



FAIRMODE

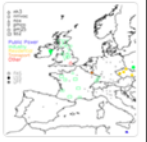
Benchmarking methodologies to improve
emission inventory and air quality modelling

Background

- QA/QC of emission inventories is challenging because of the multiplicity of information to check: sectors * pollutants * space * time
- The FAIRMODE screening approach aims at detecting inconsistencies that should then be further discussed and explained, and potentially resolved
- Main principle: If two emission estimates differ largely, then one of the inventory value or both need to be checked (and maybe corrected)

Methods for assessment of models 08 Jul 2022


A multi-pollutant and multi-sectorial approach to screening the consistency of emission inventories



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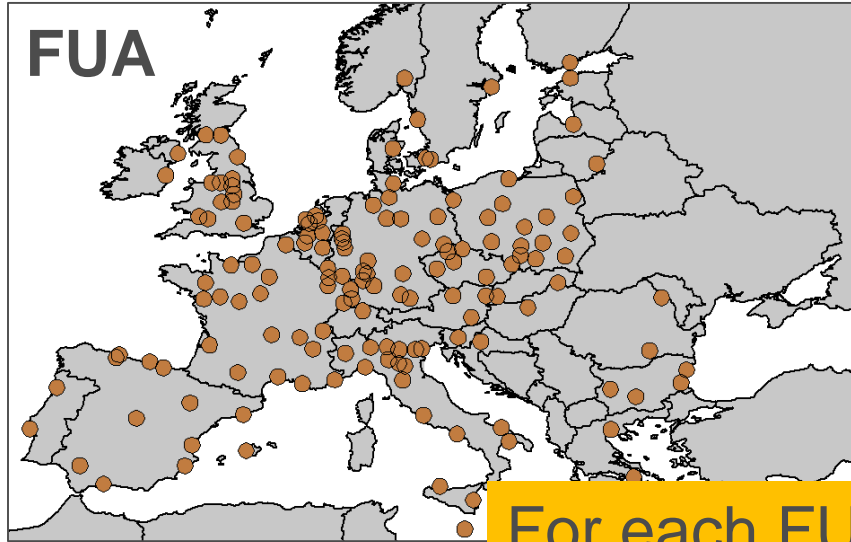
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1 Emission ensemble approach to improve
2 the development of multi-scale emission
3 inventories
4
5 Philippe Thunis¹, Jeroen Kuenen², Enrico Pisoni¹, Bertrand Bessagnet¹, Manjola Banja¹, Lech
6 Gawuc³, Karol Szymankiewicz², Diego Guizardi¹, Monica Crippa⁴, Susana Lopez-Aparicio⁵,
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8

Simplification (I): spatially and temporally aggregated data only!



For each FUA / NUTS: $e_{p,s}$
For each country/region: $E_{p,s}$

pollutant

sector

FAIRMODE
Forum for air quality modelling in Europe

Poly Type: NUTS2016

NUTS2016

FUA2020

Up Down

Left Inventory: cams_v61-Ref2-v21_2018

Bottom Up Top Down

Right Inventory: PREPAIR_2017_(ALL)_I...

Plot

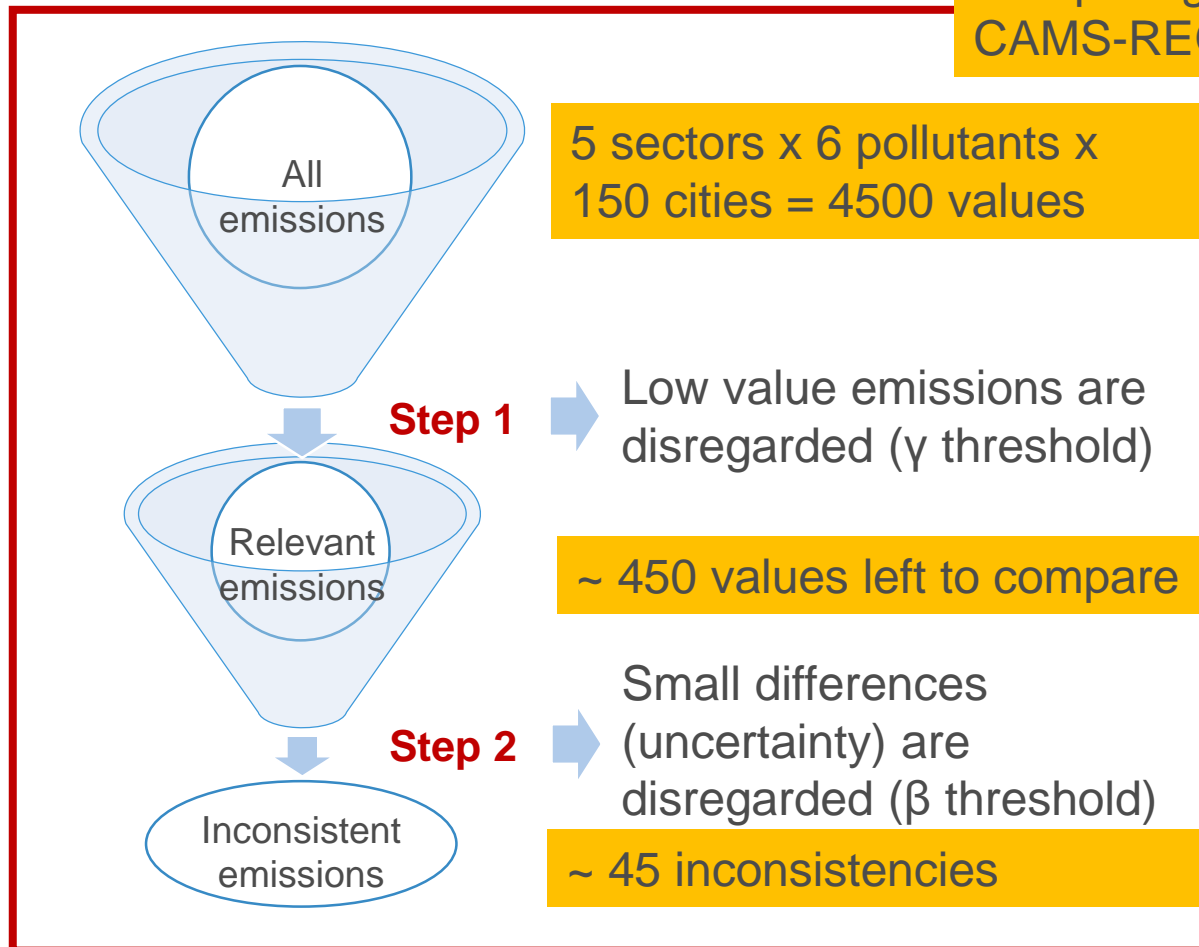
Min Emis. Consid. 0.50

Incons. Threshold 2.00

Limit to Main Country

Simplification (II): Relevant and inconsistent emissions only!

Comparing 2 versions of CAMS-REG over the EU



FAIRMODE
Forum for air quality modelling in Europe

Poly Type: NUTS2016

Switch to Free

Bottom Up / Top Down

Left Inventory: cams_v61-Ref2-v21_2018

Bottom Up / Top Down

Right Inventory: PREPAIR_2017_(ALL)_I...

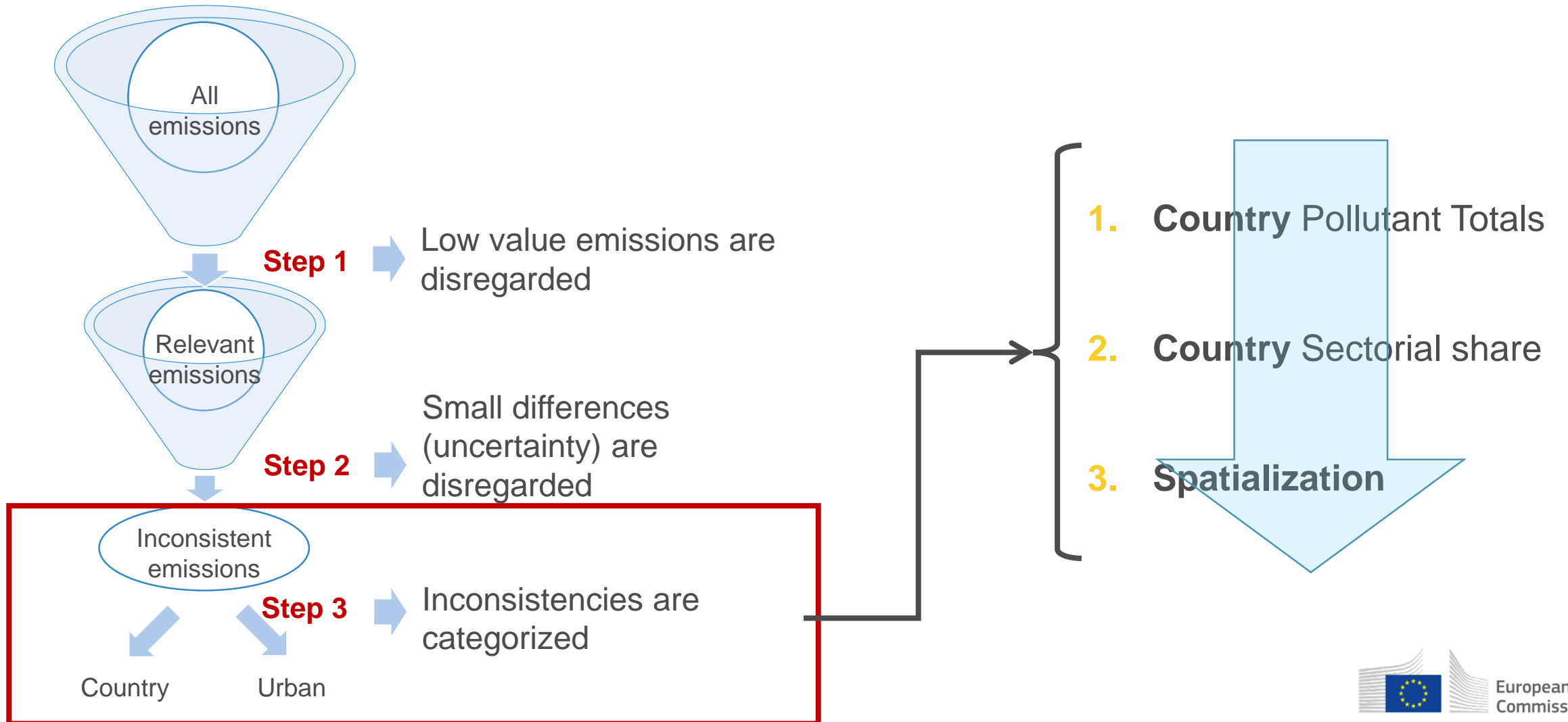
Plot

Min Emis. Consid. 0.50

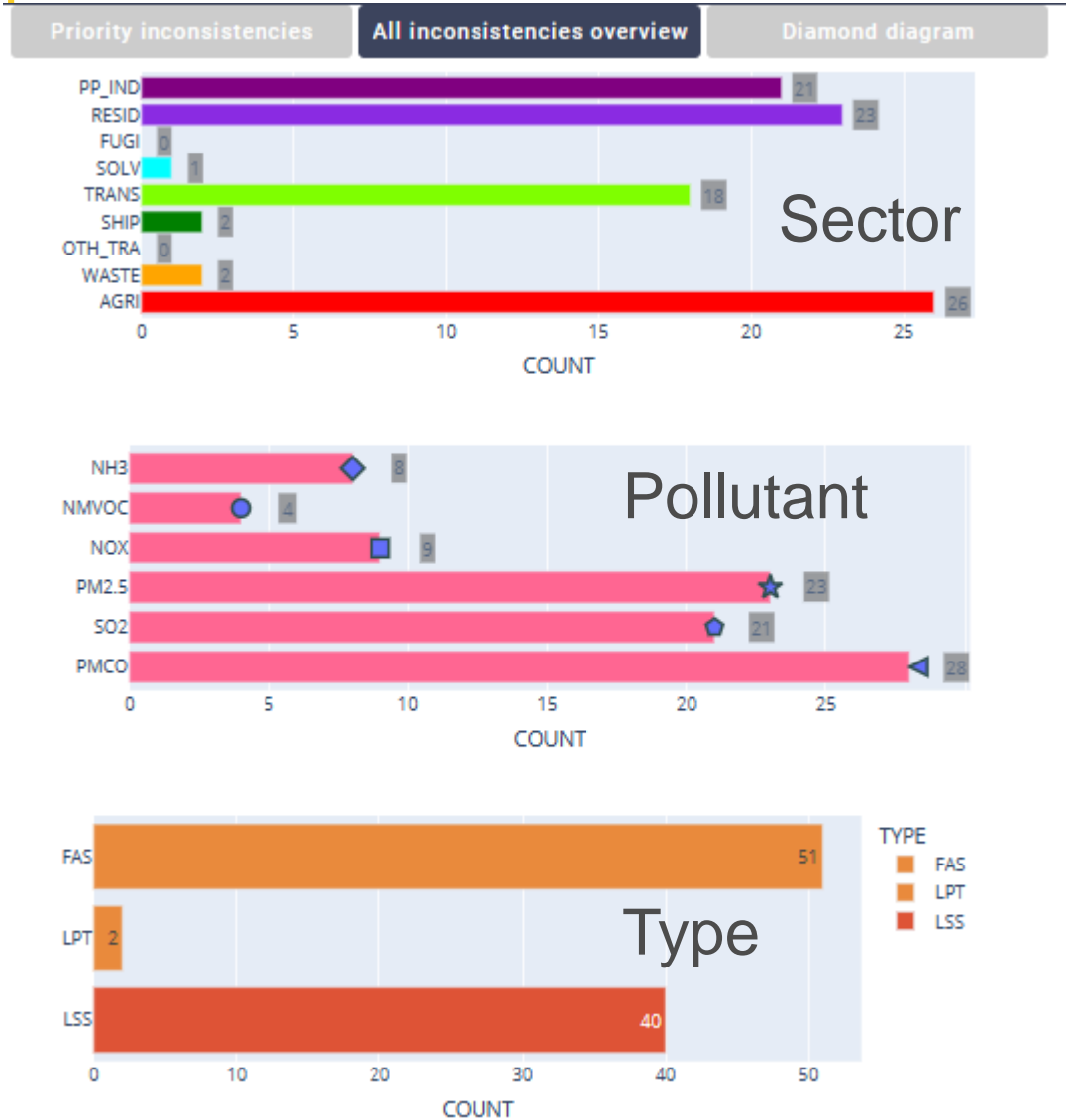
Incons. Threshold 2.00

Limit to Main Country

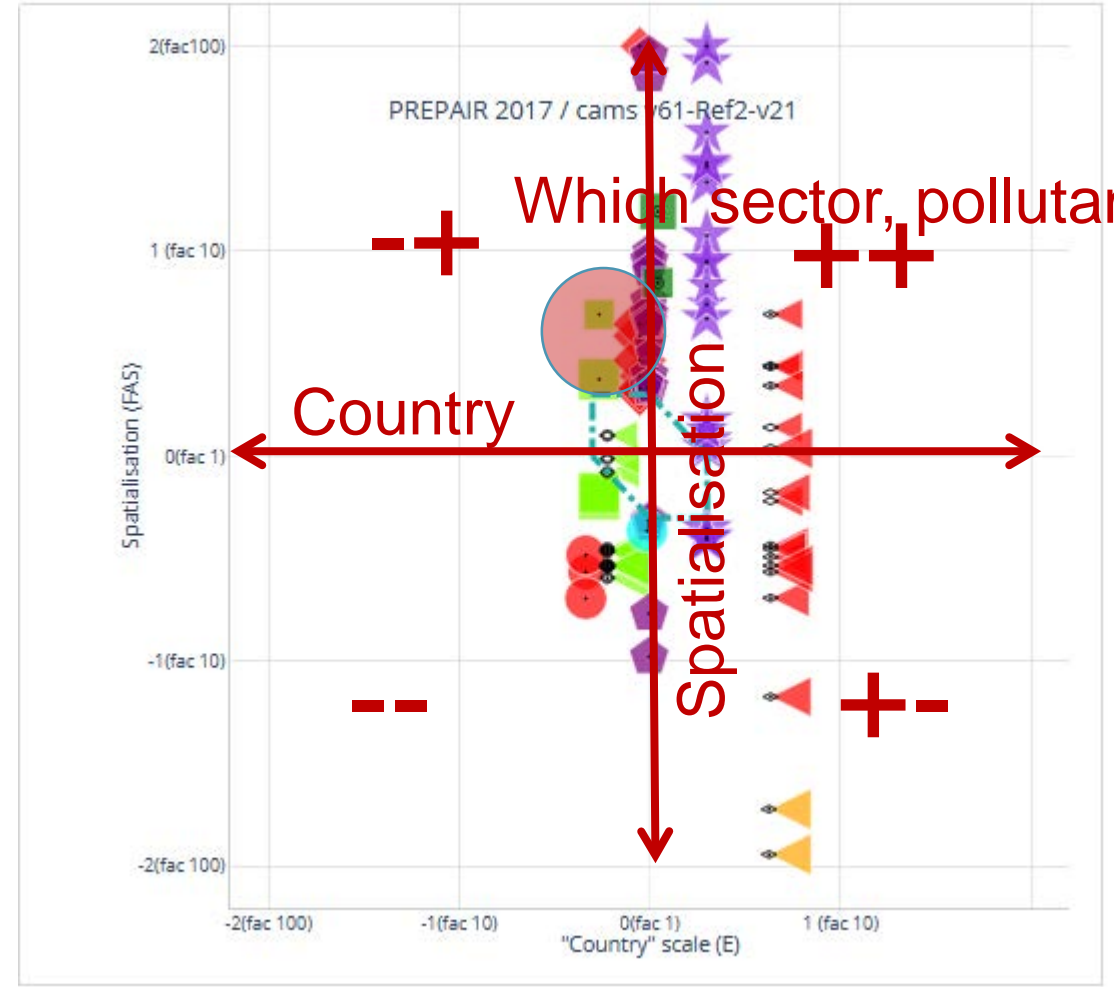
Categorization of inconsistent emissions



Visualization (I): overview



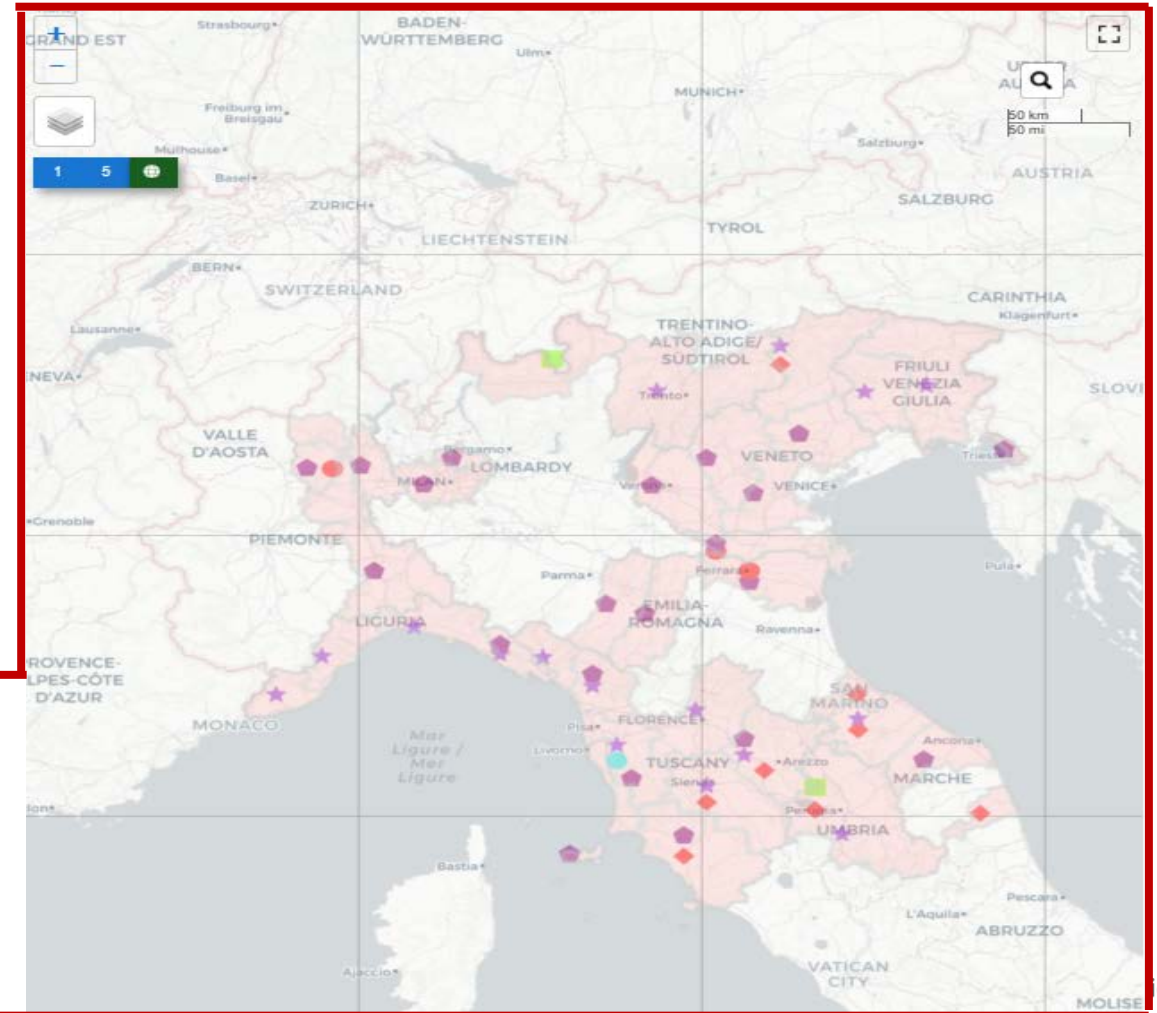
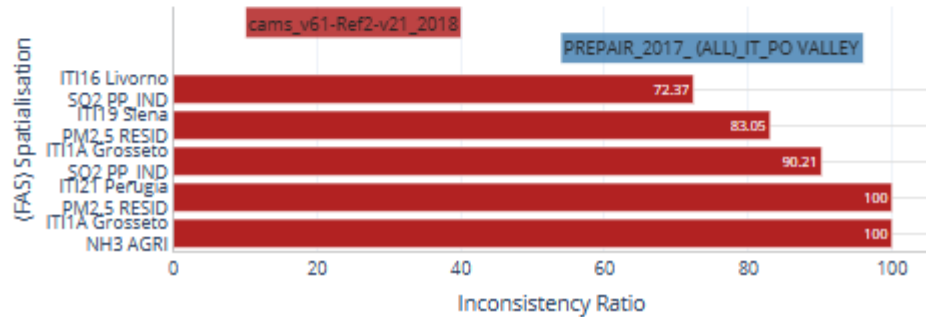
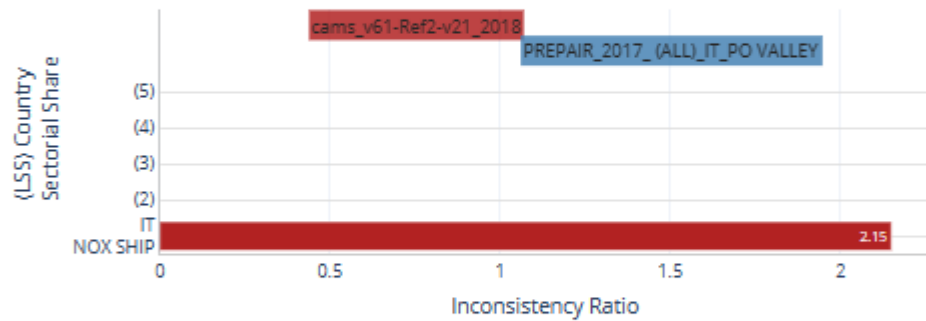
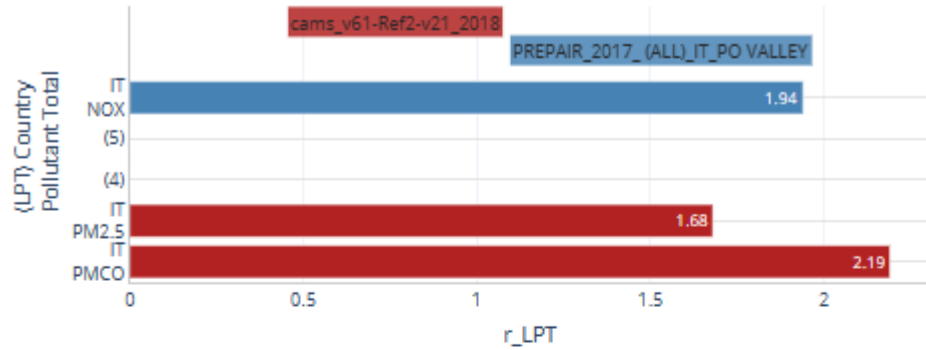
Priority inconsistencies | All inconsistencies overview | **Diamond diagram**



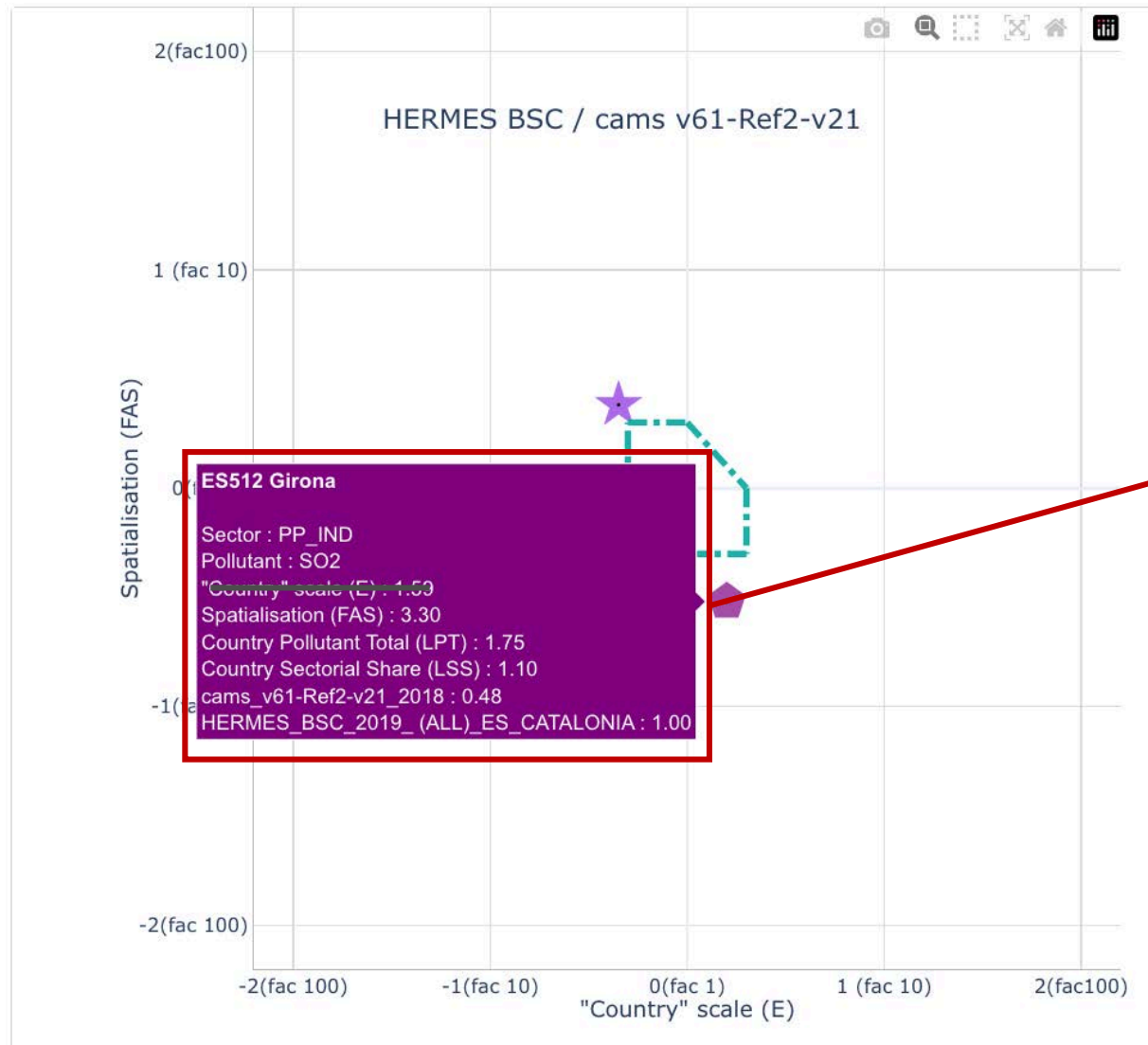
Example: Prepair vs CAMS-REG

Visualization (II): Where to start? -- priorities

Priority inconsistencies All inconsistencies overview Diamond diagram



Visualization (III): Information on the inconsistency



FUA or NUTS code

Sector: sector name

Pollutant: pollutant name

Spatialisation (FAS): Ratio of the two inventory estimates for spatialisation for the selected sector and pollutant. It assesses how country emissions are distributed to a given NUTS/FUA.

Country Pollutant Total (LPT): Ratio of the two inventory country total estimates for the selected sector and pollutant.

Country Sectorial Share (LSS): Ratio of the two inventory estimates for the country sectoral share for the selected sector and pollutant. It assesses how country emissions are distributed to sectors.

Cams_v6.1-Ref2-v21_2018: total annual emissions (kt/year) reported by the selected EU-wide inventory, sector, pollutant and FUA/NUTS code

HERMES_BSC_2019_(ALL)_ES_CATALONIA: total annual emissions (kt/year) reported by the selected bottom-up inventory, sector, pollutant and FUA/NUTS code

Thank-you