FAIRMODE WG7

WG7 – High resolution emission inventories

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European Commission

Background - WG7

- Best – practise through QA/QC

Identifying best practices through QA/QC approaches and drafting recommendations for the compilation of sectorial high resolution emission inventories that are relevant at the urban scale.

- Metadata recommendation

Elaborating recommendations for a common system to document the use of ancillary data and define the relevant meta-data that support each emission inventory at the urban scale.

- Benchmarking and Emission dashboard

Benchmarking and creating an emission dashboard (EU, bottom-up national and local inventories) to monitor progress and identify inconsistencies among inventories. Regular inter-comparisons will be carried out to support this objective.

- Use of Composite mapping platform

i) as spatial information support to evaluate specific sectors/ topics identified as inconsistency by the dashboard;
ii) to carry out emission evaluation in relation with activities of the composite mapping for assessment purposes

- Provide relevant feedback

To European inventories used for regulatory purposes (EMEP, CAMS-REG) and research project (e.g., REMI, RI-URBANS, NordicWelfAir, “Others”).

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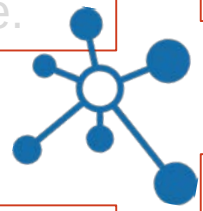
Activities in 2024

- Best – practise through QA/QC

Identifying best practices through QA/QC approaches and drafting recommendations for the compilation of sectorial high resolution emission inventories that are relevant at the urban scale.

- Metadata recommendation

Elaborating recommendations for a common system to document the use of ancillary data and define the relevant meta-data that support each emission inventory at the urban scale.



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Plenary Meeting programme

- Composite mapping of emissions: progress and current status
- Composite mapping exercise: workshop proposal
- (brief) example on the usage of the tool: Catalonia region
- Points for discussion

Composite mapping of emissions

Aim: In addition to annual gridded concentration, we aim at assessing and comparing the underlying emissions to set up the basis for best-practices and recommendations for the compilation of emission inventories.

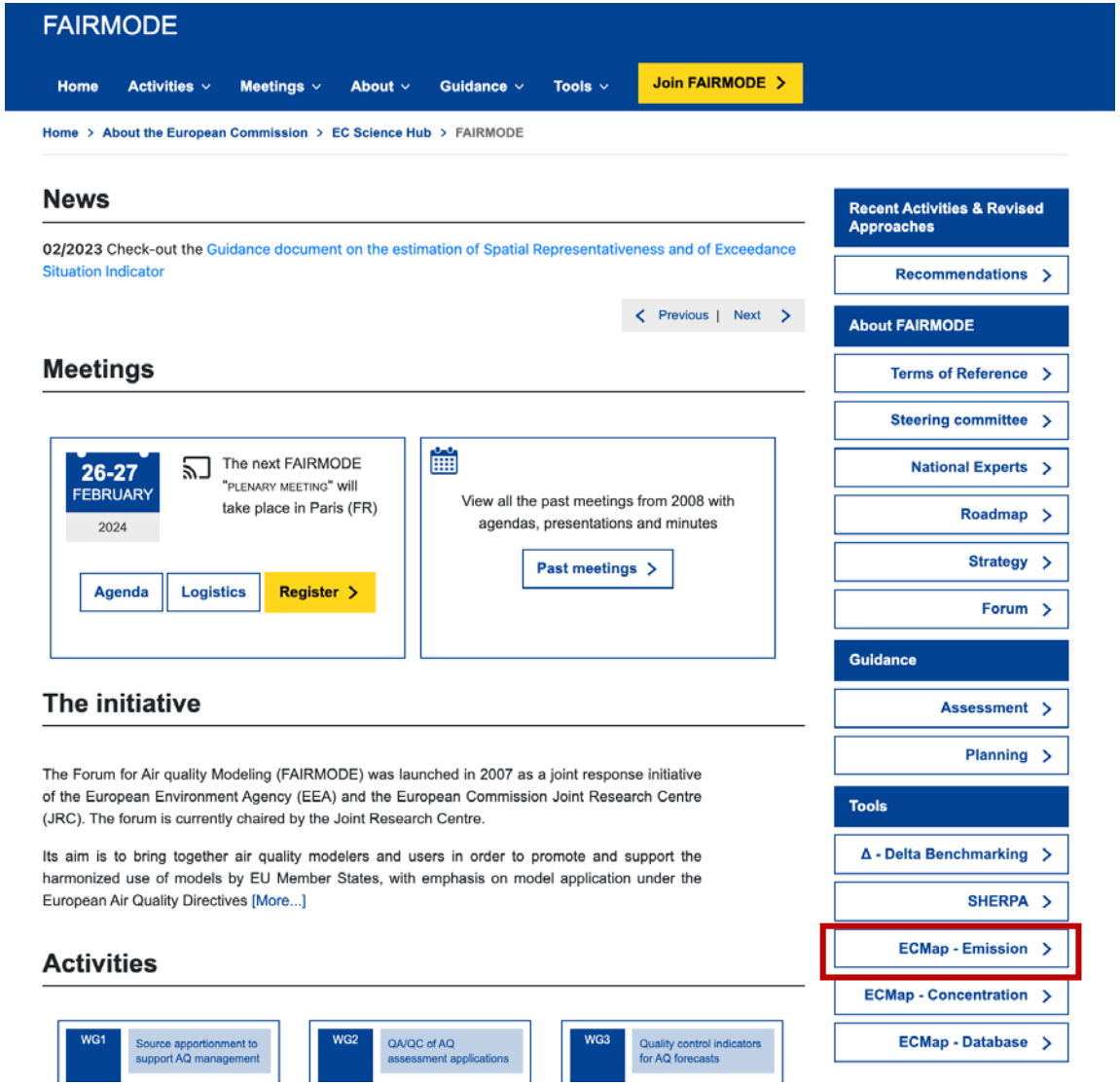
What it is needed: Annual emissions aggregated over pre-defined spatial areas (**non-gridded**):

→ NUTS3 that are covered by the modelling domain
→ predefined local areas; e.g., FUA (Functional Urban Area – a city and its commuting zone)

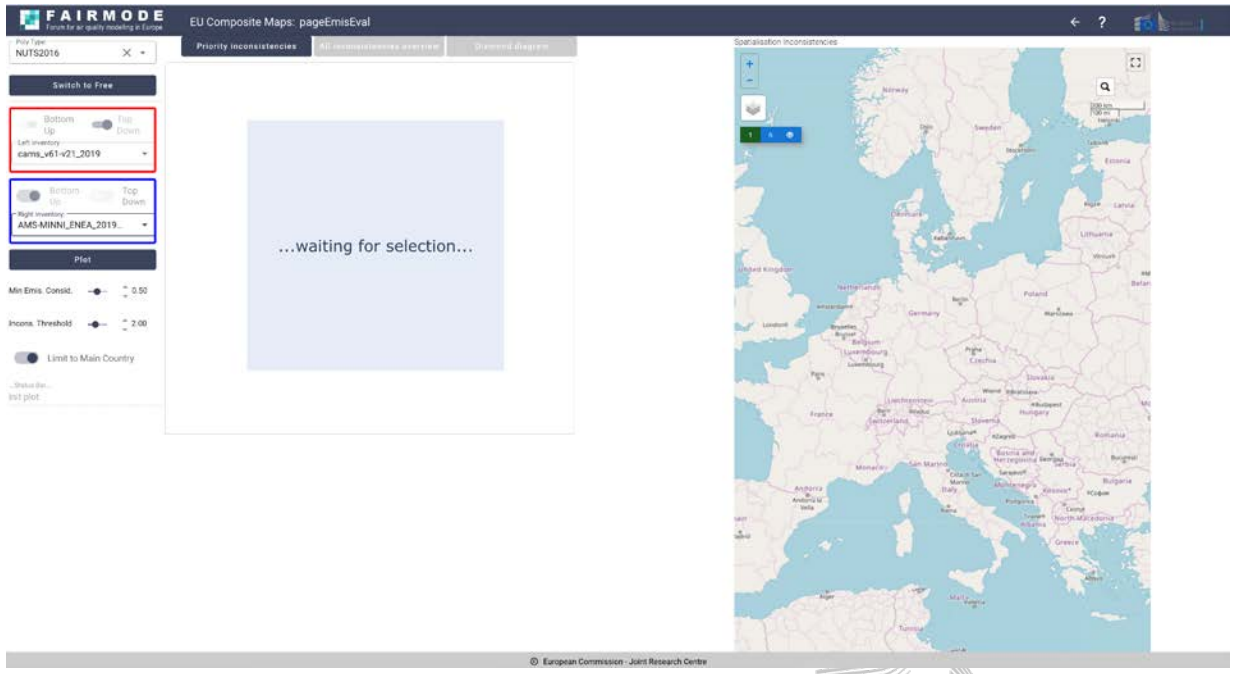
How: the screening methodology follows Thunis et al. (2022) to flag main inconsistencies when compared with EU wide inventories.

Output: Identification of inconsistencies at i) pollutant; ii) sector; iii) type (national, sector share, spatial distribution) levels

Composite mapping of emissions



- Opened and accessible from the FAIRMODE webpage
- Link circulated among WG7 participants (December 2023)



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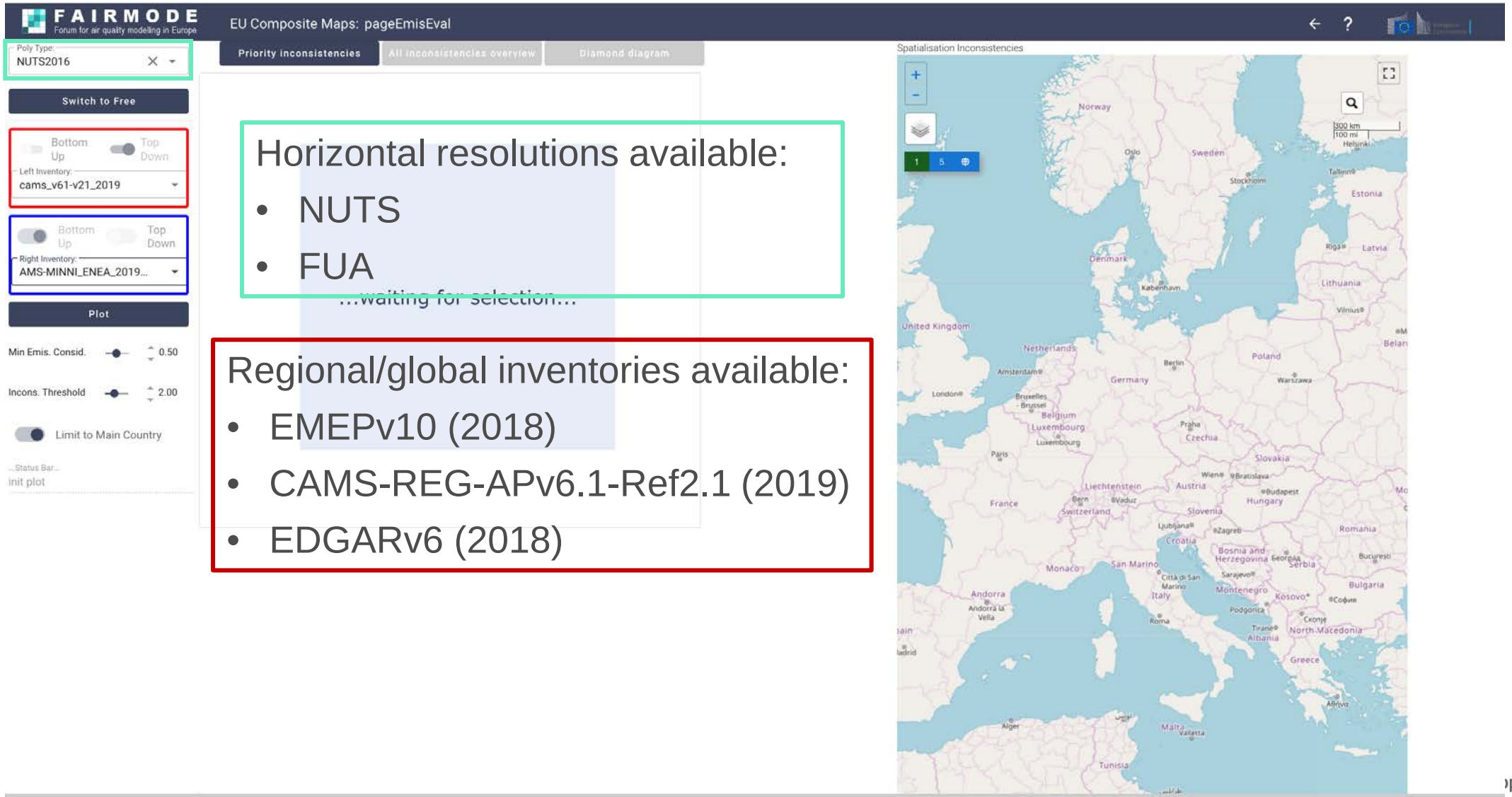
Composite mapping of emissions



Horizontal resolutions available:

- NUTS
- FUA

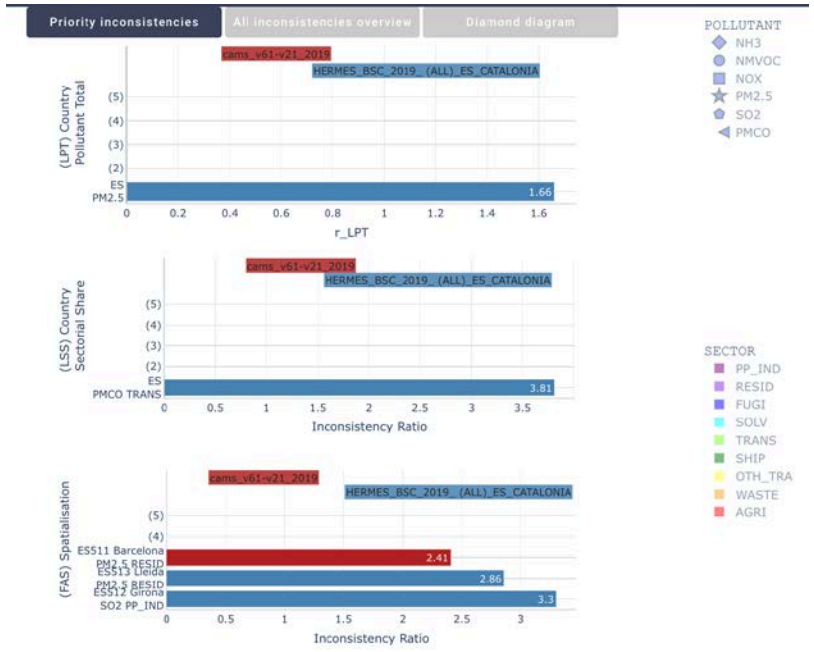
Regional/global inventories available:

- EMEPv10 (2018)
- CAMS-REG-APv6.1-Ref2.1 (2019)
- EDGARv6 (2018)

Composite mapping of emissions

Active iteration and testing process to go from first version to current version

Which plot is more relevant/should be showed first?



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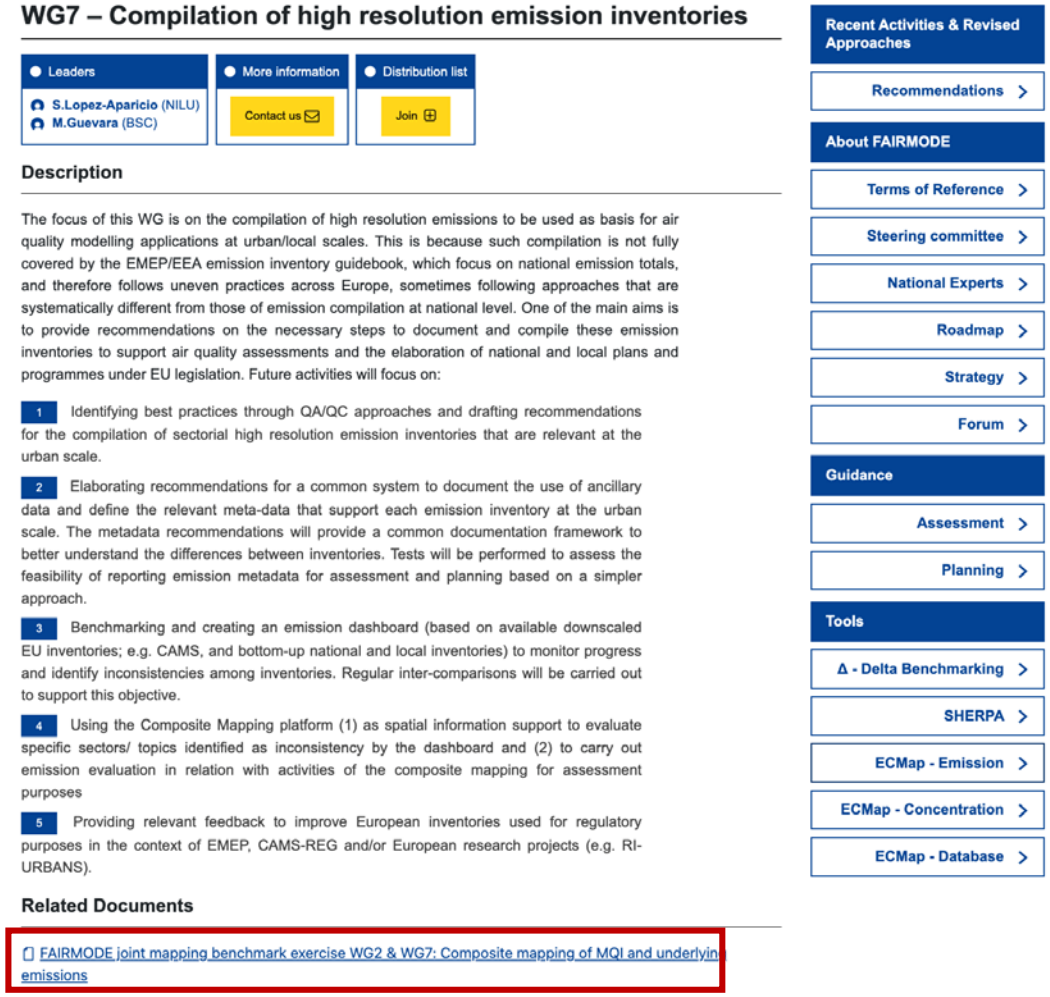
Composite mapping of emissions

Update guidance document to better describe input data requirements



WG7 – Compilation of high resolution emission inventories

Leaders	More information	Distribution list
S.Lopez-Aparicio (NILU) M.Guevara (BSC)	Contact us	Join

Description

The focus of this WG is on the compilation of high resolution emissions to be used as basis for air quality modelling applications at urban/local scales. This is because such compilation is not fully covered by the EMEP/EEA emission inventory guidebook, which focus on national emission totals, and therefore follows uneven practices across Europe, sometimes following approaches that are systematically different from those of emission compilation at national level. One of the main aims is to provide recommendations on the necessary steps to document and compile these emission inventories to support air quality assessments and the elaboration of national and local plans and programmes under EU legislation. Future activities will focus on:

1. Identifying best practices through QA/QC approaches and drafting recommendations for the compilation of sectorial high resolution emission inventories that are relevant at the urban scale.
2. Elaborating recommendations for a common system to document the use of ancillary data and define the relevant meta-data that support each emission inventory at the urban scale. The metadata recommendations will provide a common documentation framework to better understand the differences between inventories. Tests will be performed to assess the feasibility of reporting emission metadata for assessment and planning based on a simpler approach.
3. Benchmarking and creating an emission dashboard (based on available downscaled EU inventories; e.g. CAMS, and bottom-up national and local inventories) to monitor progress and identify inconsistencies among inventories. Regular inter-comparisons will be carried out to support this objective.
4. Using the Composite Mapping platform (1) as spatial information support to evaluate specific sectors/ topics identified as inconsistency by the dashboard and (2) to carry out emission evaluation in relation with activities of the composite mapping for assessment purposes
5. Providing relevant feedback to improve European inventories used for regulatory purposes in the context of EMEP, CAMS-REG and/or European research projects (e.g. RI-URBANS).

Related Documents

FAIRMODE joint mapping benchmark exercise WG2 & WG7: Composite mapping of MQI and underlying emissions

Recent Activities & Revised Approaches
- Recommendations

About FAIRMODE
- Terms of Reference
- Steering committee
- National Experts
- Roadmap
- Strategy
- Forum

Guidance
- Assessment
- Planning

Tools
- Δ - Delta Benchmarking
- SHERPA
- ECMap - Emission
- ECMap - Concentration
- ECMap - Database

Annex: Additional information regarding the upload of spatially aggregated emissions

The template for reporting emissions (either over NUTS3 or over FUA) is shown below. The output to be uploaded in the composite mapping platform should be one unique csv file (one for NUTS3 and one for FUA) containing emissions (expressed in kTons) for all sectors and pollutants mentioned in Table 3. It is important to use the following naming nomenclature:

Pollutants: PM2_5, PM10, NOX, NMVOC, SO2, NH3

Sectors: GNFRAB, GNFRC, GNFRD, GNFRE, GNFRG, GNFRHI, GNFRJ, GNFRKL

NUTS_ID/FUA_ID (*)	CNTR_CODE	NAME_LATN	POLLUTANT	YEAR	SECTOR	EMIS(kTons)
DE249	DE	Hof, Landkreis	NOX	2017	GNFRF	21586.23
AT311	AT	Innviertel	PM2_5	2017	GNFRIH	18000.01

(*) NUTS_ID for the NUTS3 csv file and FUA_ID for the FUA csv file

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Composite mapping of emissions

Increased number of contributors (thanks to all of you!)

Status by 27th February

Region or country	Contact	EMISSIONS	CONCENTRATION
Austria	Claudia Flandorfer		
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Croatia	Milic Velimir		
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Catalonia	Marc Guevara		
Portugal	Diogo Lopea		
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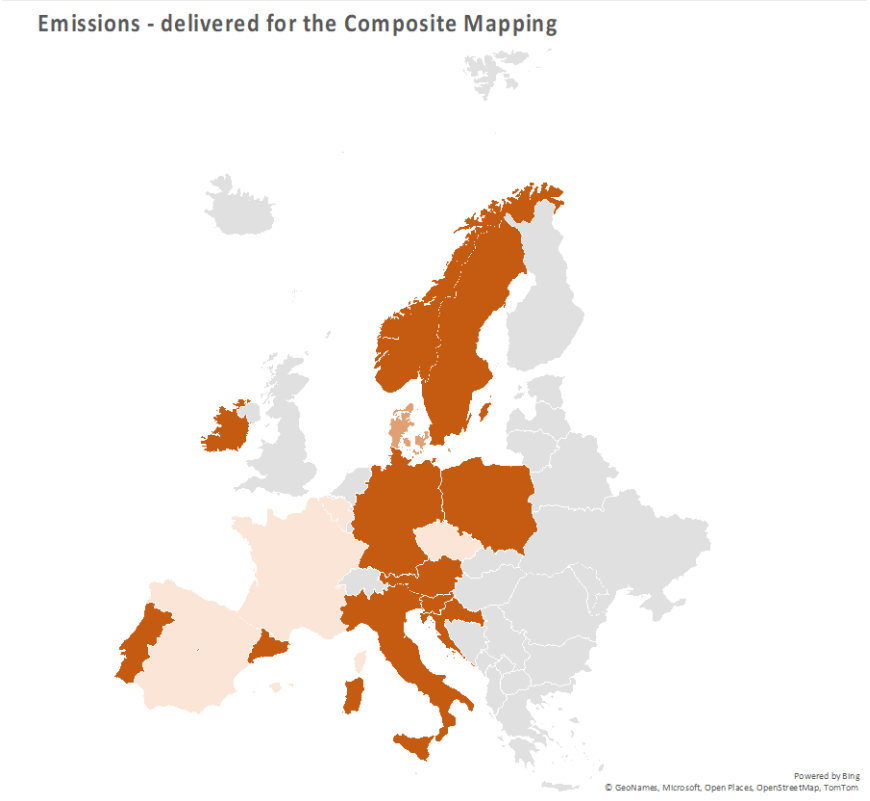

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Composite mapping of emissions

https://doi.org/10.5194/egusphere-2023-1257
Preprint. Discussion started: 28 August 2023

EGUsphere Preprint repository

1 Emission ensemble approach to improve
2 the development of multi-scale emission
3 inventories
4
5 Philippe Thunis[1], Jeroen Kuenen[2], Enrico Pisoni[1], Bertrand Bessagnet[1], Manjola Banja[1]. Lech
6 Gawuc[3], Karol Szymankiewicz[3], Diego Guizardi[1], Monica Crippa[1,4], Susana Lopez-Aparicio[5],
7 Marc Guevara[6], Alexander De Meij[7], Sabine Schindlbacher[8], Alain Clappier[9]
8

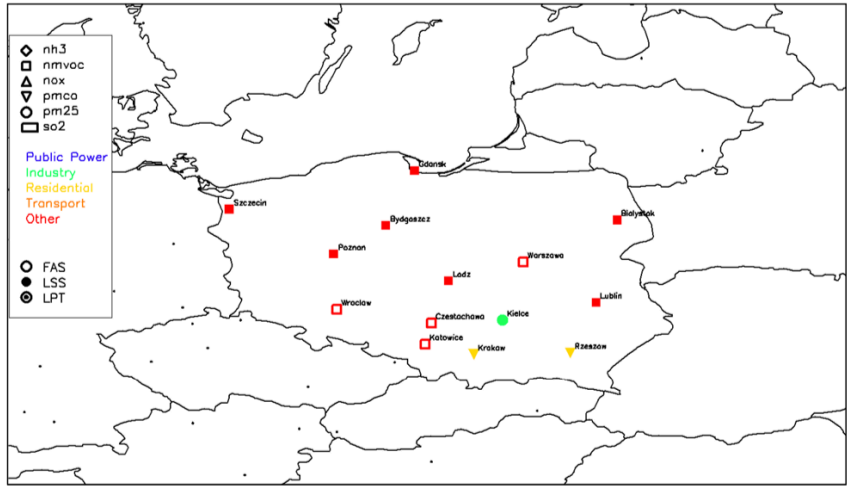

Figure 8: overview of inconsistencies for the comparison between local emission inventory in Poland and the Europe wide emission inventory ensemble

The authors addressed the reviewer's comments adequately, so the paper can be published once the remaining minor issues are addressed.

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Composite mapping exercise

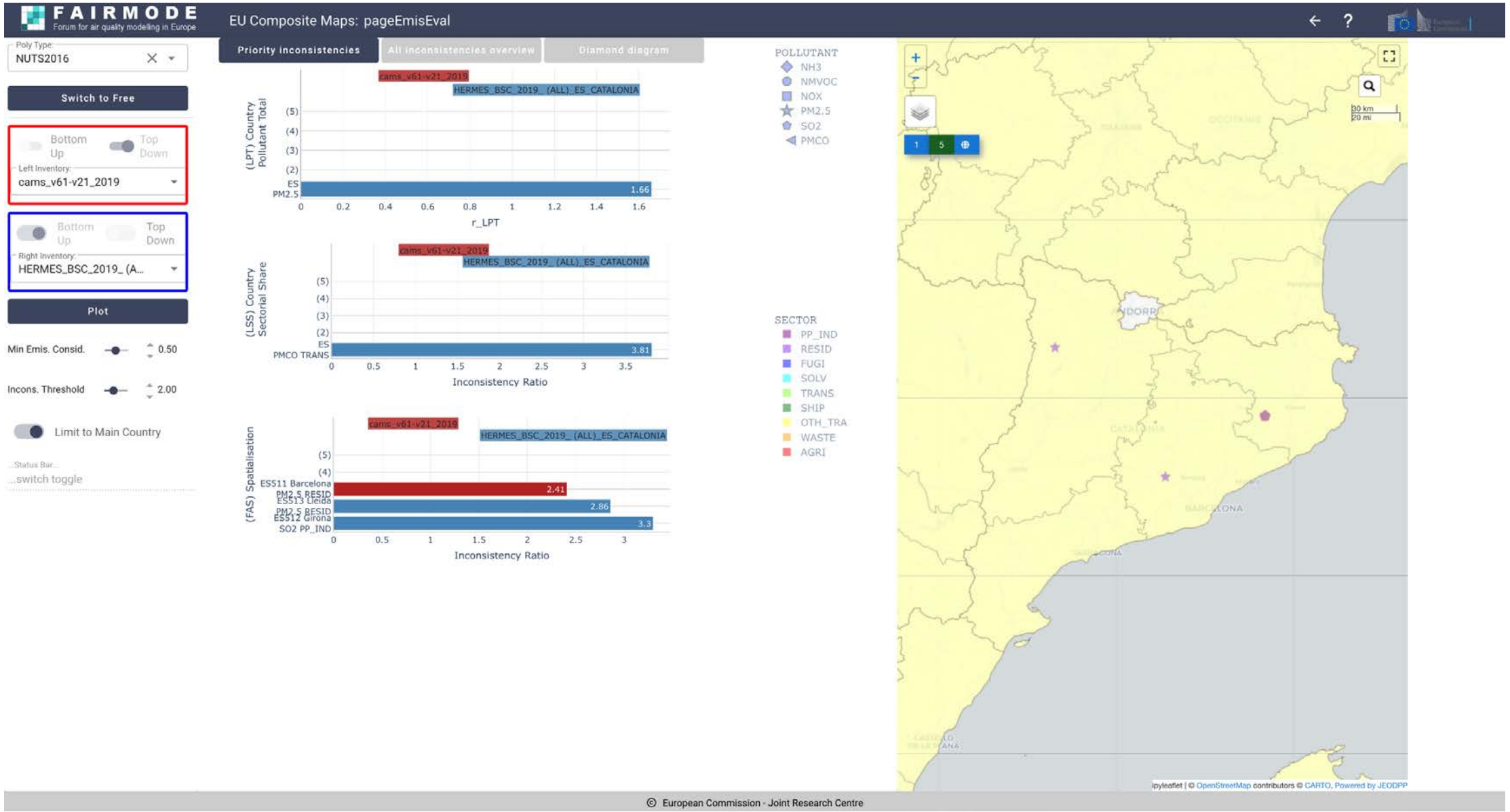
Workshop proposal:

- **Who**: People who are responsible for the development of the uploaded emissions
- **When**: End of April 2024
- **How**: Online (ensure the participation of key people)
- **What**: Fill in a template that WG7 will distribute before the workshop (homeworks!), in which we will propose a guided exercise
  - What are the main inconsistencies found?
  - Do you find the same inconsistencies in CAMS-REG and EMEP?
  - Do you find the same inconsistencies in NUTS and FUA?
  - Are these inconsistencies expected?
  - Can we explain them?
  - What are the main lessons learned?
- **Why:** Identify reasons behind relevant inconsistencies, correct (some of) them, identify best practices, provide feedback to EU wide emission inventories

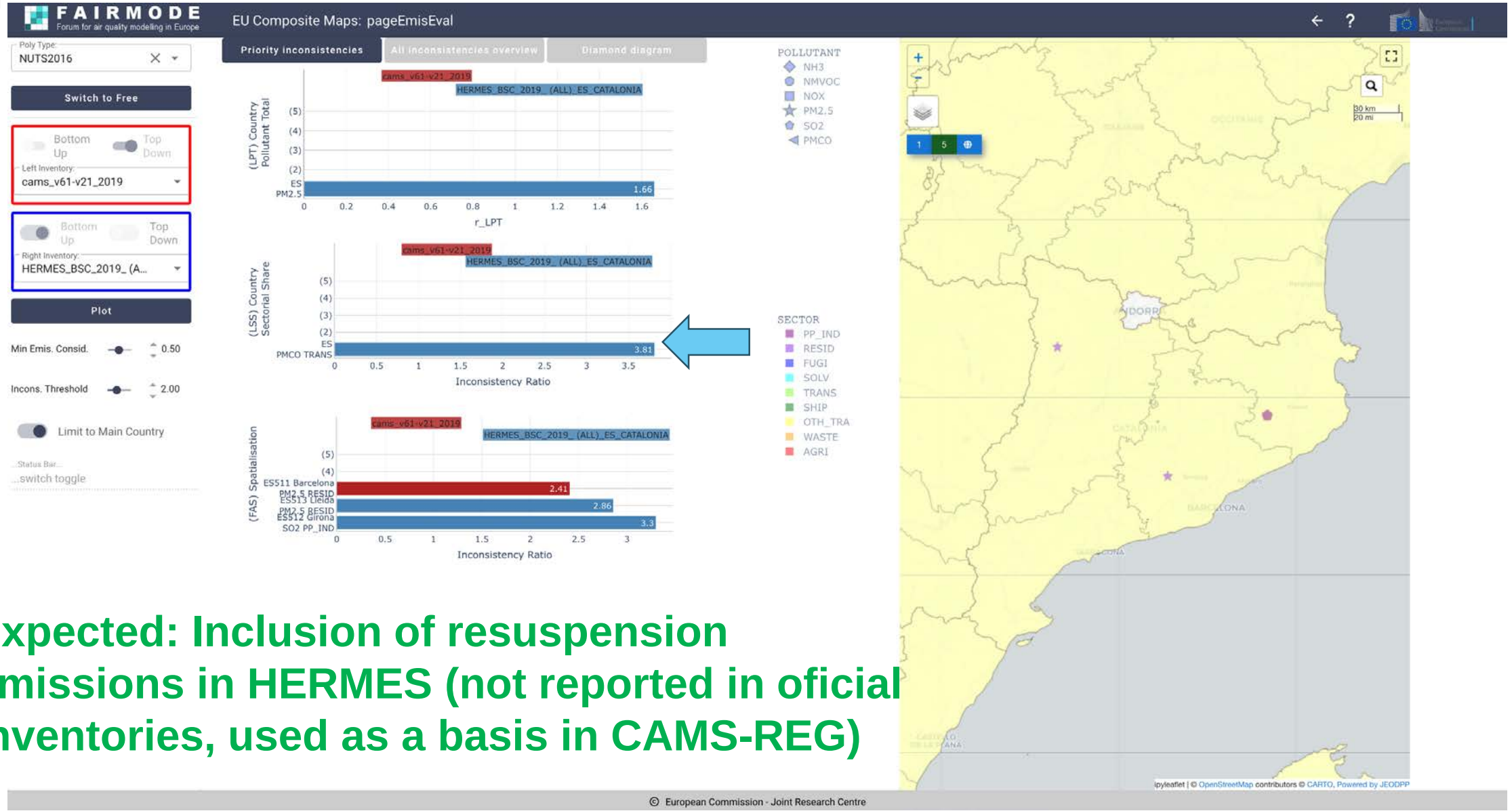
Composite mapping exercise

Organisation of a webinar (previous to the workshop) on how to use the tool and interpret the results

Example: Catalonia (Spain)

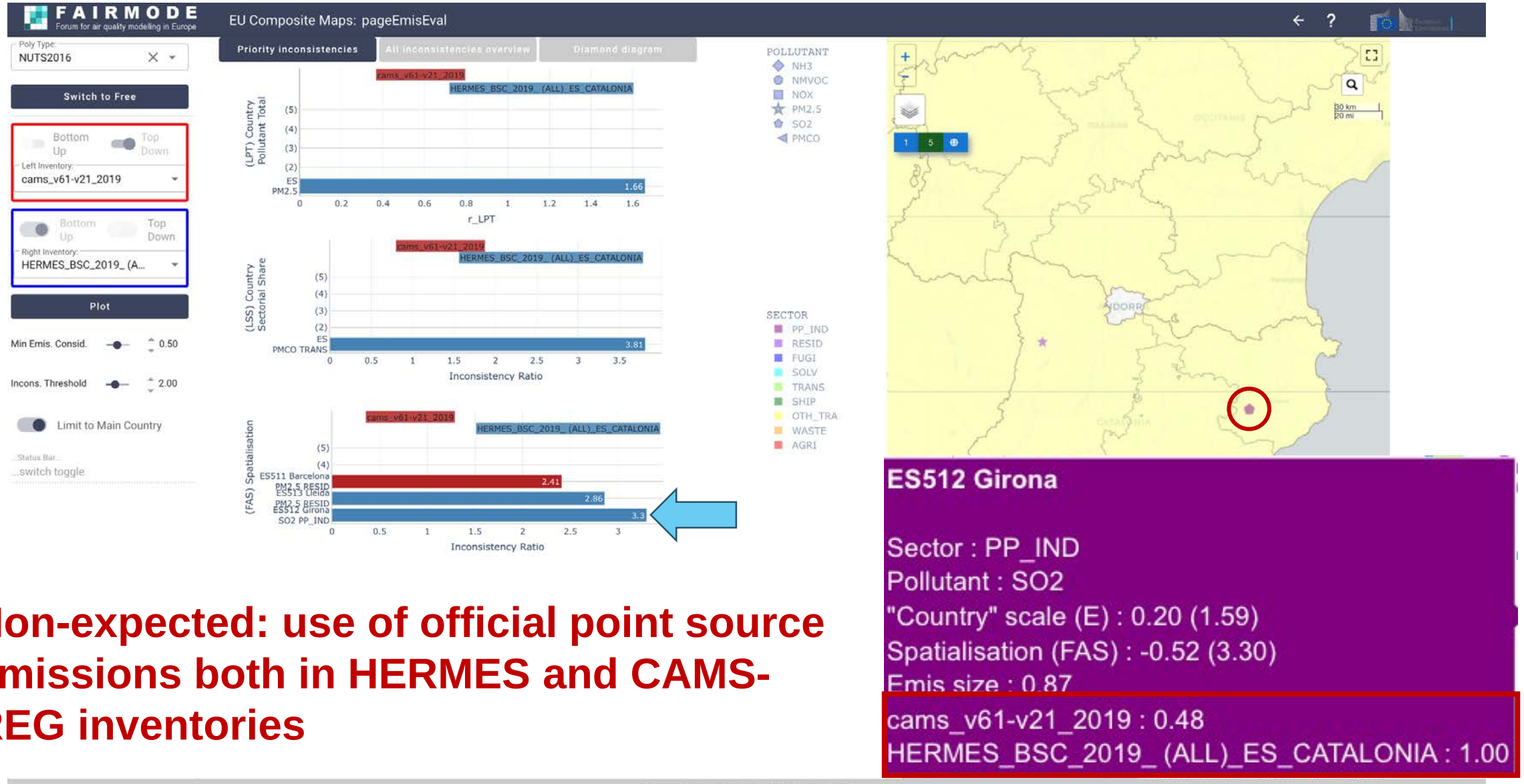


Example: Catalonia (Spain)



Expected: Inclusion of resuspension emissions in HERMES (not reported in oficial inventories, used as a basis in CAMS-REG)

Example: Catalonia (Spain)

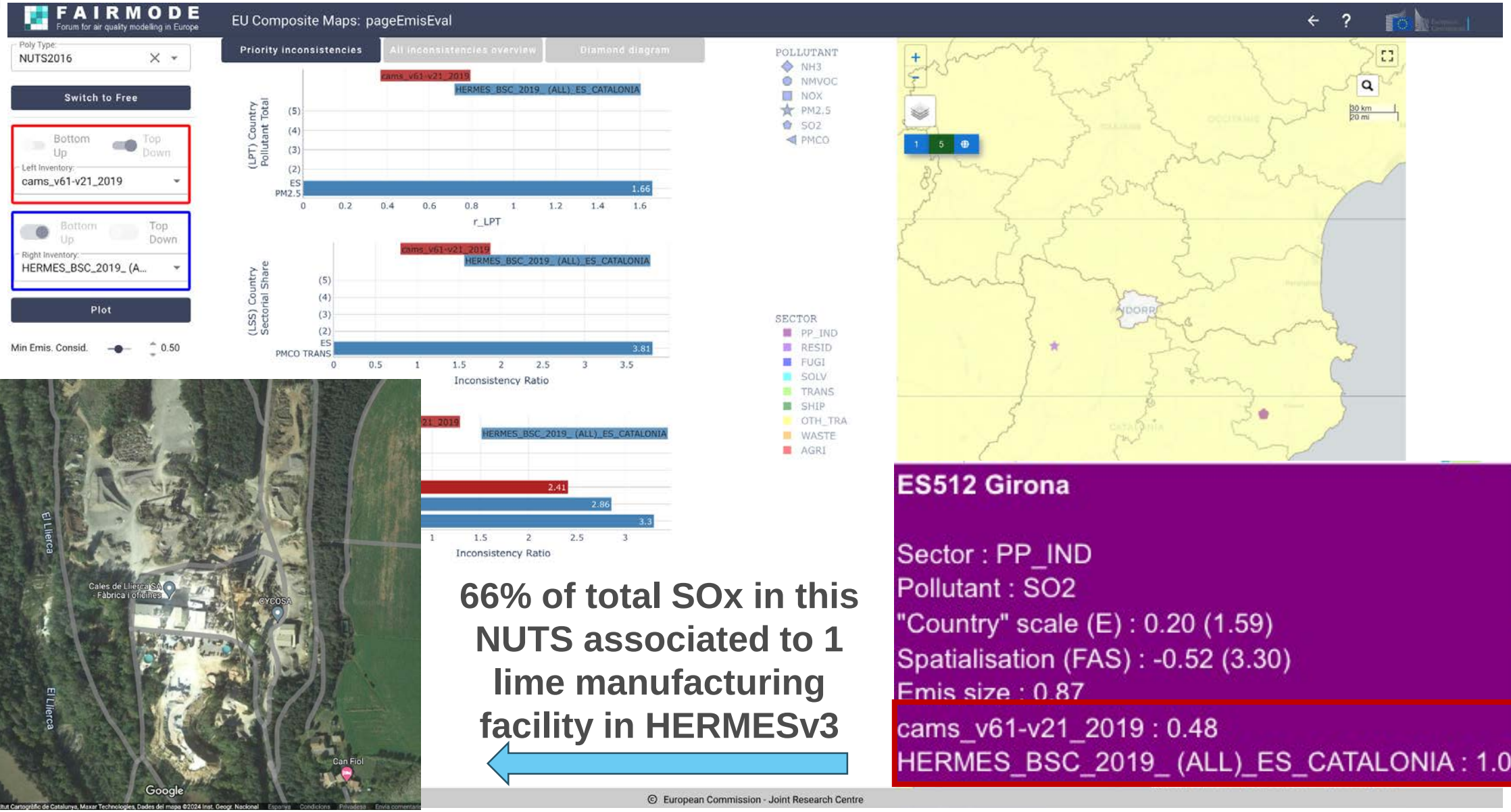


ES512 Girona

Sector : PP_IND
Pollutant : SO2
"Country" scale (E) : 0.20 (1.59)
Spatialisation (FAS) : -0.52 (3.30)
Emis size : 0.87
cams_v61-v21_2019 : 0.48
HERMES_BSC_2019_ (ALL)_ES_CATALONIA : 1.00

Non-expected: use of official point source emissions both in HERMES and CAMS-REG inventories

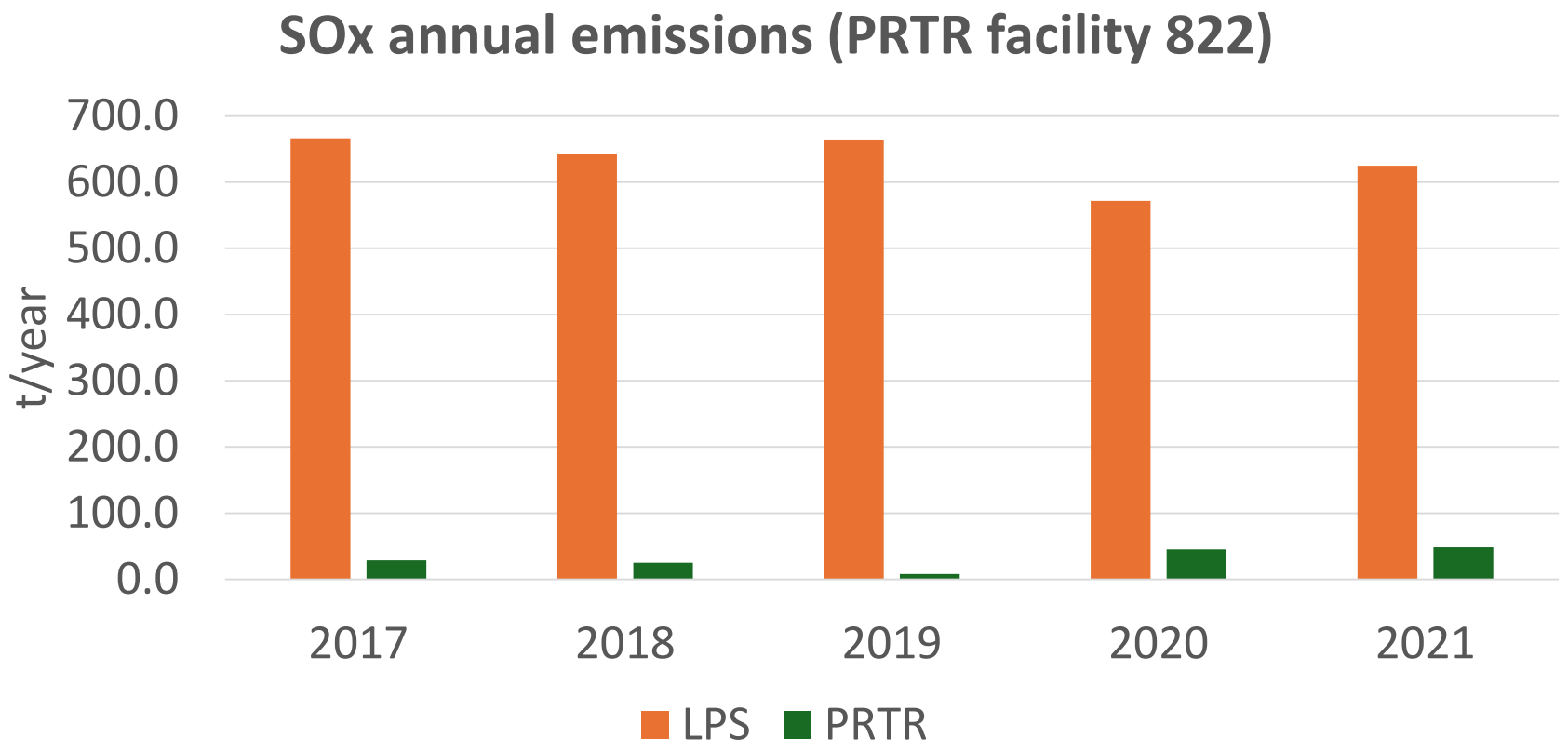
Example: Catalonia (Spain)



66% of total SOx in this NUTS associated to 1 lime manufacturing facility in HERMESv3

Example: Catalonia (Spain)

- HERMESv3 → LPS + PRTR
- CAMS-REG → distribution of national emissions according to PRTR + CORINE land use for “leftovers”



If we replace LPS by PRTR in HERMESv3: 0.99 kt/year → 0.35 kt/year (closer to 0.48 kt/year reported by CAMS-REG)

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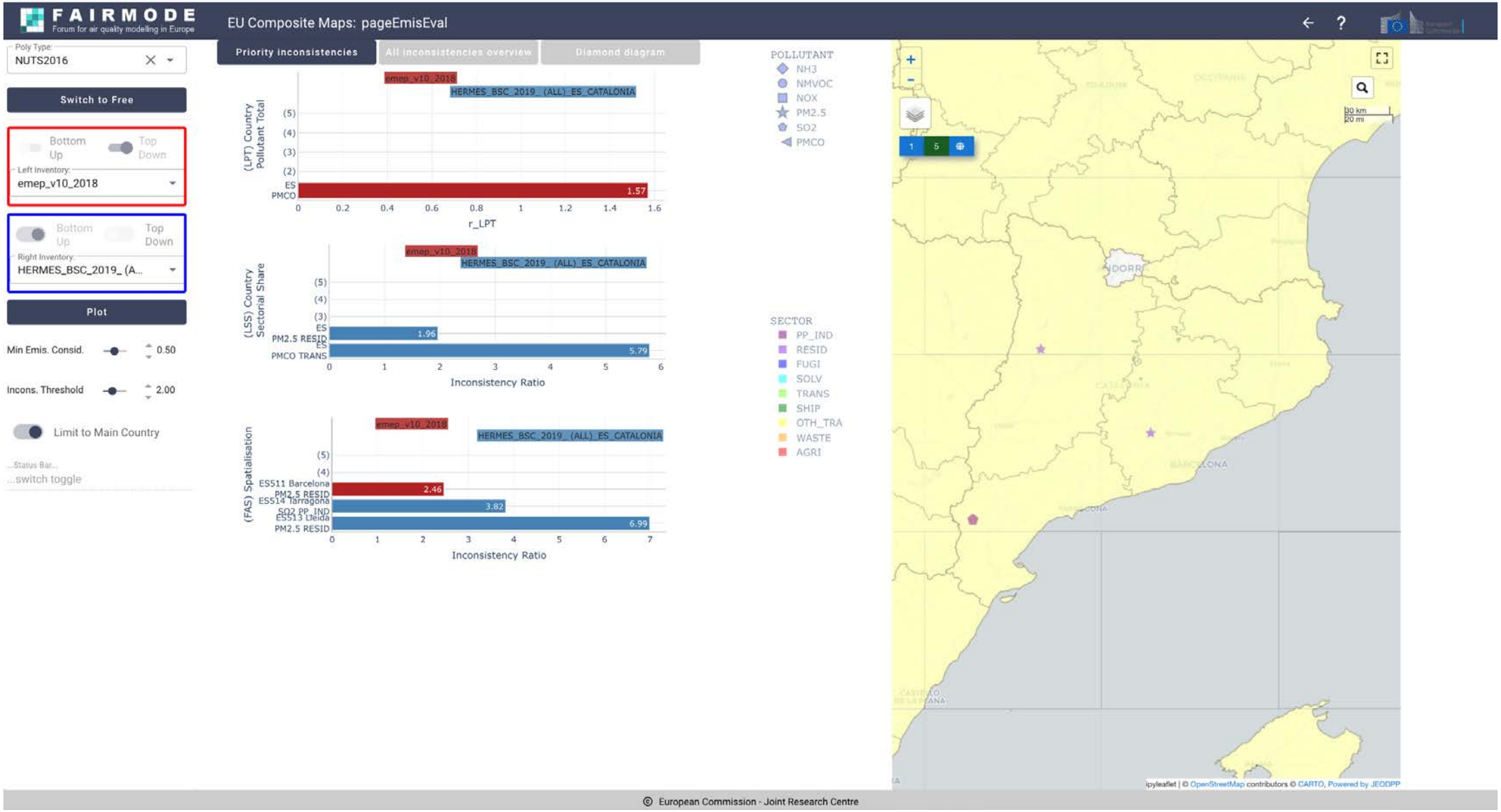
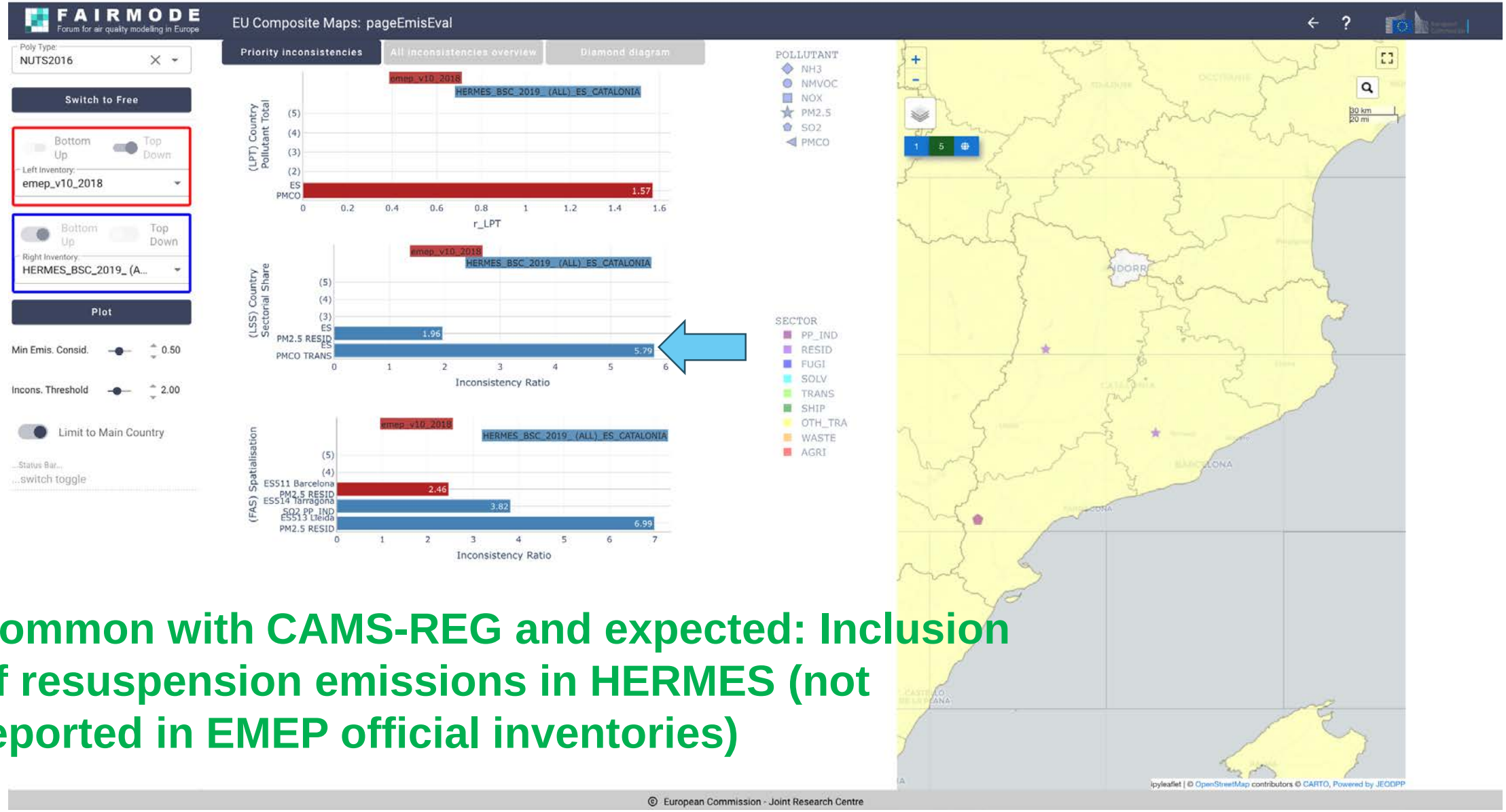
Example: Catalonia (Spain)



Example: Catalonia (Spain)



Common with CAMS-REG and expected: Inclusion of resuspension emissions in HERMES (not reported in EMEP official inventories)

Points for discussion

- Participation: Little feedback on the use of the platform, even when only targeting people who uploaded data → **How do we engage people?**

- Workshop proposal → **How do we design the first workshop to achieve relevant outcomes?**
  - Webinar previous to the workshop → **Useful?**
  - Questions to adress before the workshop → **Any other ideas?**
    - What are the main inconsistencies found?
    - Are them the same in CAMS-REG and EMEP?
    - Are them the same in NUTS and FUA?
    - Are these inconsistencies expected?
    - Can we explain them?
    - What are the main lessons learned?

- Workshop outcomes → **How do we draw best practices from the benchmarking exercise?**
  - Focus on the contribution to the regional emission inventories?
  - Focus on new approaches for developing local emissions?
  - Both?