



**SEEDS**  
Sentinel EO-based Emission  
and Deposition Service

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# SEEDS NO<sub>x</sub> emissions in cities

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**CERFACS**  
CENTRE EUROPÉEN DE RECHERCHE ET DE FORMATION AVANCÉE EN CALCUL SCIENTIFIQUE



**isardSAT**  
**lobelia.**



# Contents

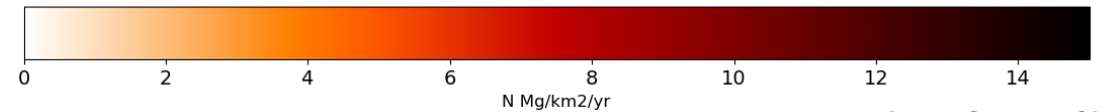
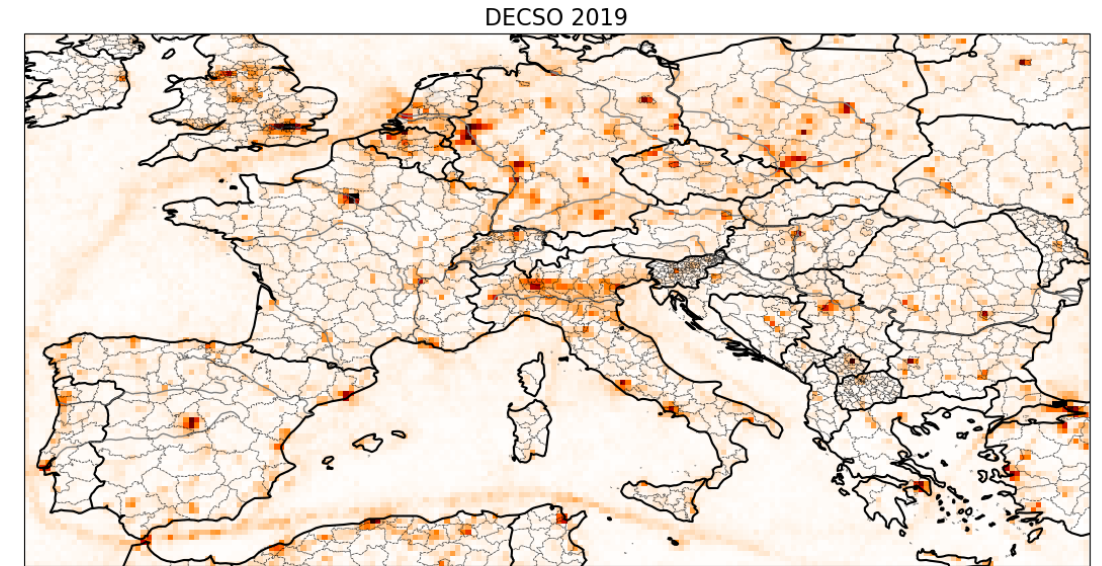
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- Characteristics
- Spatial distribution
- Temporal profile
- Impact of COVID on city emissions
- Conclusions

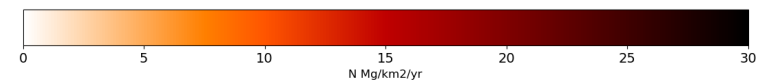
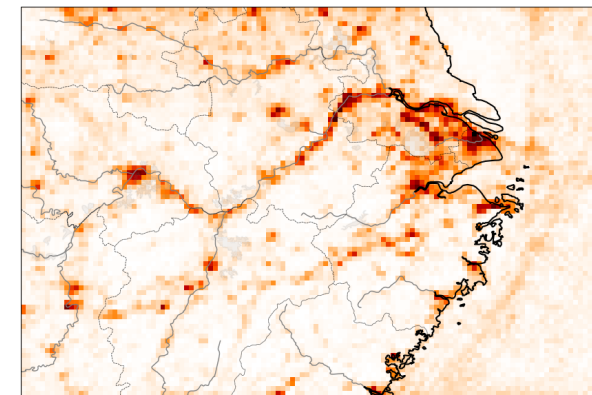
# City emissions of NO<sub>x</sub>

## Characteristics of city emissions

- Main source is traffic.
  - Industry at the outskirts.
  - The big cities cover several grid cells
- 
- Here we show examples of European cities and along the Yangtze river.
  - SEEDS NO<sub>x</sub> emissions are derived with DECSO



(0.2°x0.2°)

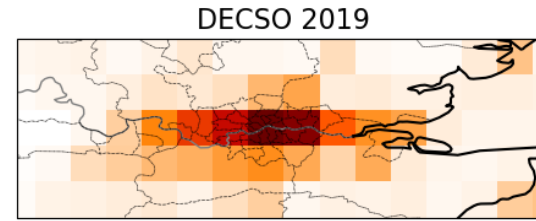


(0.1°x0.1°)

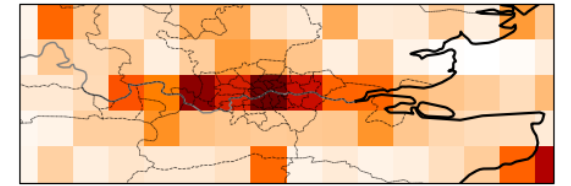
# Annual NOx emissions

DECSO compared to CAMS for some big cities

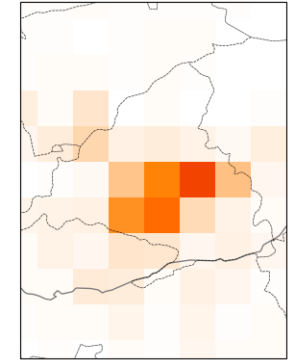
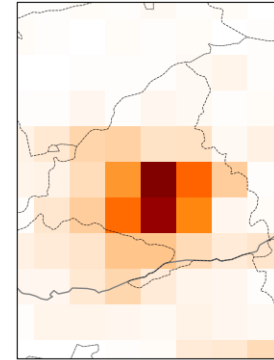
London



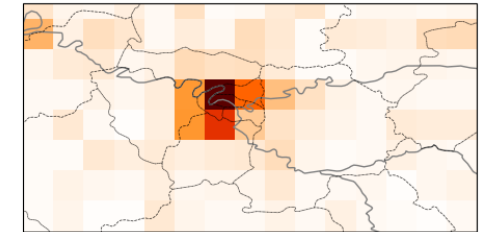
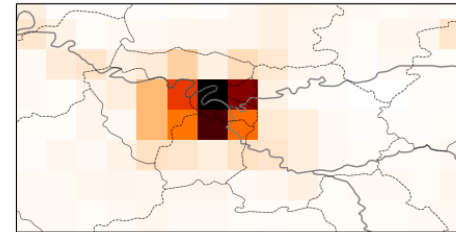
CAMS 2017



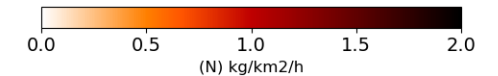
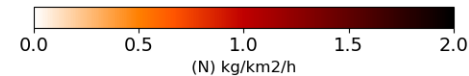
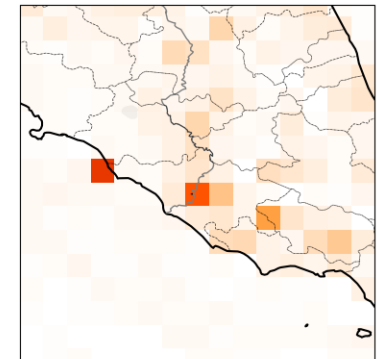
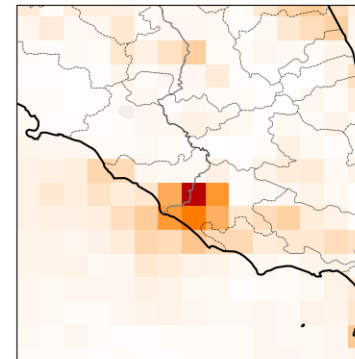
Madrid



Paris

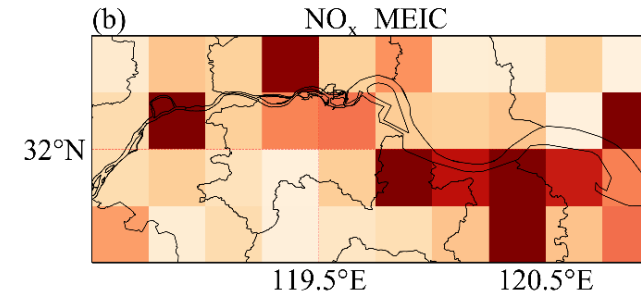
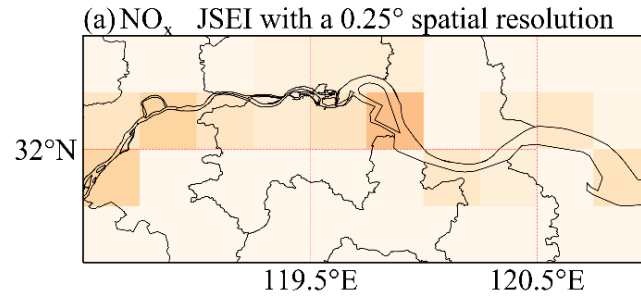


Rome



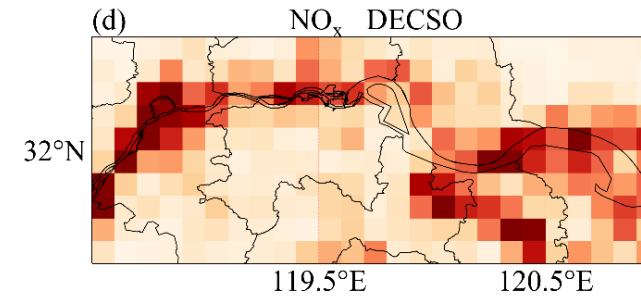
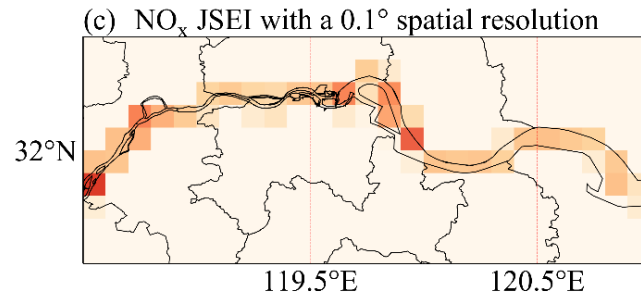
# Urban agglomeration along the Yangtze river

River emissions (from AIS)

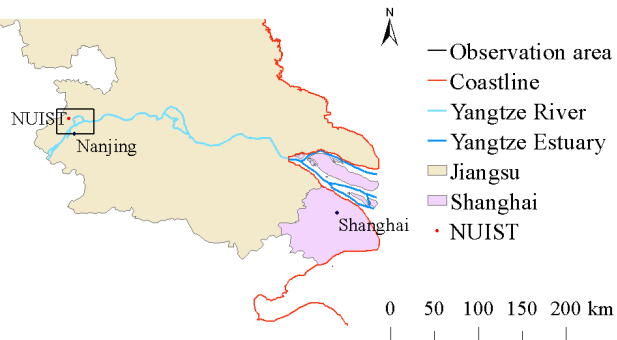
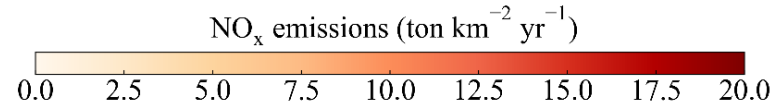


Anthropogenic emissions from bottom-up inventory MEIC (0.25 x 0.25 degree)

River emissions (from AIS)



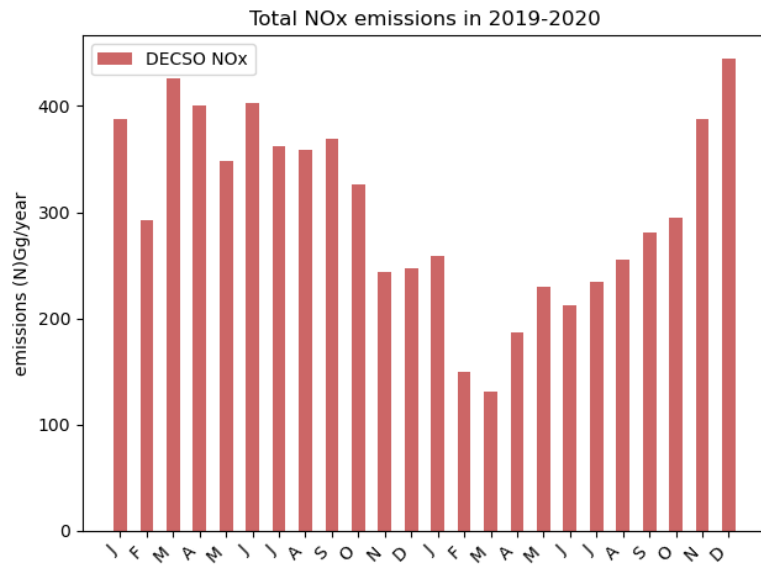
Total emissions from DECSO (0.1 x 0.1 degree)



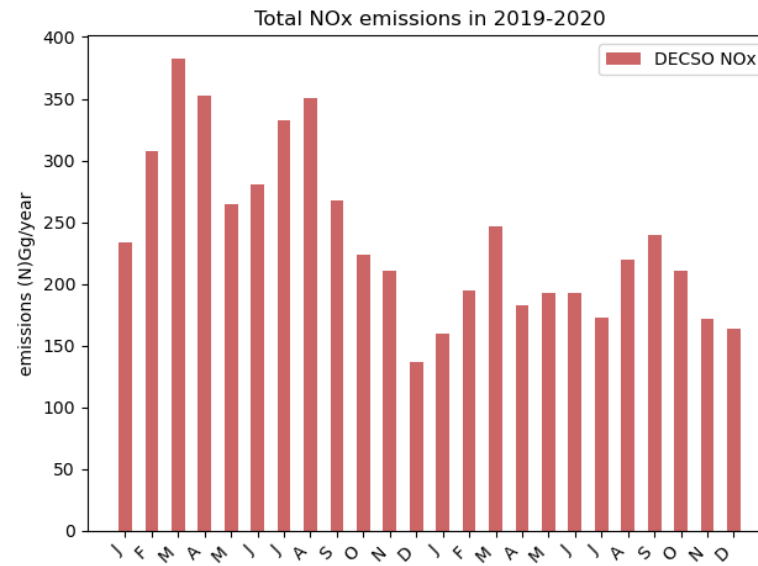


# Time series of NOX emissions

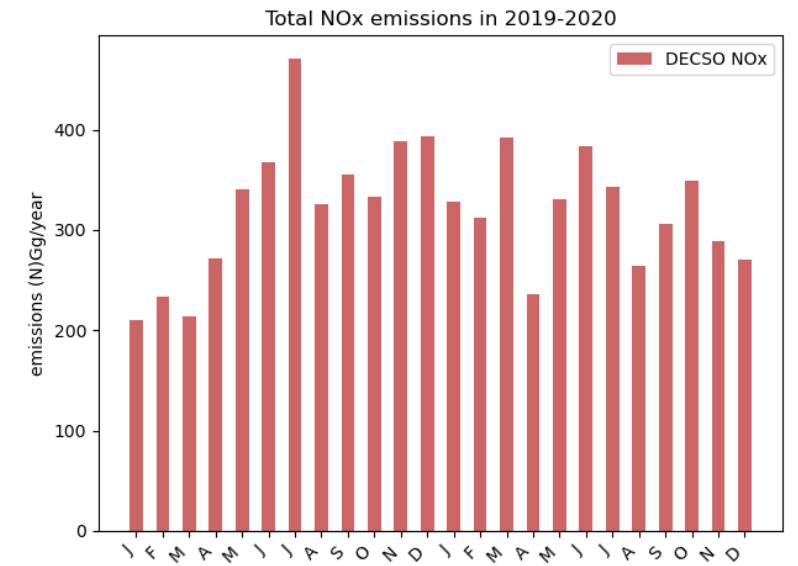
## Nanjing



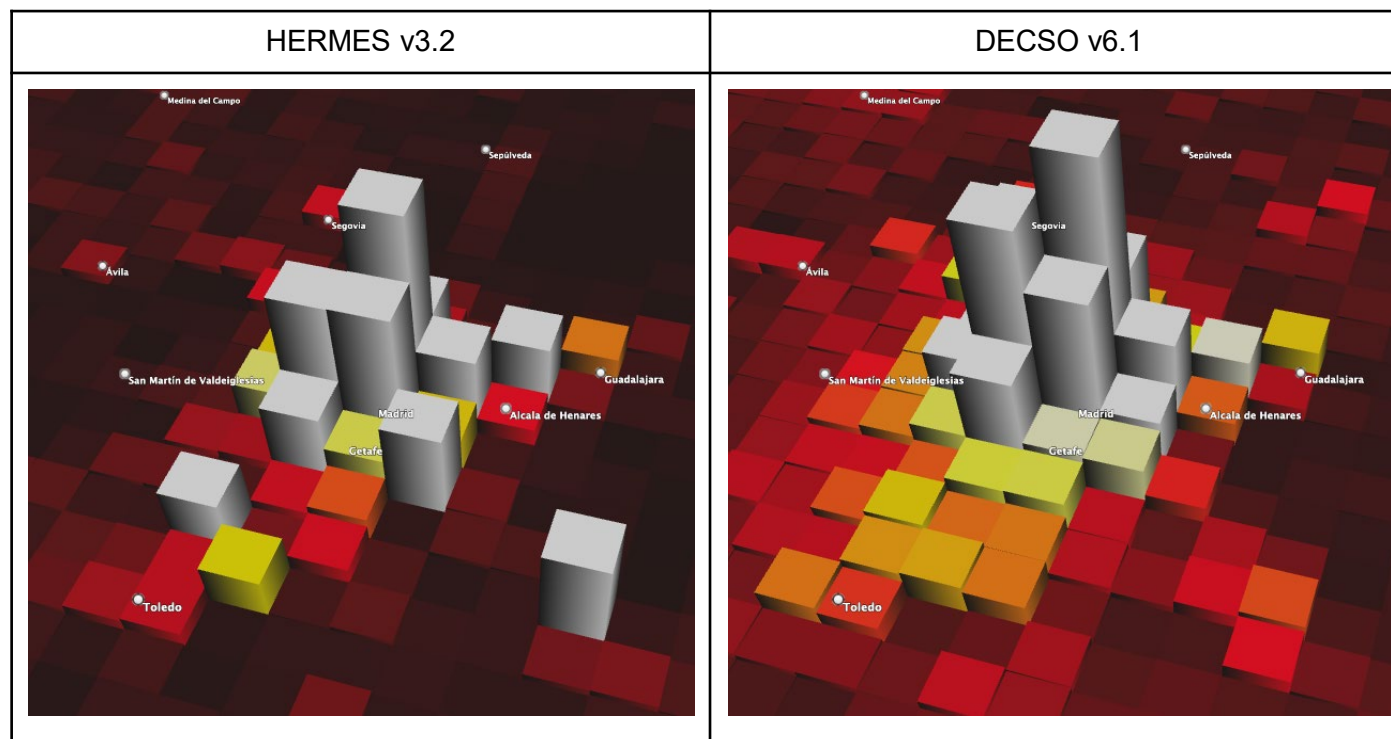
## Brussels



## Rotterdam

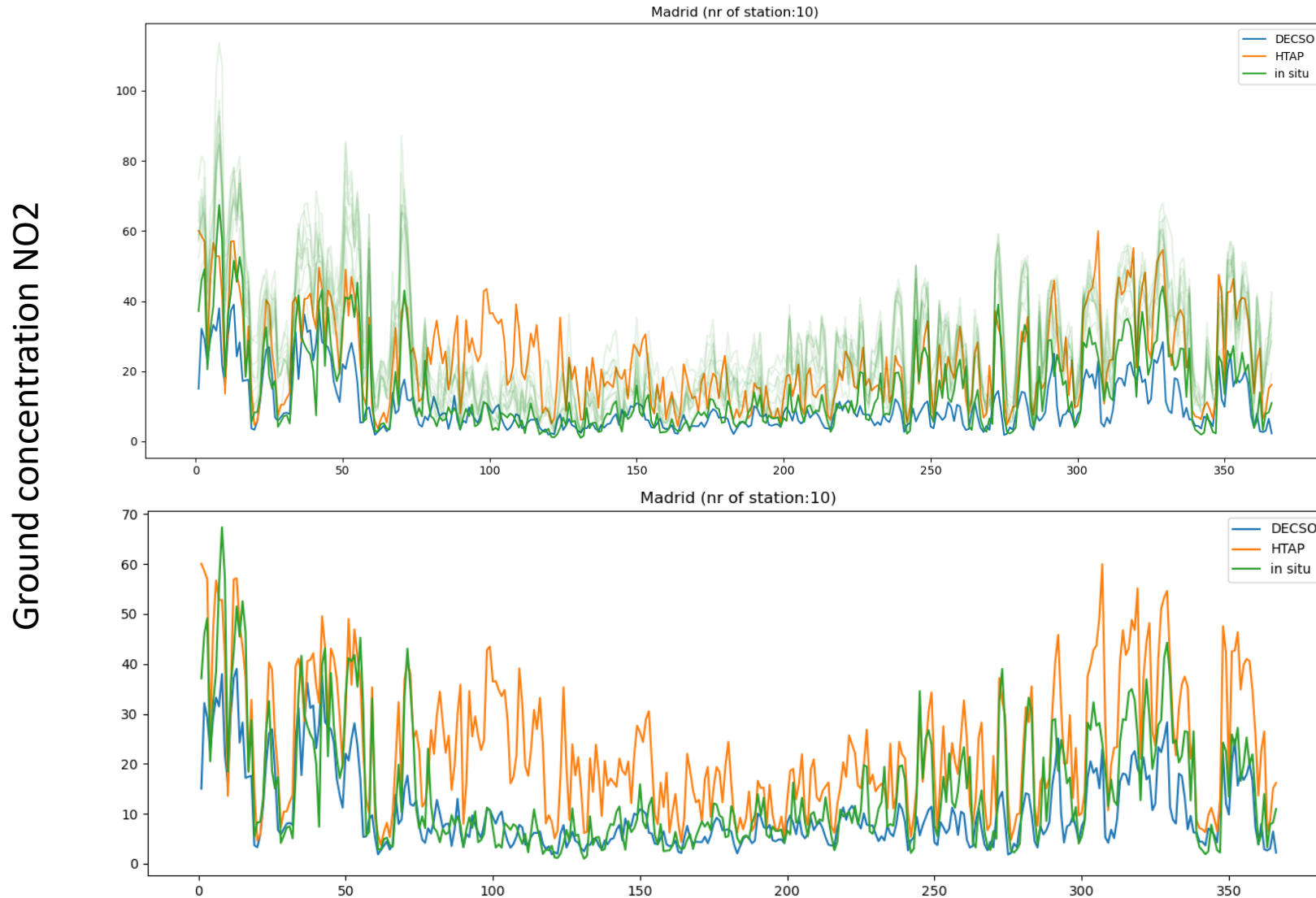


# NOx emission distribution in Madrid



# Comparison for north Madrid 2020

## In-situ vs model based on DECSO or HTAP

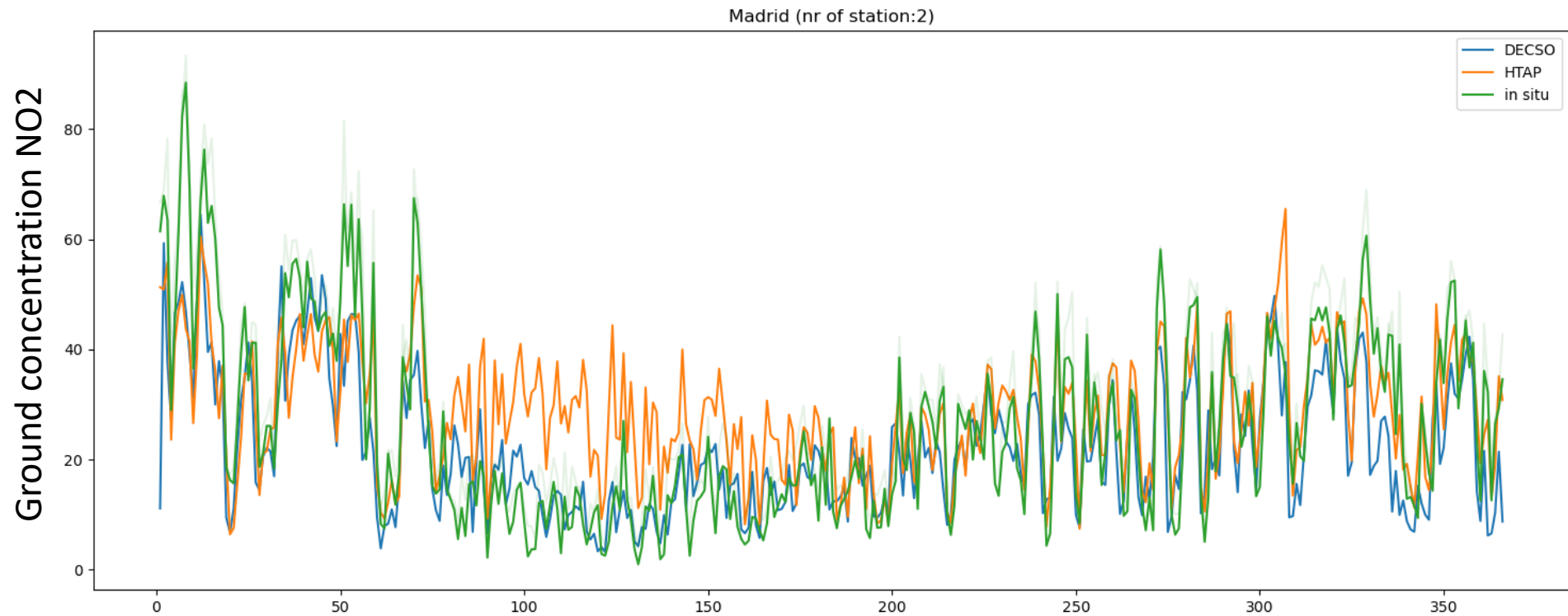


Here, DECSO is on a resolution of 0.2x0.2 degree.



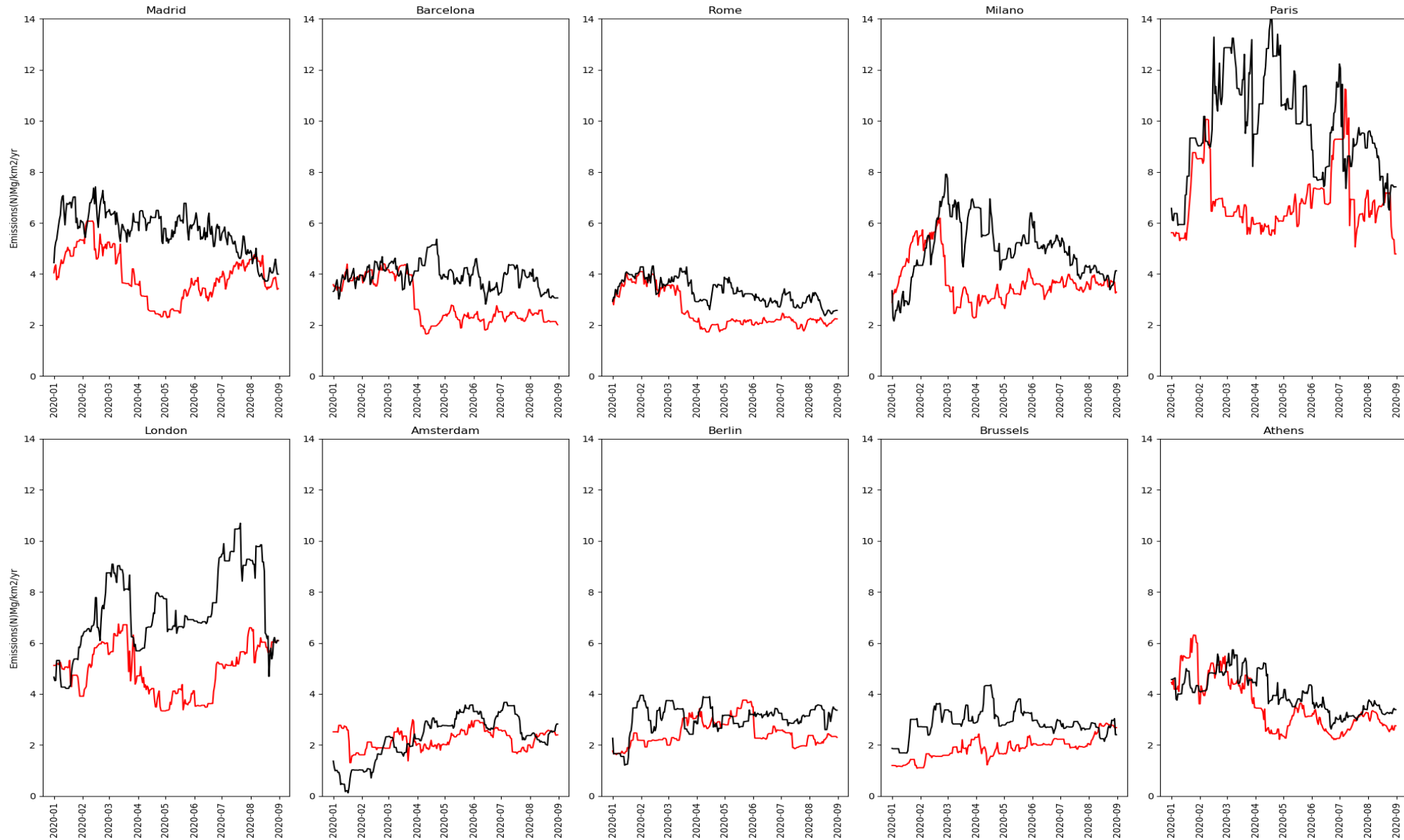
# Comparison for south of Madrid 2020

## In-situ vs model based on DECSO or HTAP



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

NOx Emissions



Black line  
= 2019

Red line  
= 2020

# NO<sub>x</sub> 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 behaviour from city to city in Europe.