Gridded non-exhaust emissions from GNORTRIP

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Aim: Improve timing and distribution of PM10 from non-exhaust emissions in the CAMS forecasts

Why: Surface buildup of dust on roads during winter is not captured by current, constant emission factors

How: Use the NORTRIP model to generate a new set of emission files to be used in air quality models
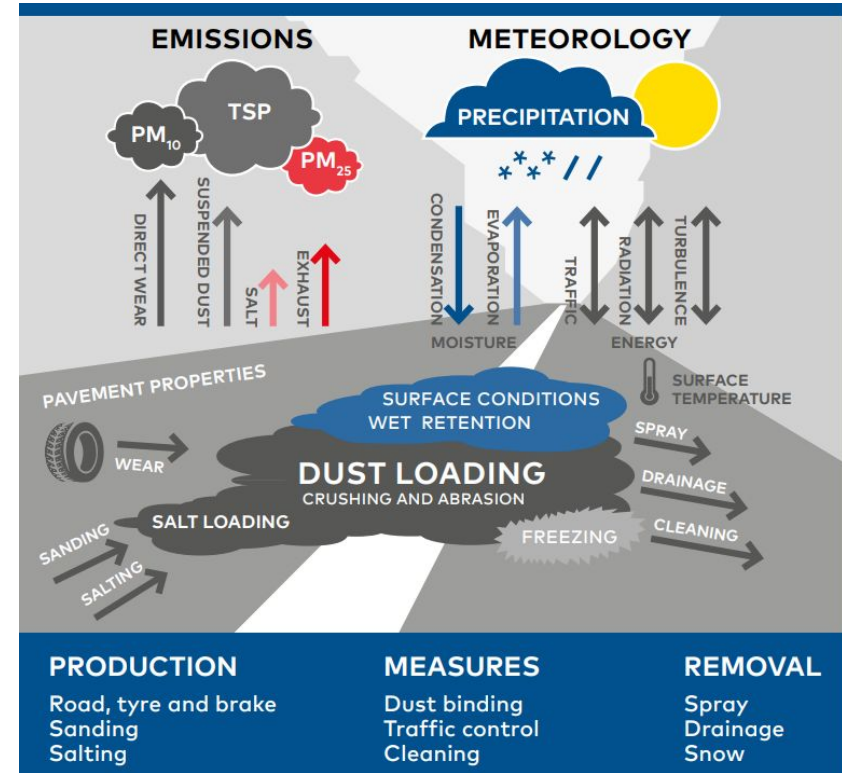
WP5, task 5.1

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Input:

- Meteorology
- Traffic data (ADT)
- Road metadata
- Road activity

Output (hourly):

- road dust loading
- emissions
- surface conditions

https://norden.diva-portal.org/smash/get/diva2:1069152/FULLTEXT02.pdf

Per road link → Need to make a gridded version

- Gridded (0.05° x 0.1°) vehicle.km for different vehicle types. Provided by TNO; Tilman Hohenberger, Jeroen Kuenen.
- Aggregated to six different OSM road types (trunk, motorway, primary, secondary, tertiary, residential)
- Normalized with national totals (veh.km, 2022) for countries where this is available (mainly from Eurostat)
- Studded tyre share included for countries where this is applicable

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- Hourly IFS meteorology (2023)
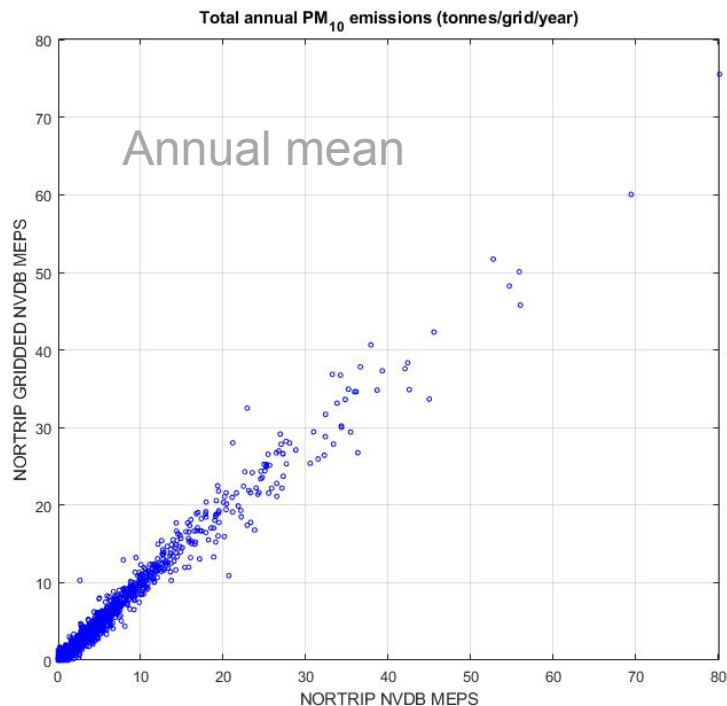
- Wear factors for different road types

Limitations:

- Using six representative road types per gridcell → No shadow effects from terrain/buildings

- Wear factors, traffic profiles and other parameters mainly based on Norwegian data

- Quality of traffic data

Total annual PM$_{10}$ emissions (tonnes/grid/year)

Annual mean

Total daily PM$_{10}$ emissions (tonnes/grid/day)

Daily mean
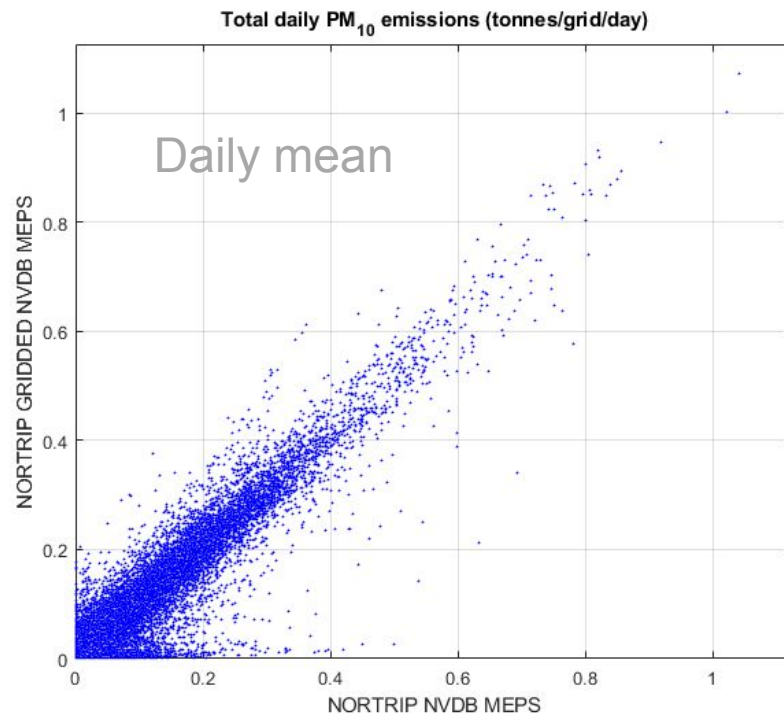
Norway: PM10 non-exhaust emissions 2023

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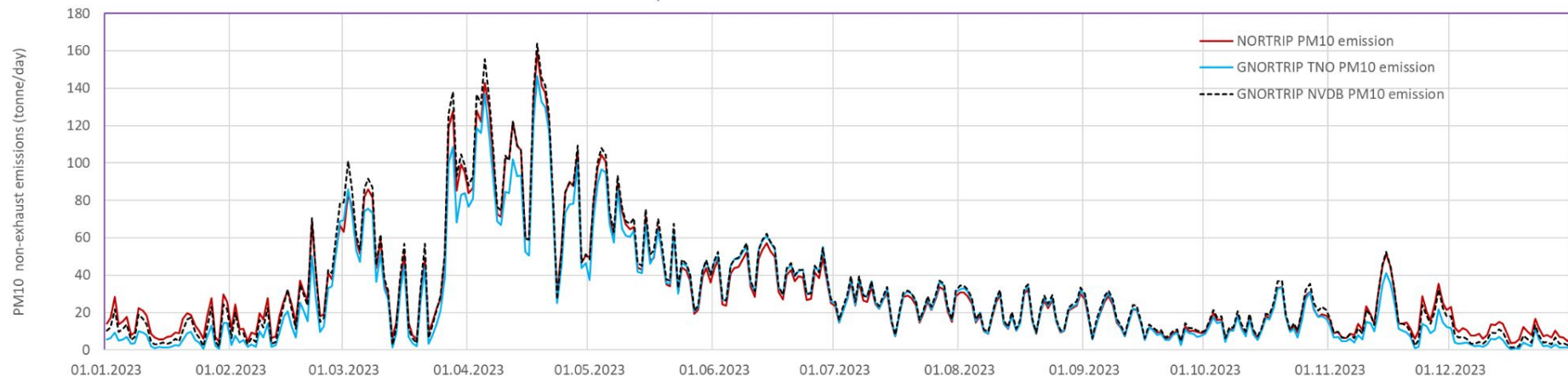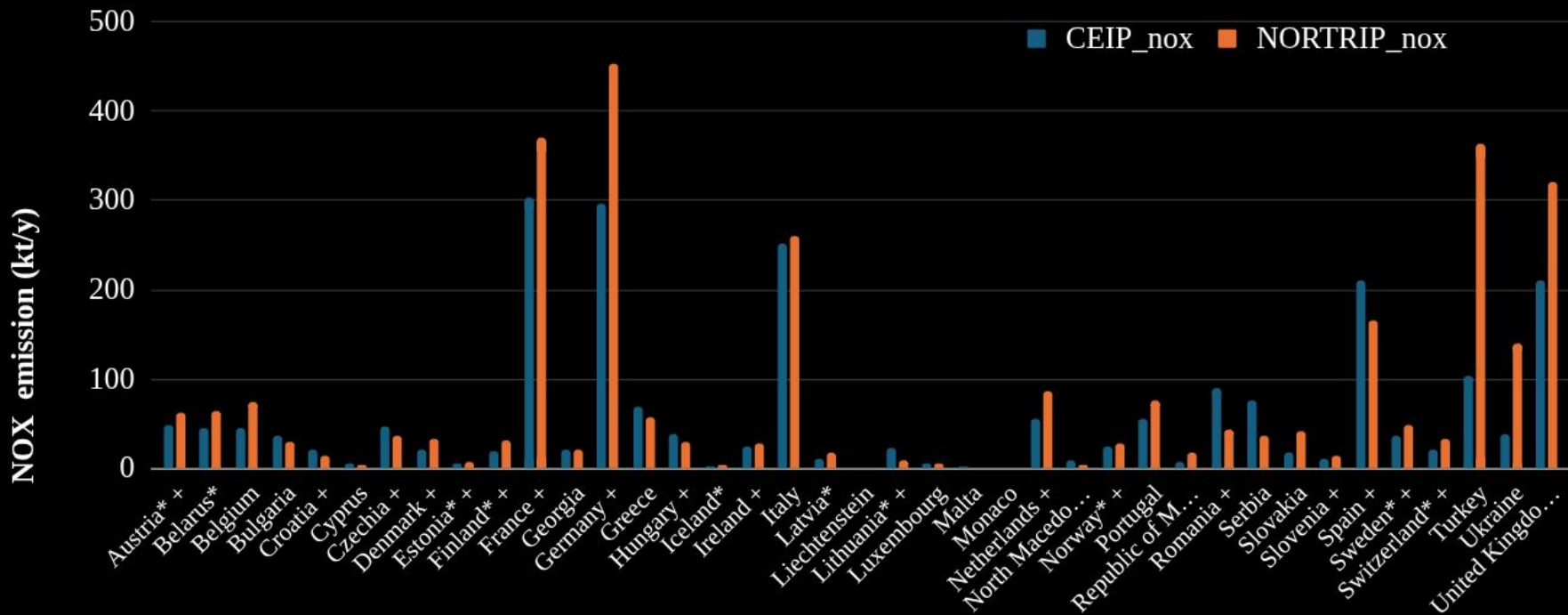
NOX Exhaust

* : Studded tyre share used in modelling
+ : Normalised with national totals

PM10 Tyre and brake wear

* : Studded tyre share used in modelling
+ : Normalised with national totals

PM10 Road wear
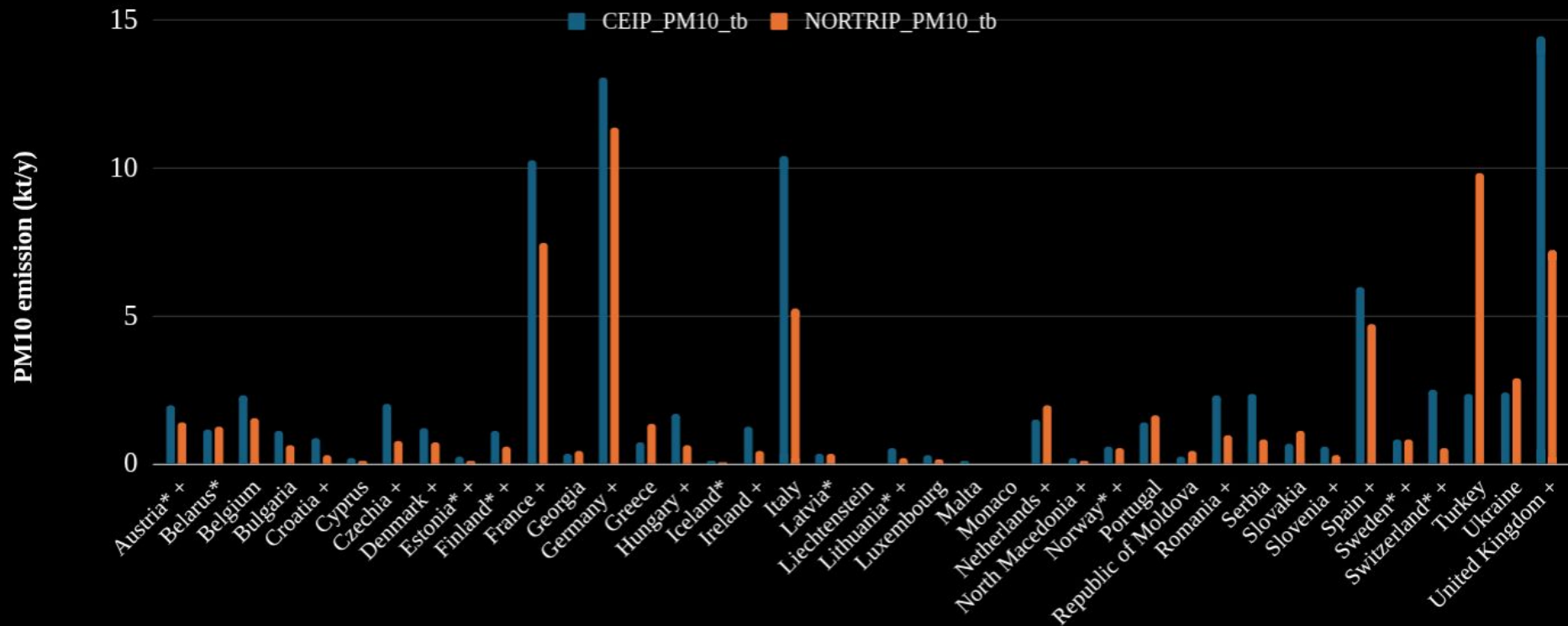
* : Studded tyre share used in modelling
+ : Normalised with national totals
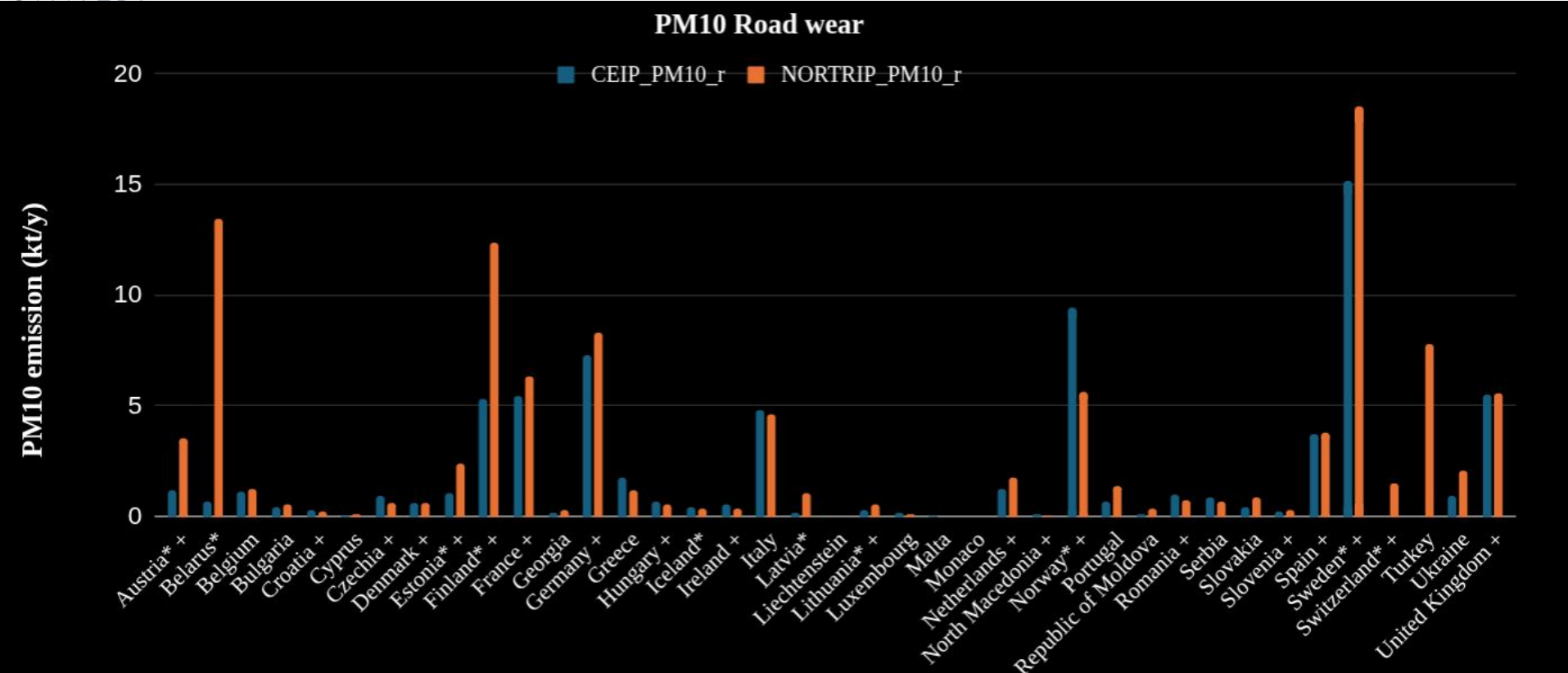
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GNFR F road pmco
Time: 2023-01-07 01:00:00
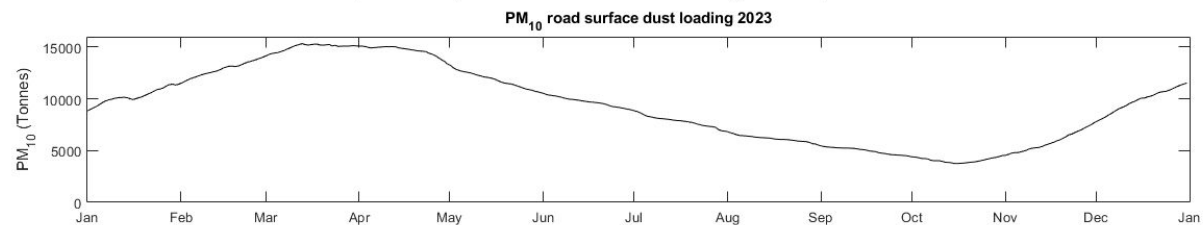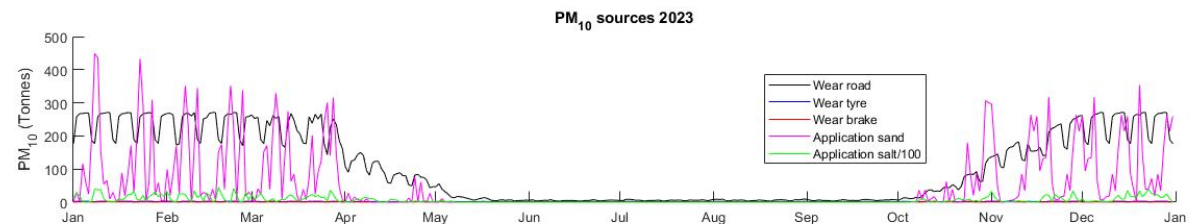
GNFR F road pmco (g/h)

0,000   2000,000   4000,000   6000,000   8000,000   10000,000
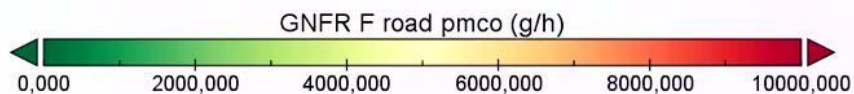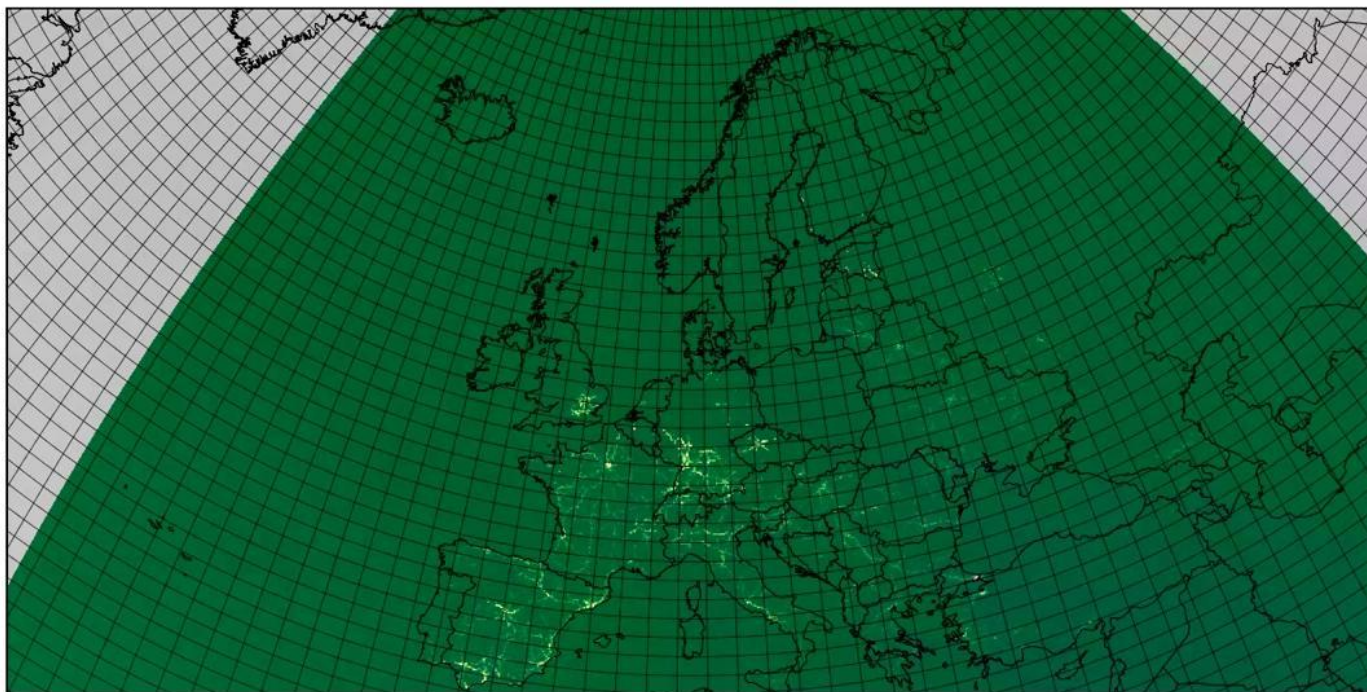
Data Min = 0,000, Max = 14604,370
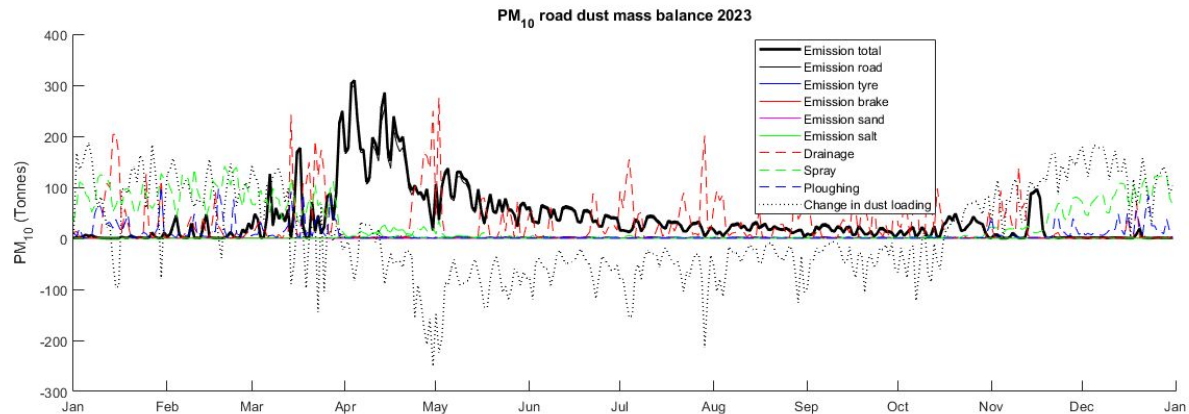
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UK time profile

CAMAERA – Copernicus Atmosphere Monitoring Service AERosol Advancement
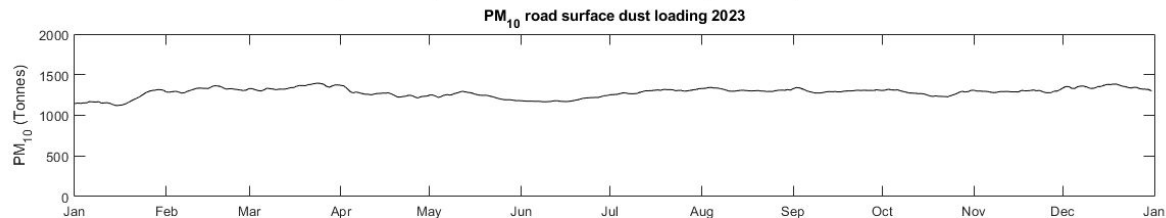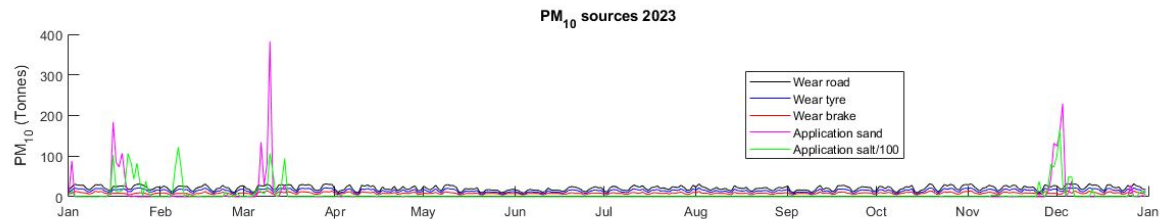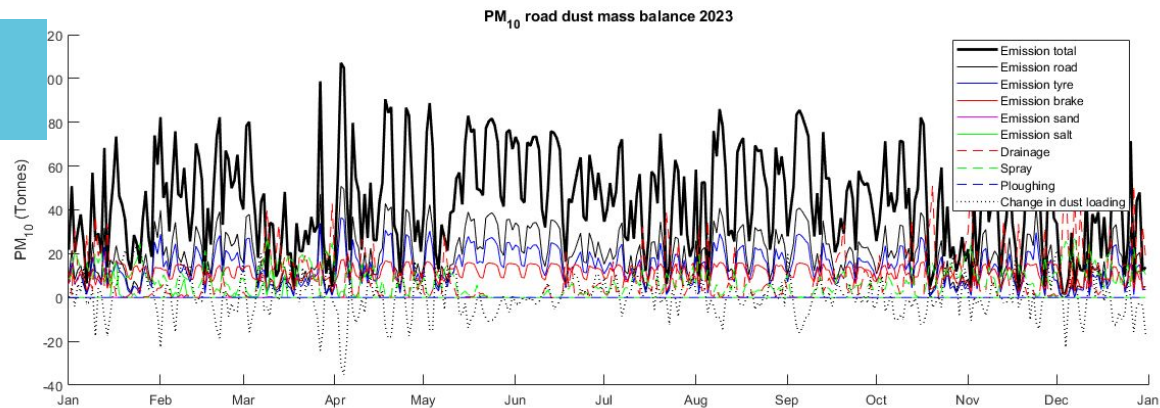
- Data available here: https://thredds.met.no/thredds/catalog/data/fou-kl/uEMEP/CAMAERA/EU_emissions_v2/catalog.html

- Running EMEP with the new emissions

- Running EURAD-IM, LOTOS-EUROS and SILAM with the new emissions

- Expecting improved temporal correlation with observations, especially in winter/spring