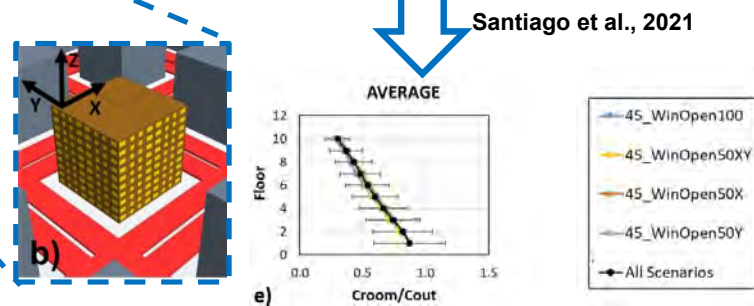
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•Objective 5. Population exposure assessment and health impacts



Microscale

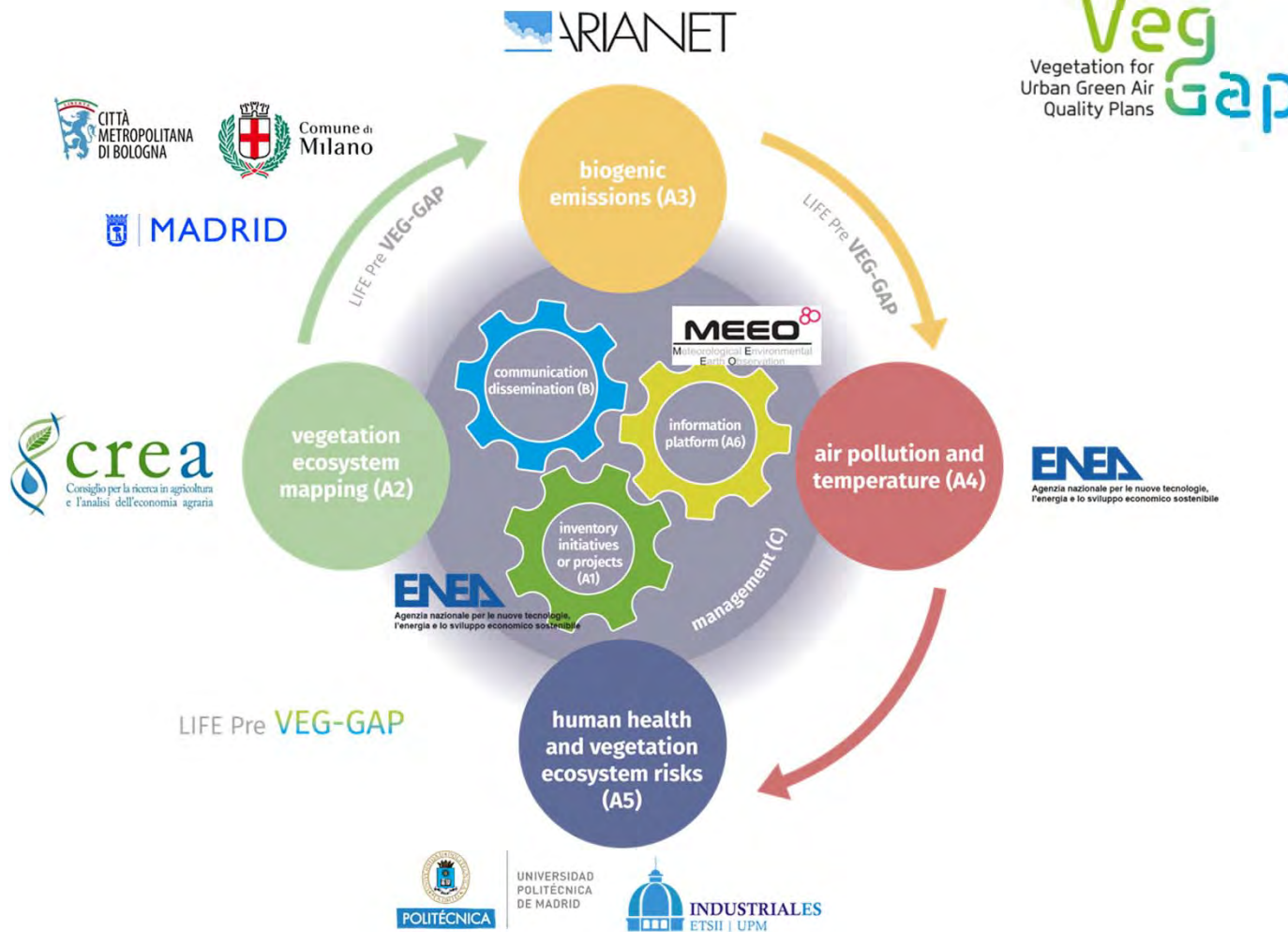


→ Integral exposure and health impact assessment



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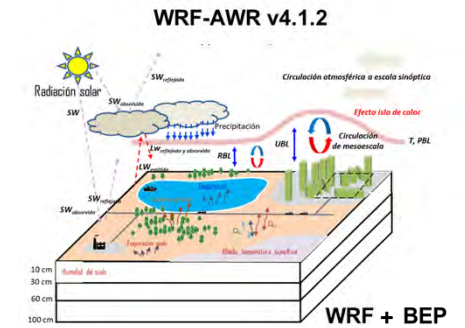
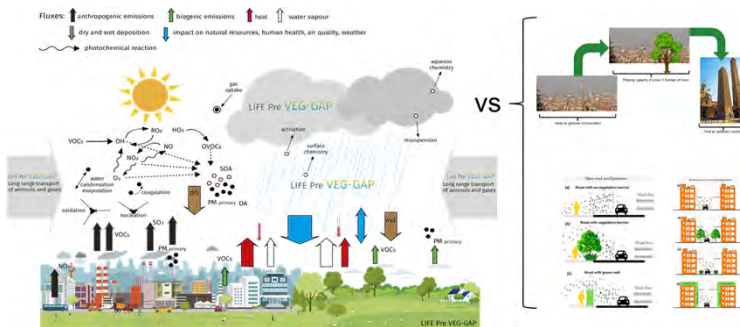


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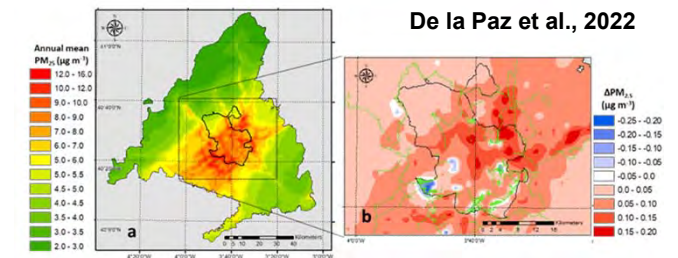
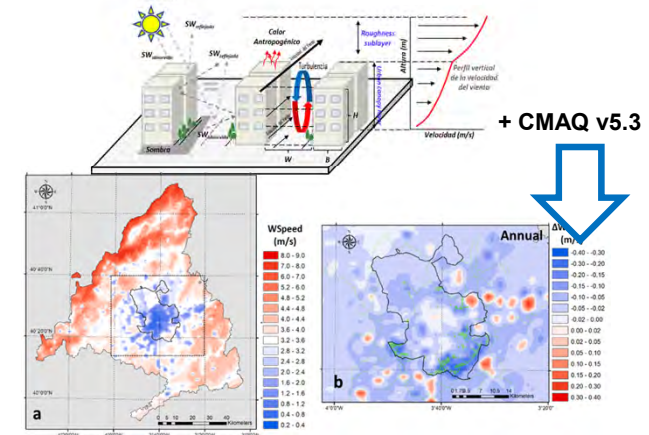
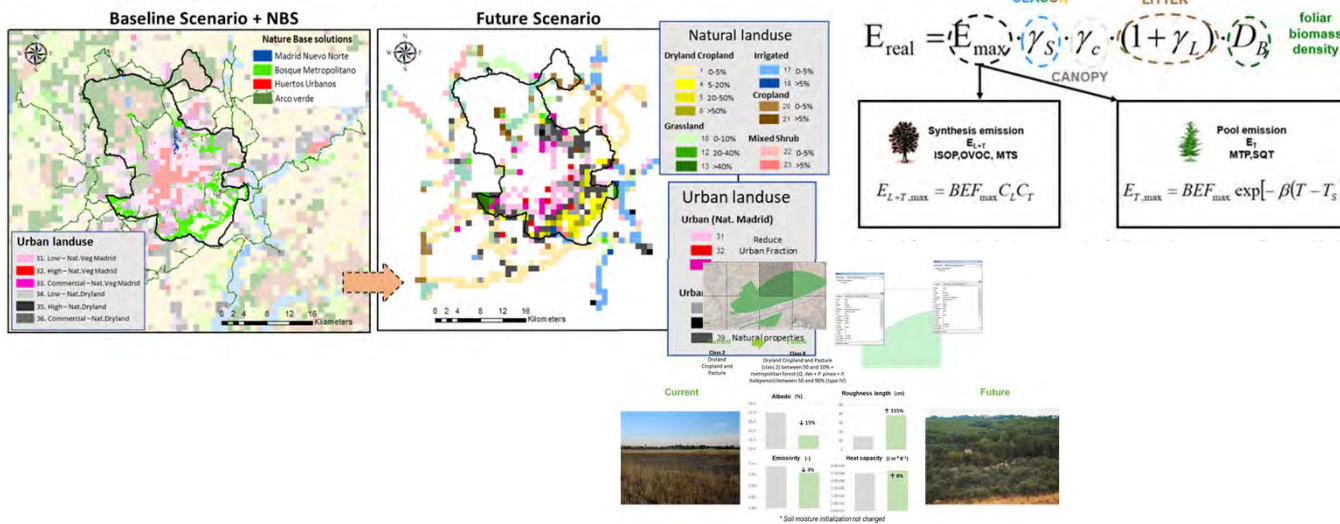
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## • Mesoscale approach



## - City-specific scenarios and modification of relevant properties and biogenic emissions





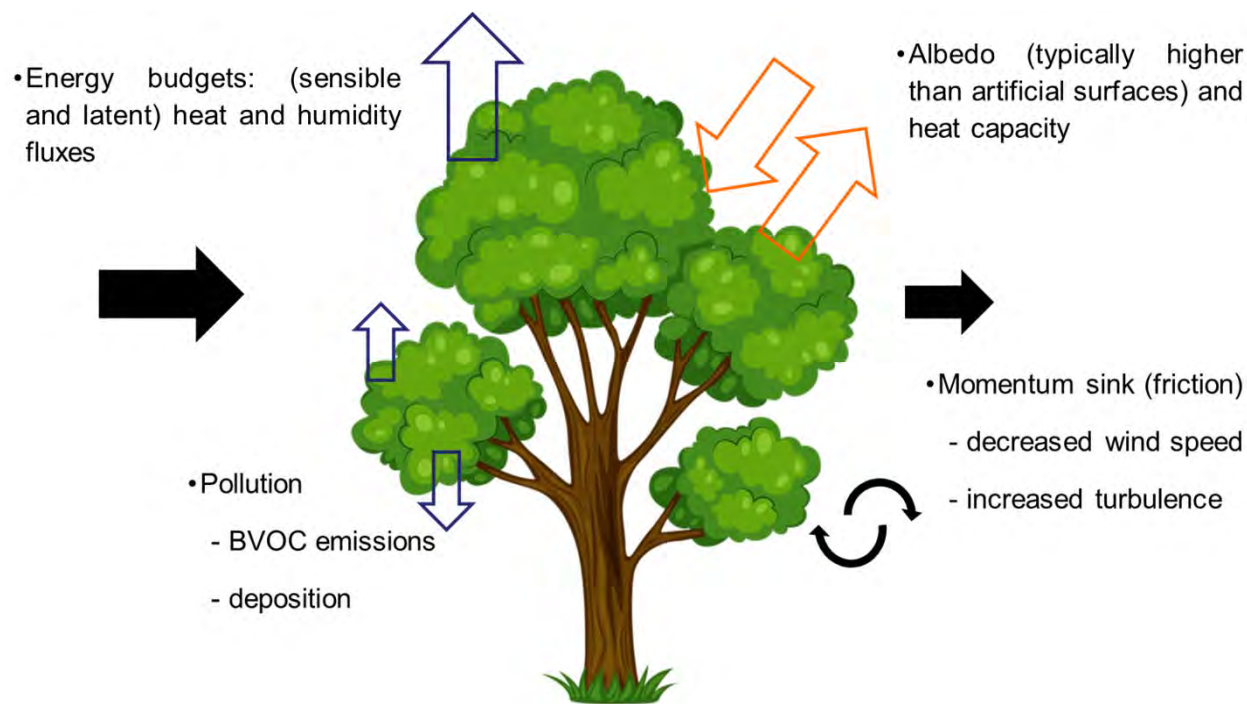


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- **Need to combine NBS with further anthropogenic emission abatement measures**
- Many technical challenges remain on the modelling side



- Integration of meso and microscale simulations
- Improvement in the representation of vegetation and relevant properties
- Deposition schemes, etc.



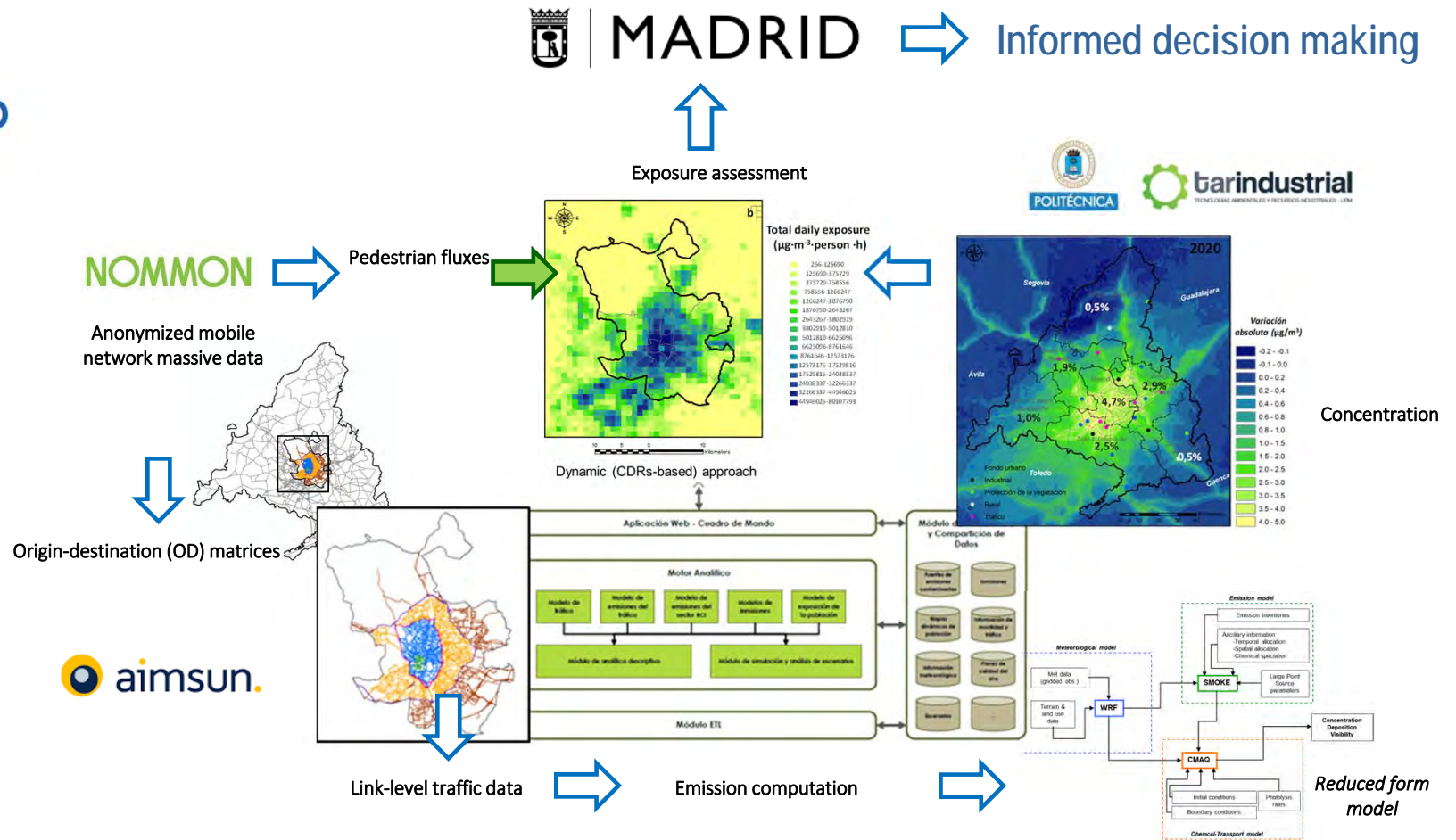
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**SIMAD**   
**SIMULACIÓN MADRID**  
**CLIMA Y AIRE**

- SIMAD (Advanced air pollution and climate change analysis and assessment system for the city of Madrid): a tool to keep track of pollution exposure over time and its response to emission abatement measures







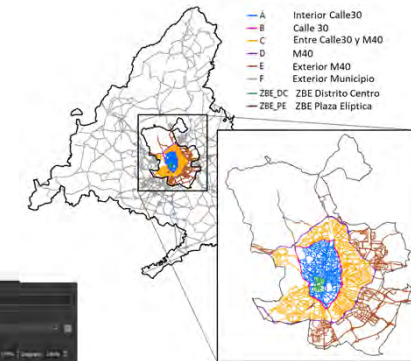
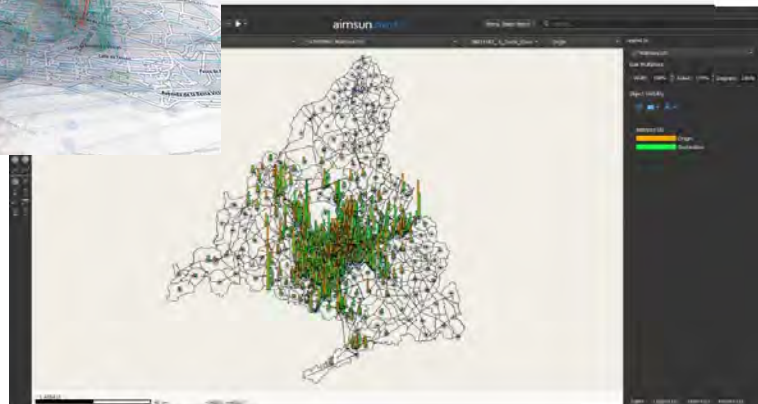
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Road traffic emissions

- Multi-resolution traffic model Aimsun Next



- Network definition and traffic counts data

- origin-destination (OD) matrices estimated from massive anonymized mobile phone data

- Traffic volume assignment at link level (17,408 in the region)





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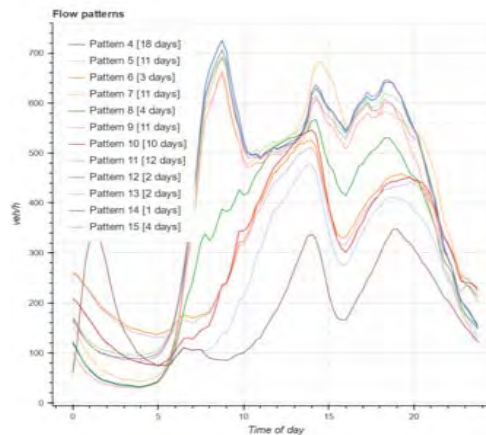
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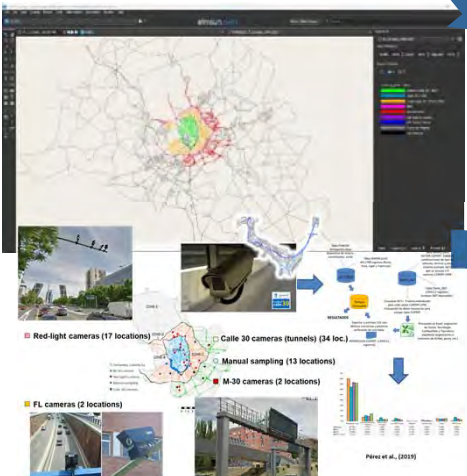
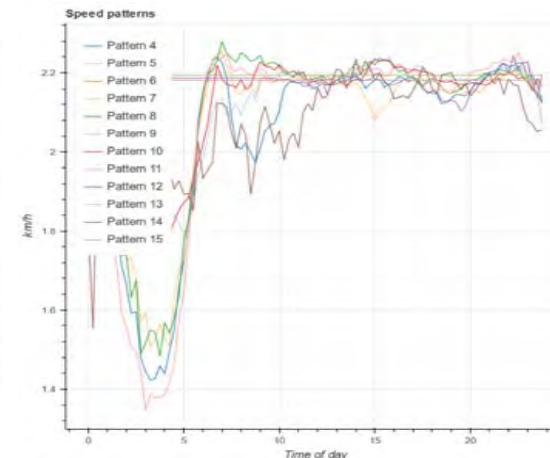
**Patterns calendar (3 months)**



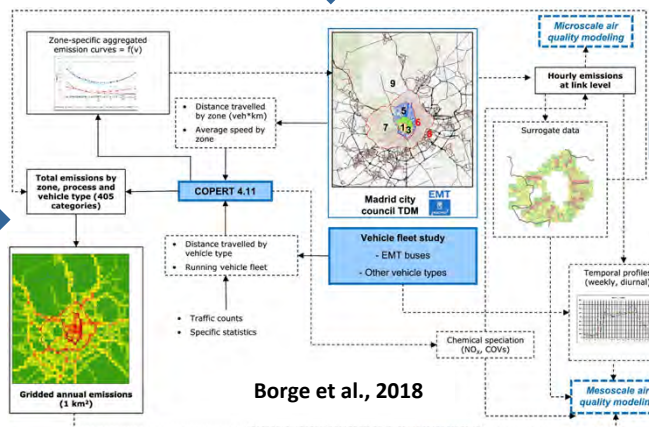
**Flow patterns**



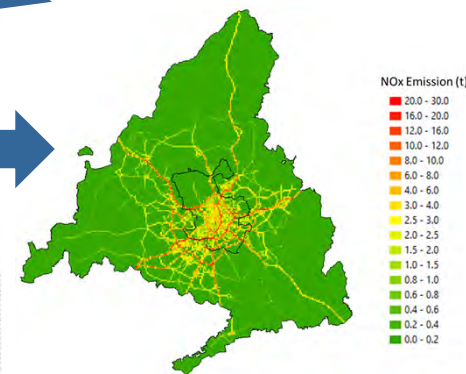
**Speed patterns**



**Fleet composition (Pérez et al., 2019)**



Borge et al., 2018



• 1-hour, 500 m x 500 m resolved emissions





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## Exposure

Browser: <https://simaddev.nommon.es/simad/exposure>

**SIMAD CLIMA Y AIRE** Datos disponibles Datos en validación rafael

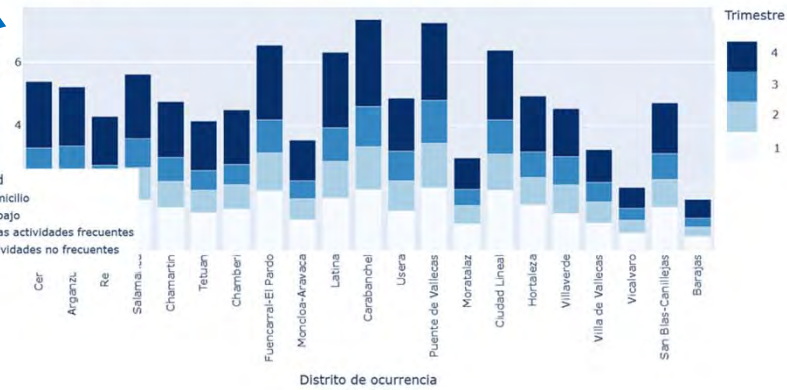
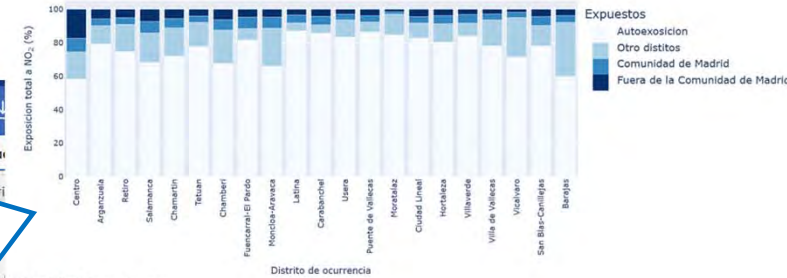
Periodo: 2022-Q1, 2022-Q4 Contaminante: NO2 Género: Masculino y Femenino  
Edad: 0-24, 25-44, 45-64 y 65  
Propósito: Casa, Trabajo, Otras actividades frecuentes y Otras actividades no frecuentes

Exposición de la población

Desde: 2022-Q1  
Hasta: 2022-Q4  
Indicador: NO2  
Género: Masculino, Femenino  
Edad: 0-24, 25-44, 45-64, 65+  
Propósito: Casa, Trabajo, Otras frecuen...

Mapa de exposición a NO2 por actividad (µg/m³-h)

Celda	Barrio	Distrito	Exposición media de NO2 (p.h x µg/m³)	Exposición media de PM2.5 (p.h x µg/m³)
27.367	Casco Histórico de Vallecas	Villa de Vallecas	517.658	1.347.456
27.368	Casco Histórico de Vallecas	Villa de Vallecas		
27.369	Casco Histórico de Vallecas	Villa de Vallecas		
27.370	Casco Histórico de Vallecas	Villa de Vallecas		
27.371	Casco Histórico de Vallecas	Villa de Vallecas		





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**Thank you for your attention!**

[rafael.borge@upm.es](mailto:rafael.borge@upm.es)



IRTEMS – Instantaneous Road Traffic Emissions Modelling System for cities project has received funding from the European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 896417. The information here provided reflects the author(s) view. It does not necessarily reflect the views or policy of the European Commission and REA which are not responsible for any use that may be made of the information it contains.