



SEEDS
Sentinel EO-based Emission
and Deposition Service

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SEEDS NO_x emissions in cities

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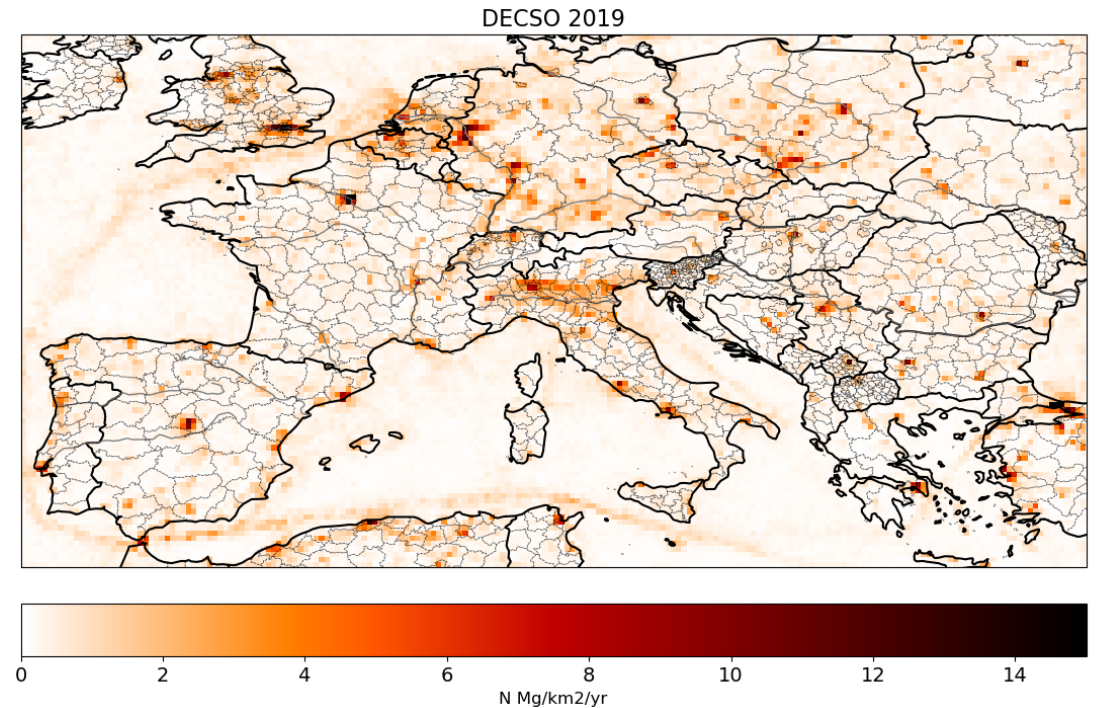
Contents

- Characteristics
- Spatial distribution
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- Link to other projects
- Conclusions

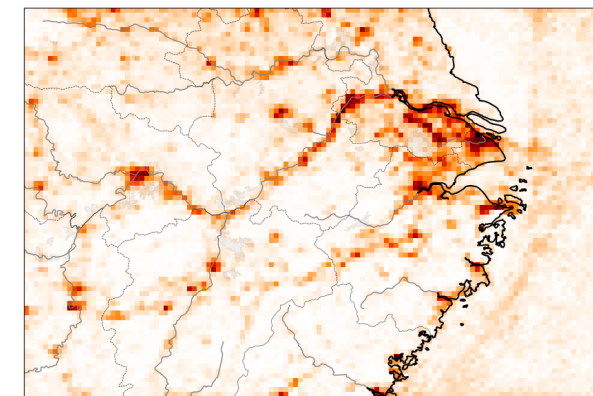
City emissions of NO_x

Characteristics of city emissions

- Main source is traffic.
- Industry at the outskirts.
- The big cities cover several grid cells
- SEEDS NO_x emissions are derived with DECSO
- Figures on the right show anthropogenic emissions of Europe and cities along the Yangtze river.



(0.2°x0.2°)

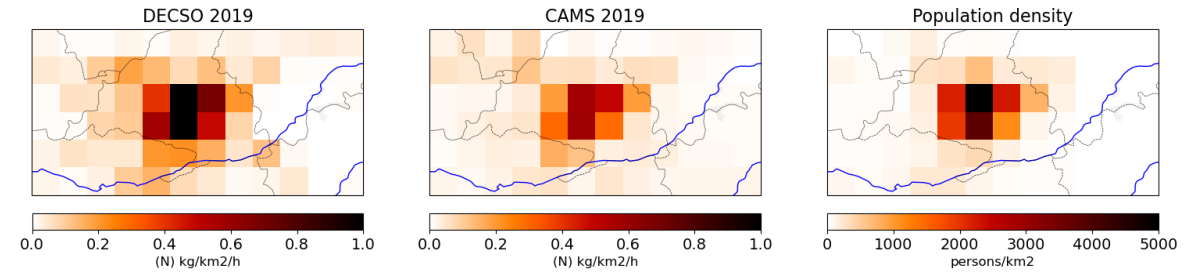


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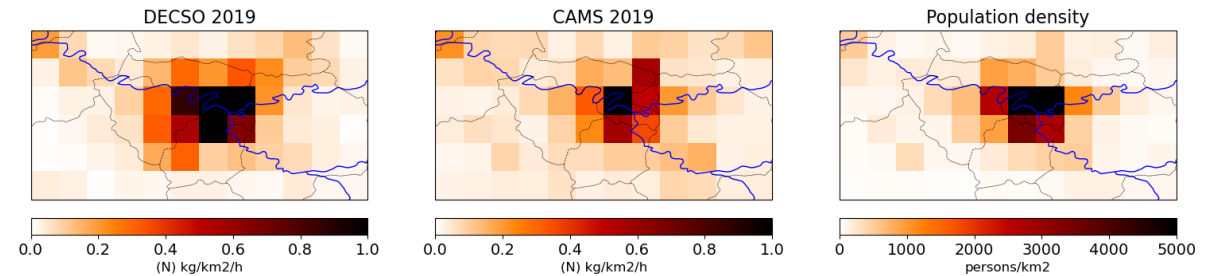
Annual NO_x emissions

DECSO compared to CAMS-REG-AP for some megacities (2019)

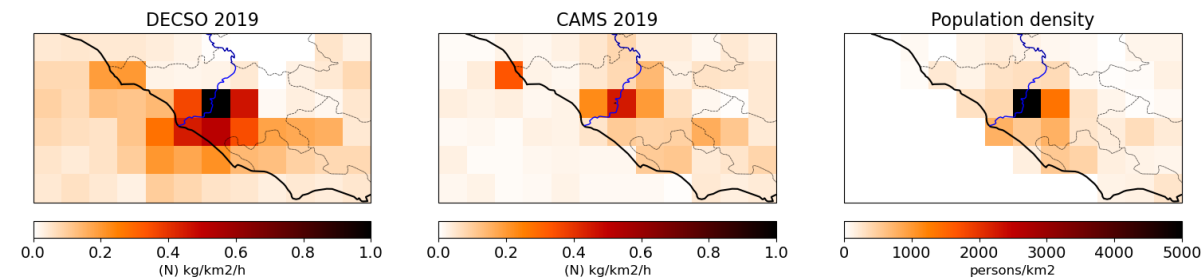
Madrid



Paris

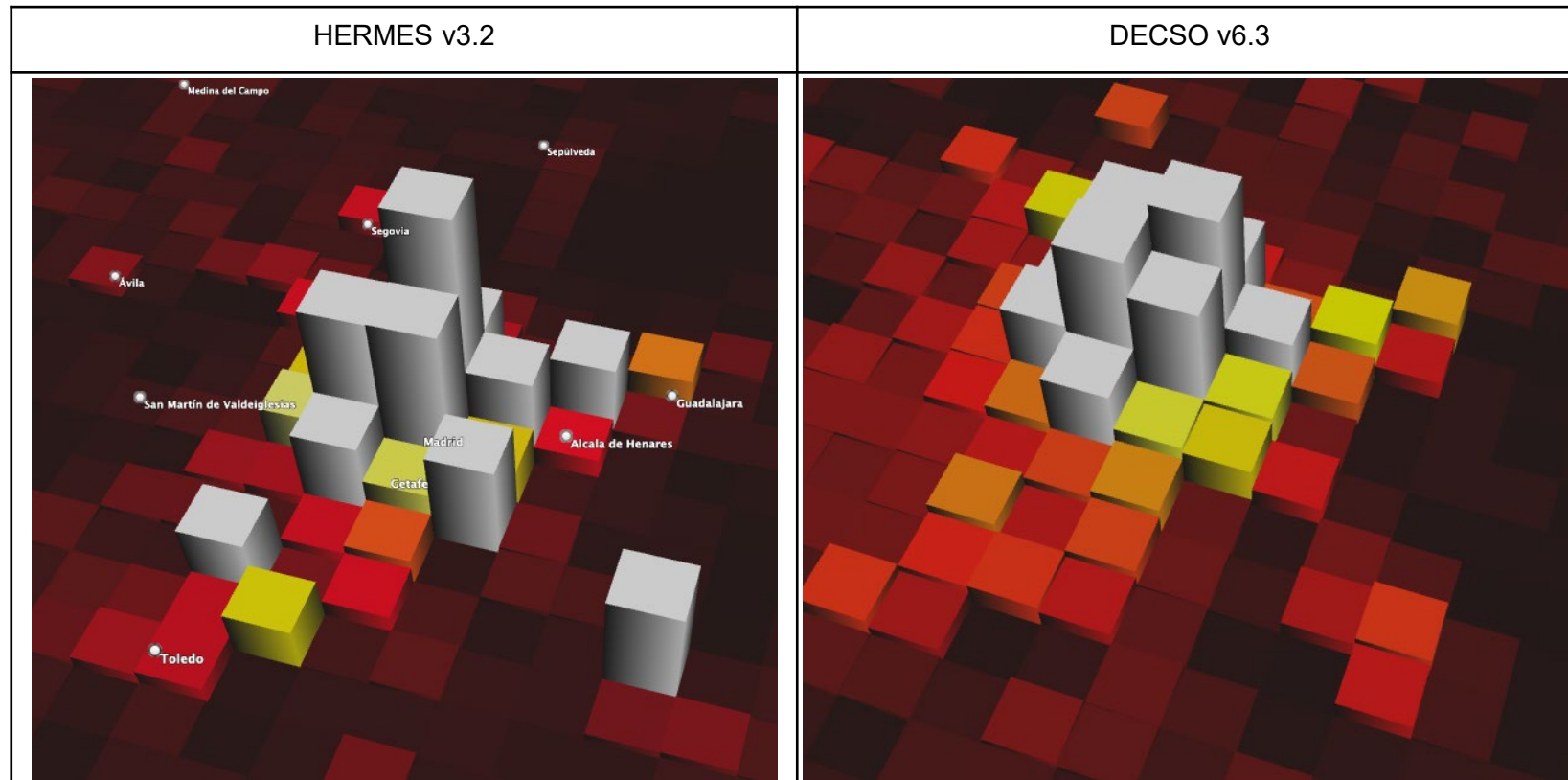


Rome



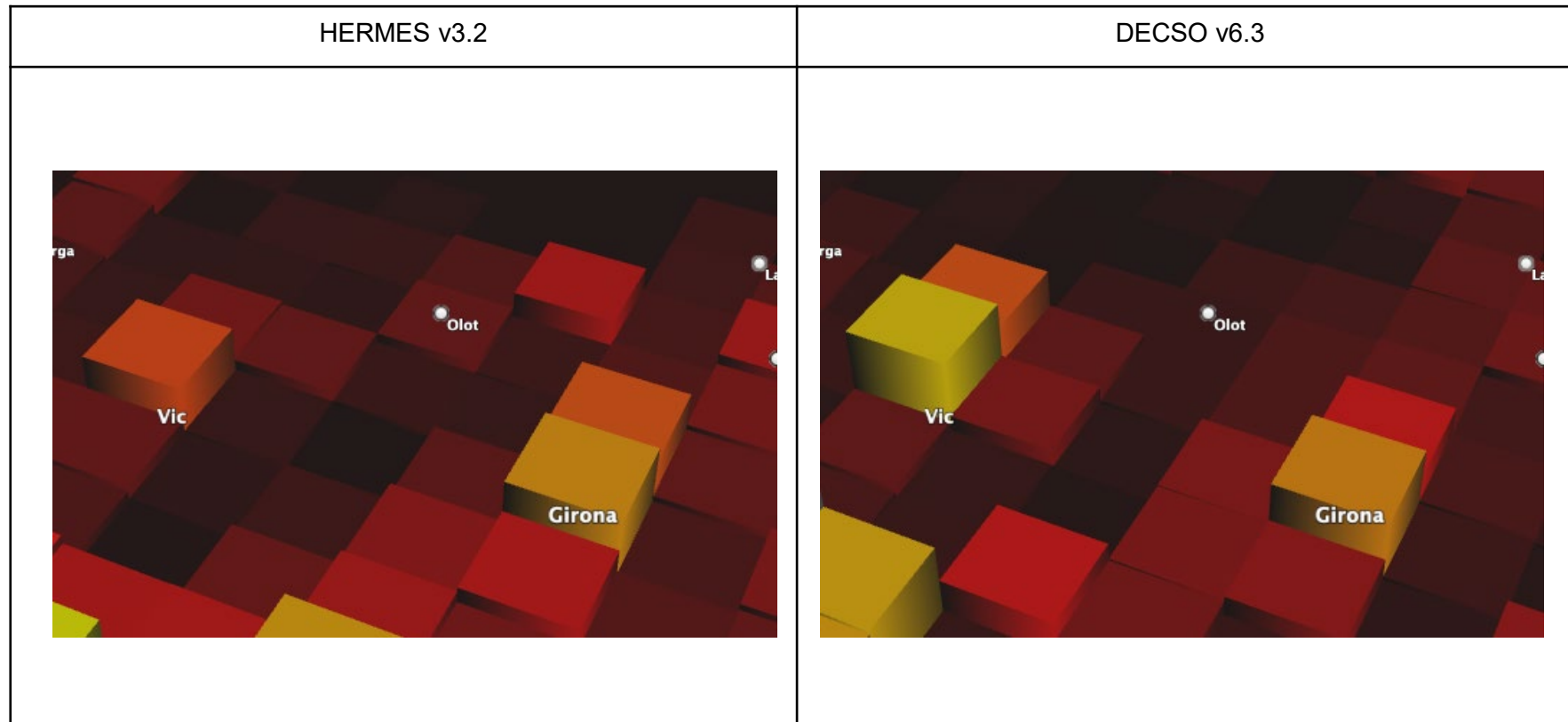
NOx emission distribution of cities in Spain

Madrid



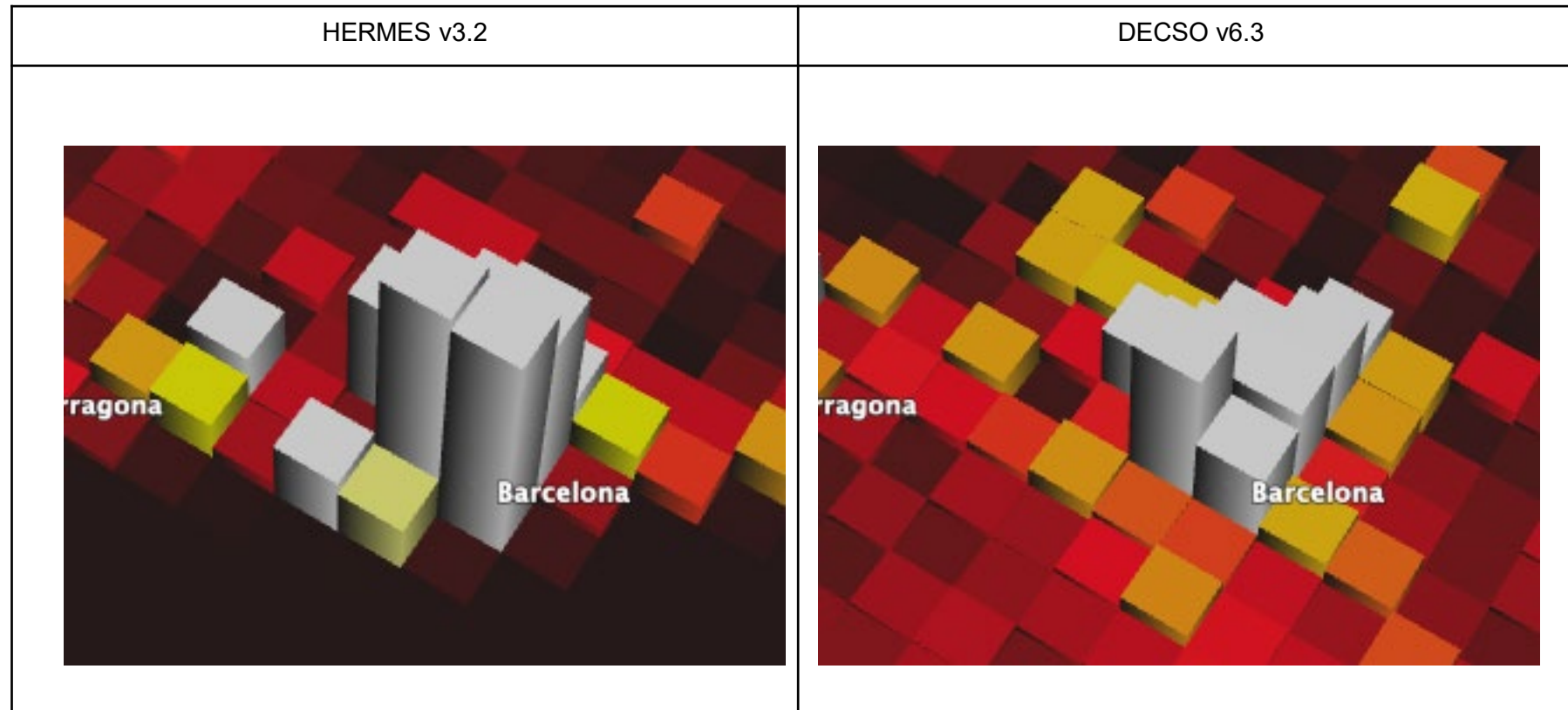
NOx emission distribution of cities in Spain

Vic and Girona



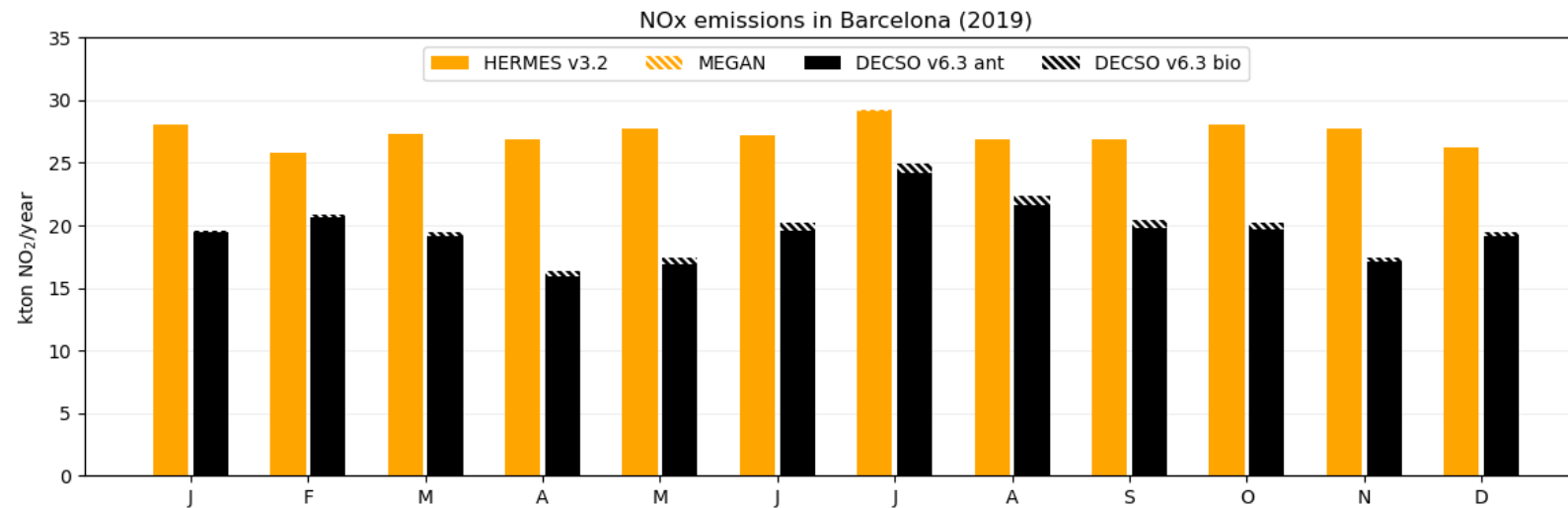
NOx emission distribution of cities in Spain

Barcelona



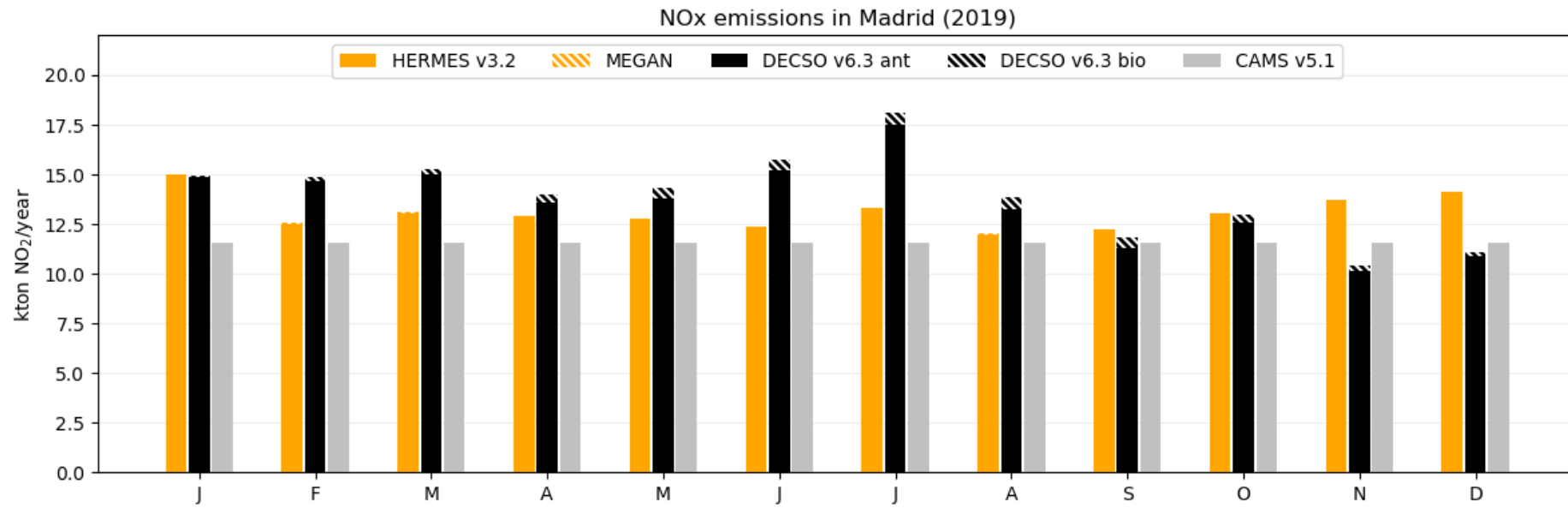
Time series of NOX emissions

Barcelona



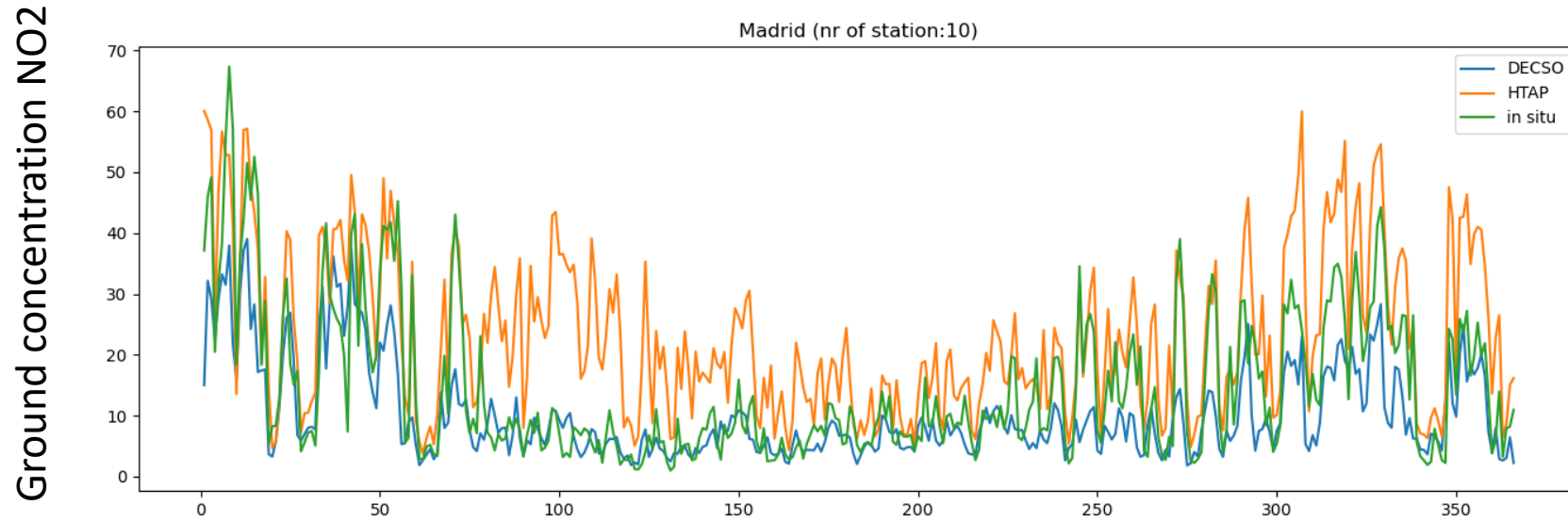
Time series of NOX emissions

Madrid



Comparison for north Madrid 2020

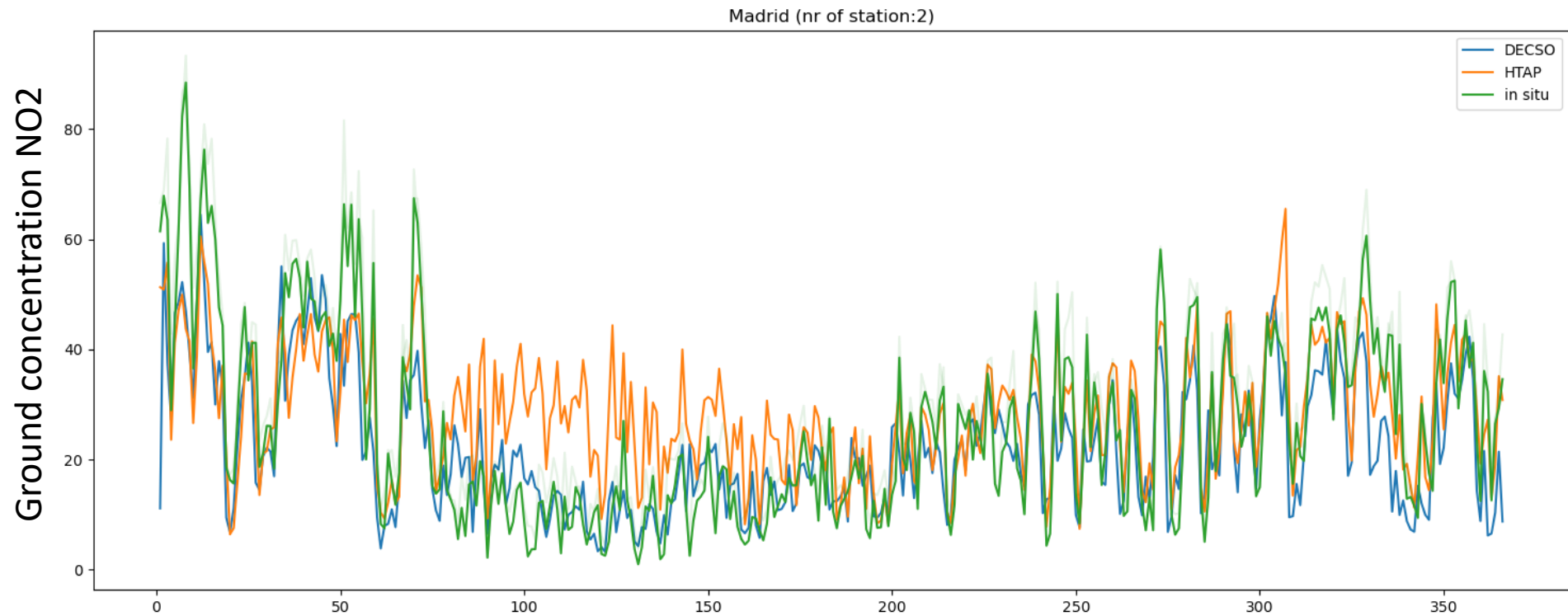
In-situ vs model based on DECSO v6.1 or HTAP



Here, DECSO is on a resolution of 0.2x0.2 degree.

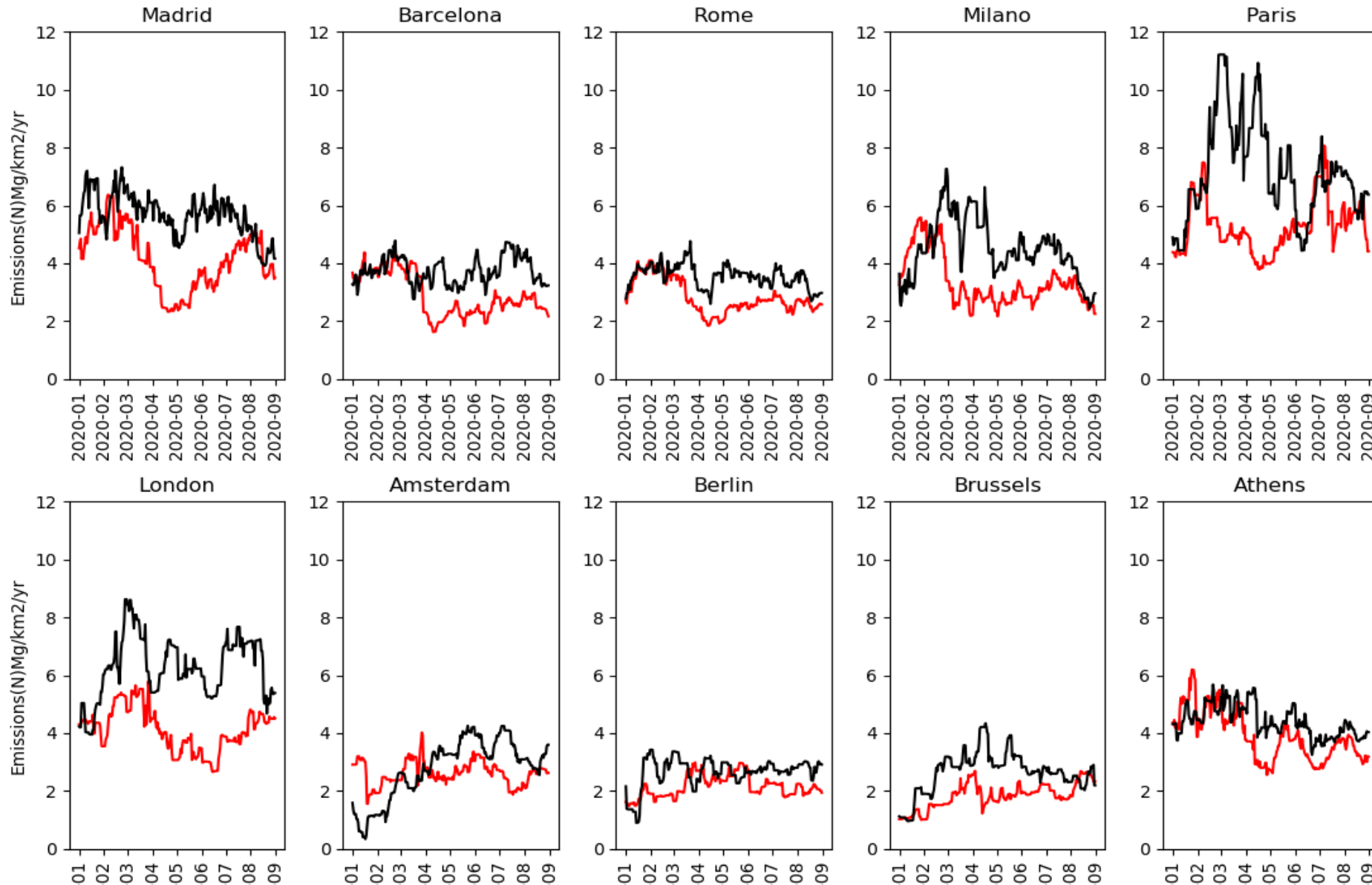
Comparison for south of Madrid 2020

In-situ vs model based on DECSO v6.1 or HTAP



Effect of COVID-19 on city emissions (Jan-Aug)

NOx Emissions



Black line
= 2019

Red line
= 2020

Link to CAMS

Evaluation of NO_x emissions in the CAMEO project:

Comparison of

- **DECISO** v6.3 (Developed within SEEDS project)
- **CAMS**: CAMS-REG-AP, CAMS-GLOB-ANT, CAMS-SOIL
- Other: LRTAP, NEC, HEMCO, E-PRTR, HERMES, etc.

Spatial scales:

- Country totals
- Cities
- Industrial facilities
- Soil emissions



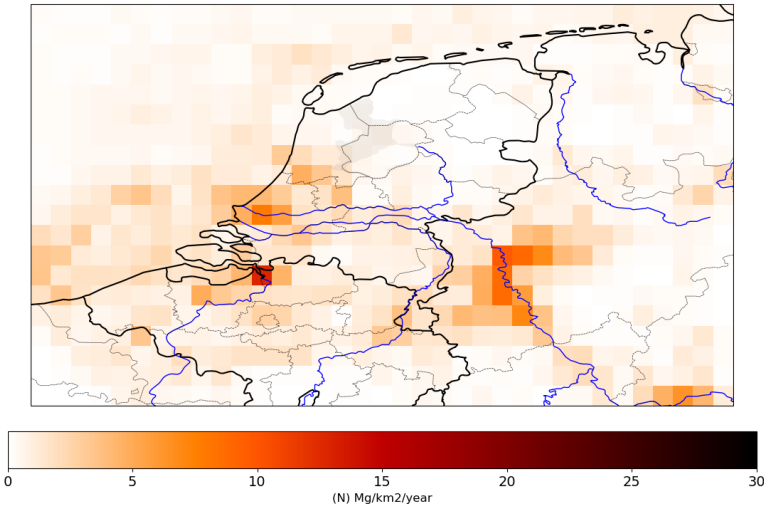
Going to a higher spatial resolution

- DECSO 6.3
- SEEDS
- 20x20 km

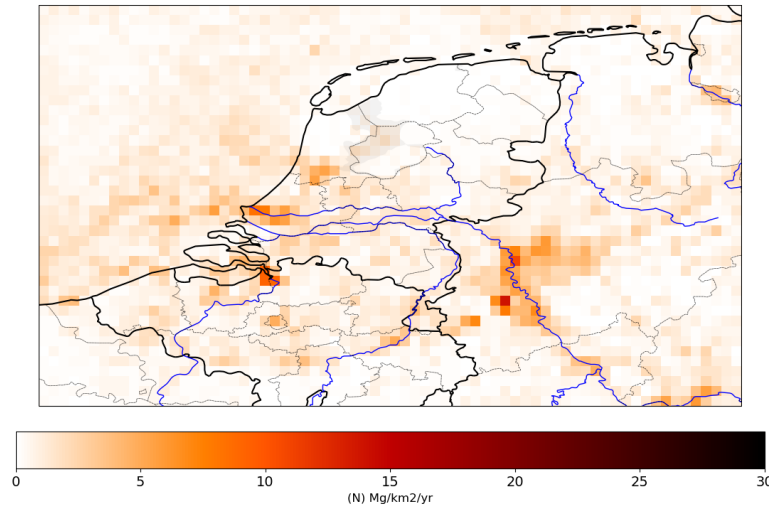
- DECSO 6.3
- Next step (CAMEO)
- 10x10 km

- DECSO new
- Under development
- 5x5 km

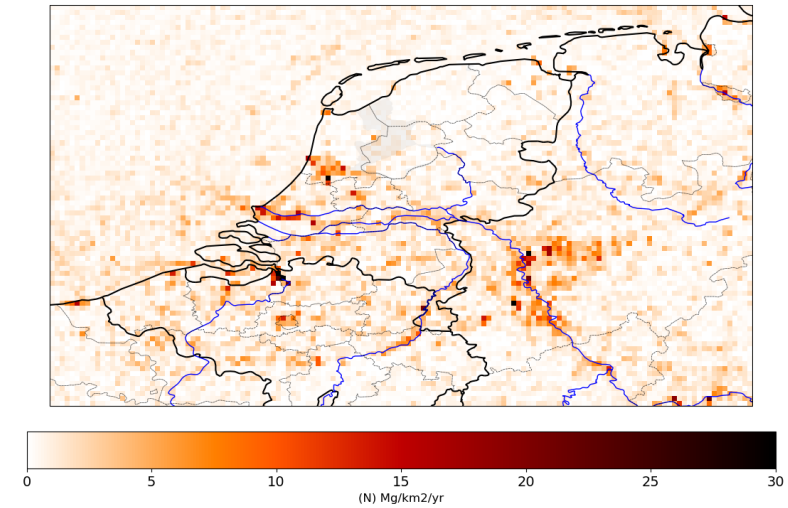
DECSO 2020



DECSO-NOx 2019



DECSO-NOx 2020



NO_x emissions of cities

- Spatial differences over the city can be seen in emissions.
- Holiday periods and COVID regulations clearly show up in city emissions.
- Big differences in time series from city to city in Europe.