SHERPA-Cloud and its application to the PM2.5 Atlas

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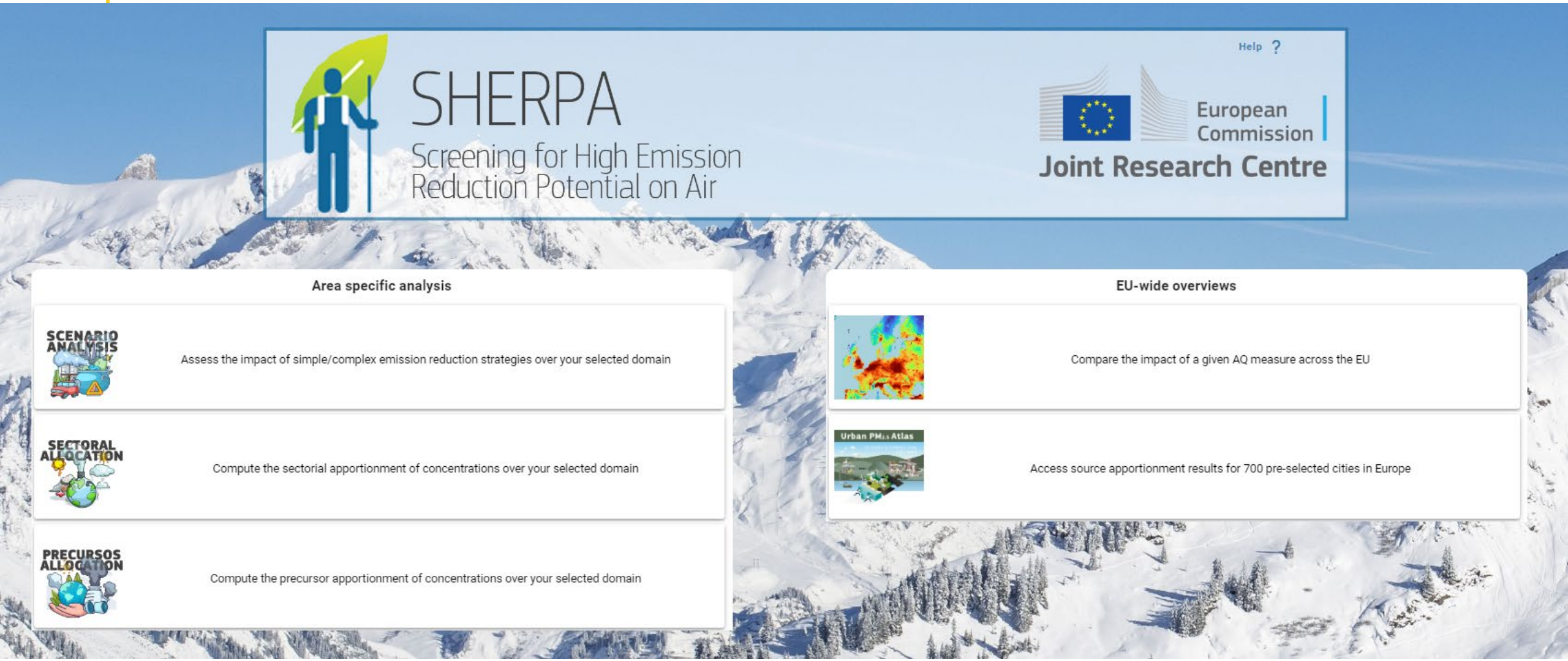
JRC

Joint
Research
Centre

Outline

- The SHERPA-Cloud
- The Atlas results

SHERPA-Cloud



https://jeodpp.jrc.ec.europa.eu/eu/dashboard/voila/render/SHERPA/Sherpa.ipynb

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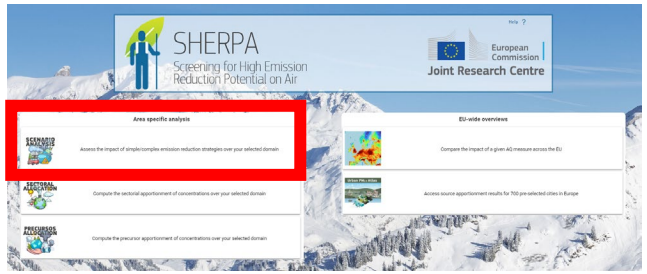
Scenario analysis



- Base year: 2019, CAMS (with condensables), 0.1x0.05 deg resolution
- Including health evaluation (based on HRAPIE)

ELSEVIER

Environment International
Volume 172, February 2023, 107760

Full length article

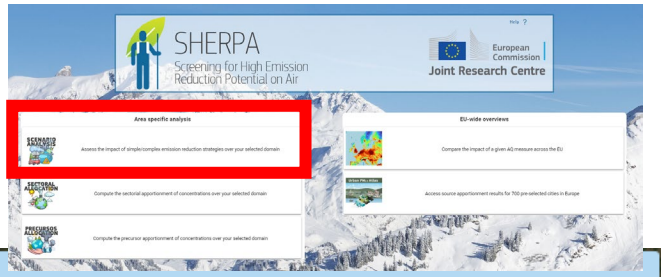
Modelling the air quality benefits of EU climate mitigation policies using two different PM2.5-related health impact methodologies

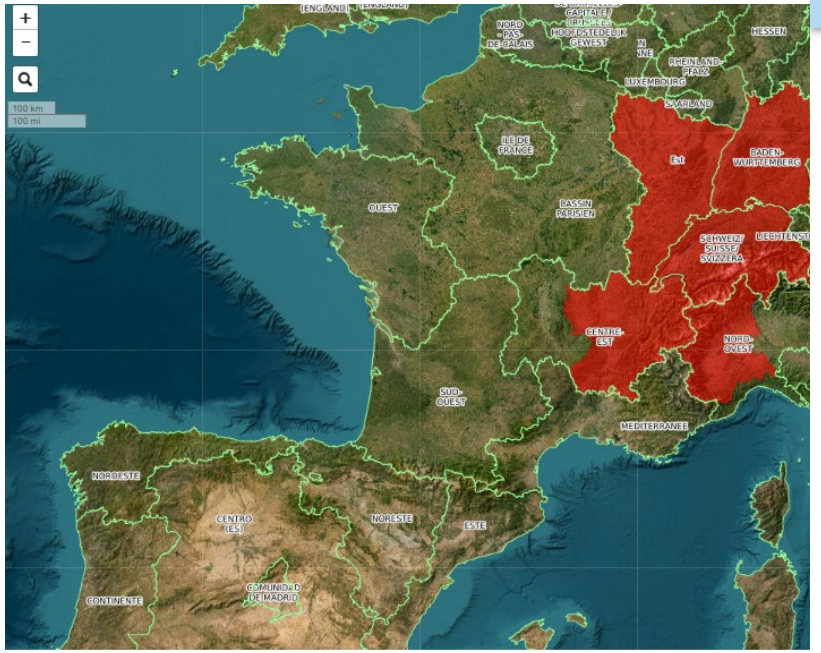
E. Pisoni [a], P. Thunis [a], A. De Meij [b], J. Wilson [a], B. Bessagnet [a], M. Crippa [a], D. Guizzardi [a], C.A. Belis [a], R. Van Dingenen [a]

- Cost-benefit analysis

European Commission

Scenario analysis





Reduction table [%]

	ALL	GNFR1	GNFR2	GNFR3	GNFR4	GNFR5	GNFR6	GNFR7	GNFR8	GNFR9	GNFR10	GNFR11	GNFR12
ALL	35	35	35	35	35	35	35	35	35	35	35	35	35
NOx	35	35	35	35	35	35	35	35	35	35	35	35	35
NMVOC	35	35	35	35	35	35	35	35	35	35	35	35	35
NH3	35	35	35	35	35	35	35	35	35	35	35	35	35
PPM25	35	35	35	35	35	35	35	35	35	35	35	35	35
SOx	35	35	35	35	35	35	35	35	35	35	35	35	35

Air Quality Index: PM25

Local calcu

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Costs charts

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Download image

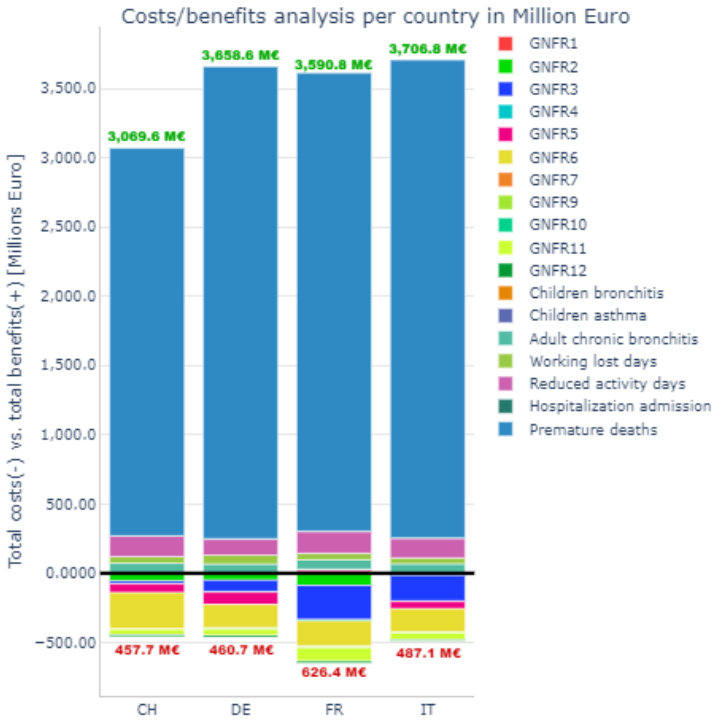
Display values

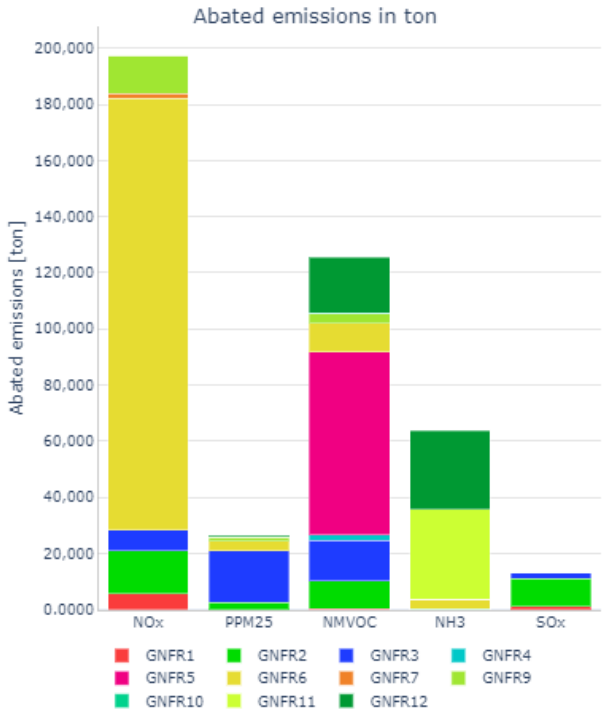
Country: ALL

Download image

Include: Costs | Benefits | Both

Benefits: Morbidity | Mortality | Both





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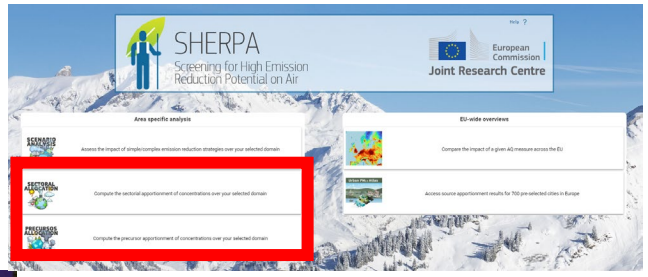
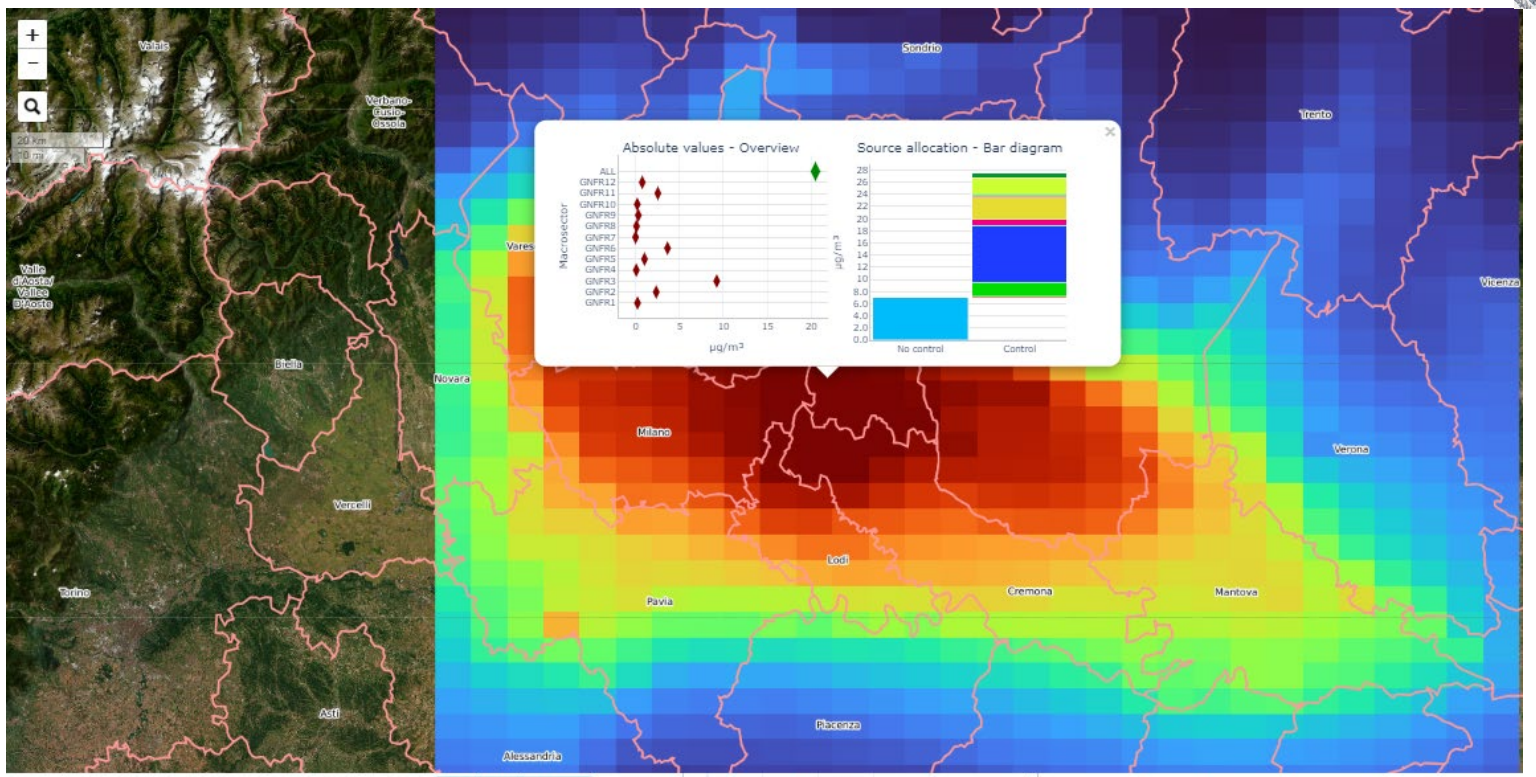
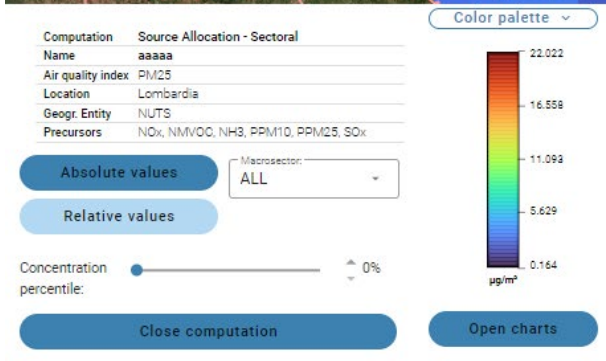
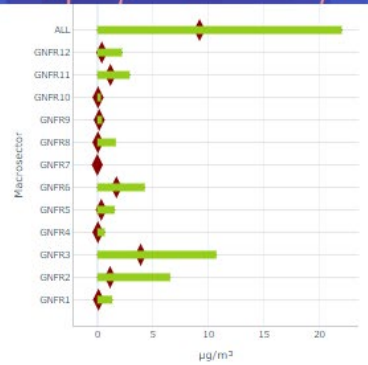
On-the-fly sectoral-precursor source allocation (local, polygons)









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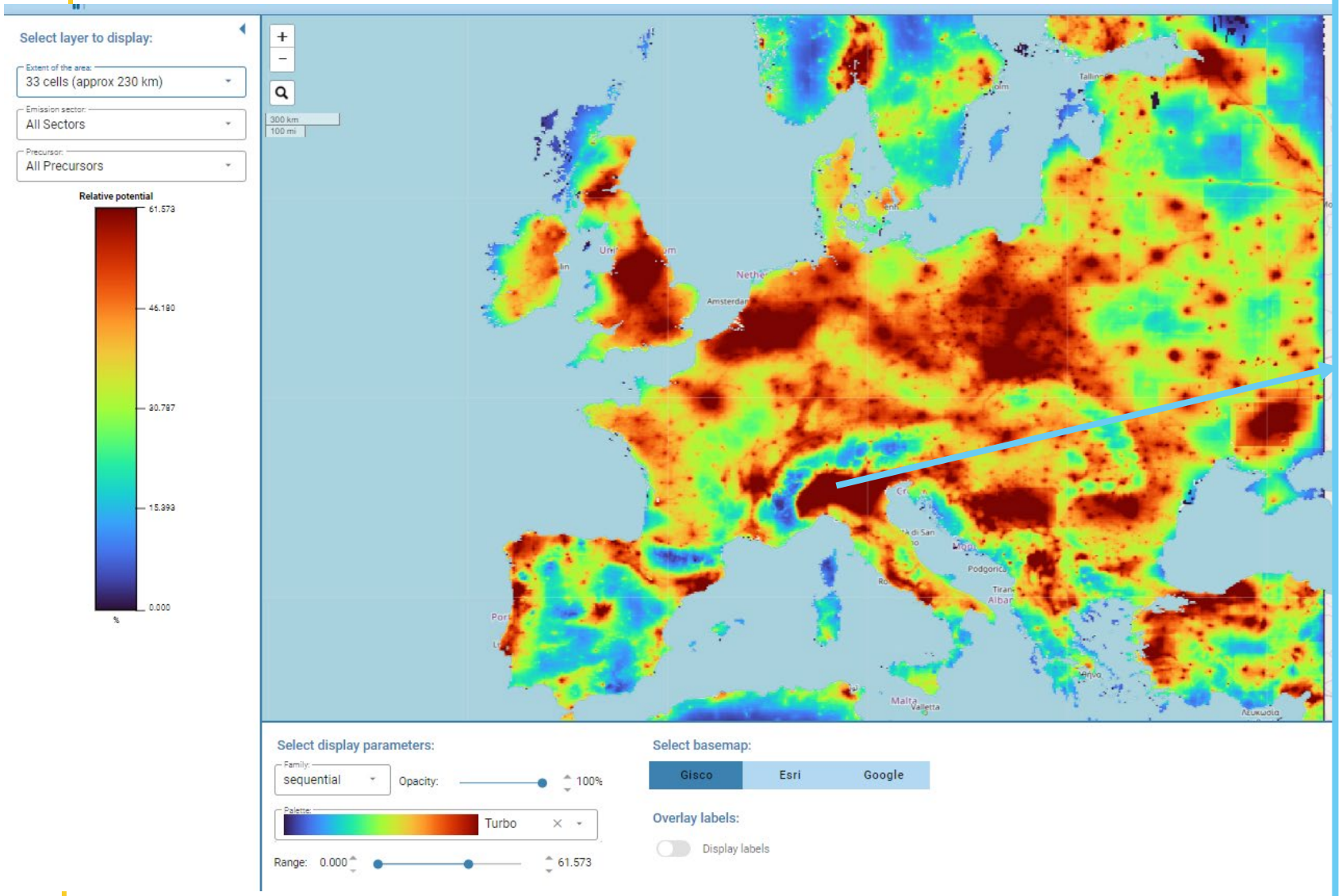
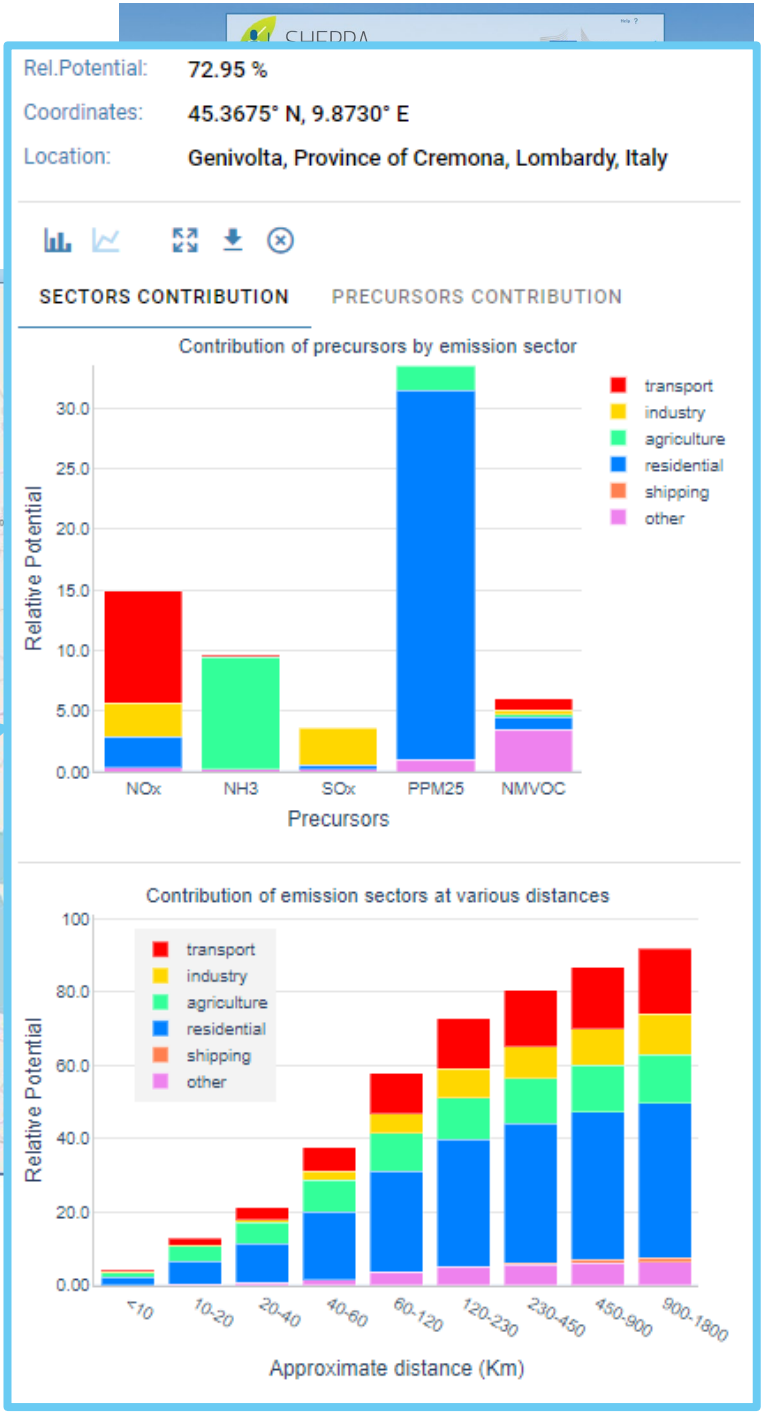
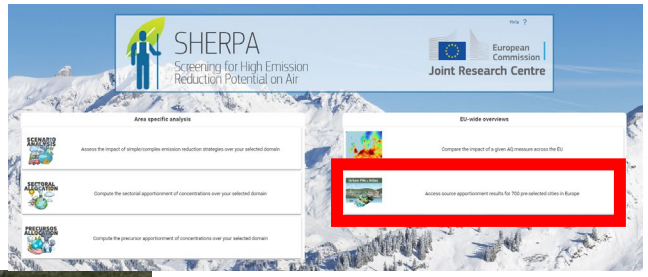
On-the-fly sectoral-precursor source allocation (EU, squares)





PM2.5 Atlas+, results for >700 cities



Milano.pdf

CLOSE

1 of 1

Italy, Milano

Urban monitoring stations (2019)

PM2.5 Spatial and sectoral allocation

Sectors

T - Transport
I - Industry
A - Agriculture
R - Residential
S - Shipping
O - Other
N - Natural
E - External

Emissions (kton/year)

Percentage of total mass

City emissions
Greater City emissions

Search city by name:

Legend

city area and FUA area > 300 km2
FUA area > 300 km2
FUA area <= 300 km2

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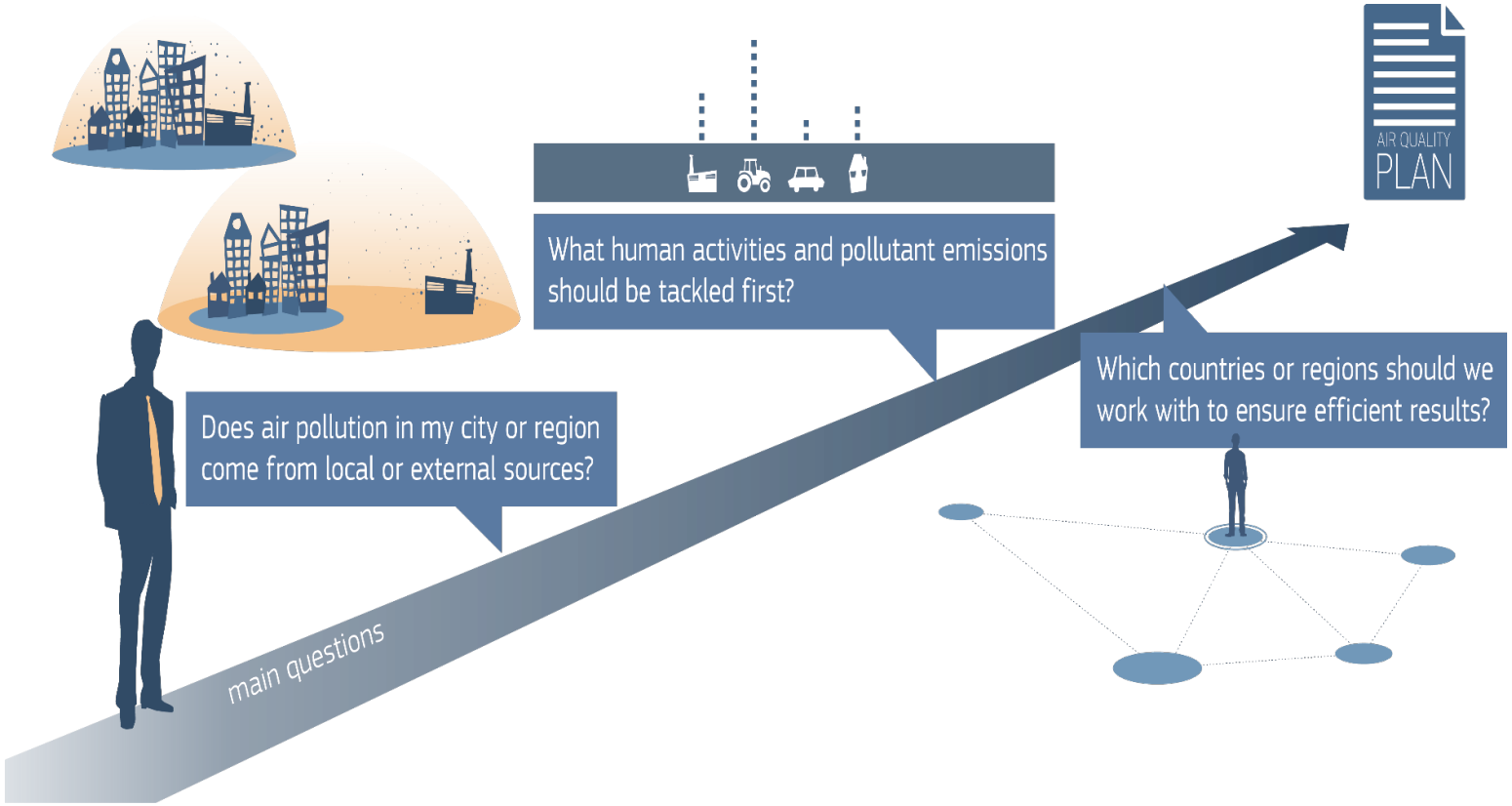
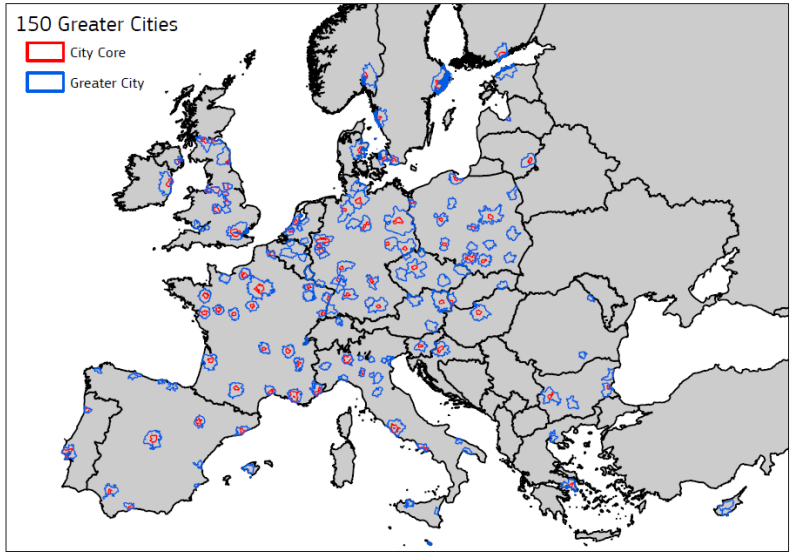
Outline

- The SHERPA-Cloud
- The Atlas results

The JRC PM2.5 urban atlas

to help local/regional policy makers design their air quality plans





150 cities (atlas)

+

550 cities (online)

10

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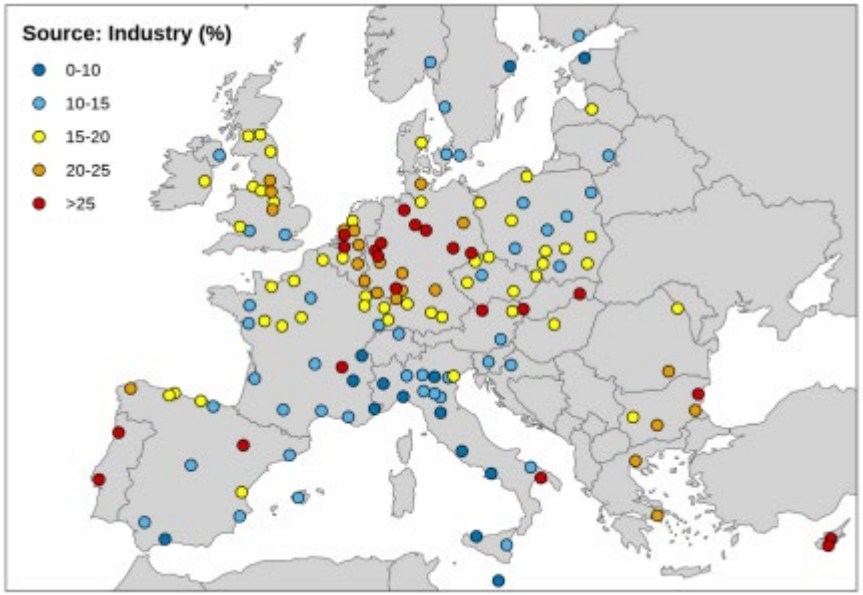
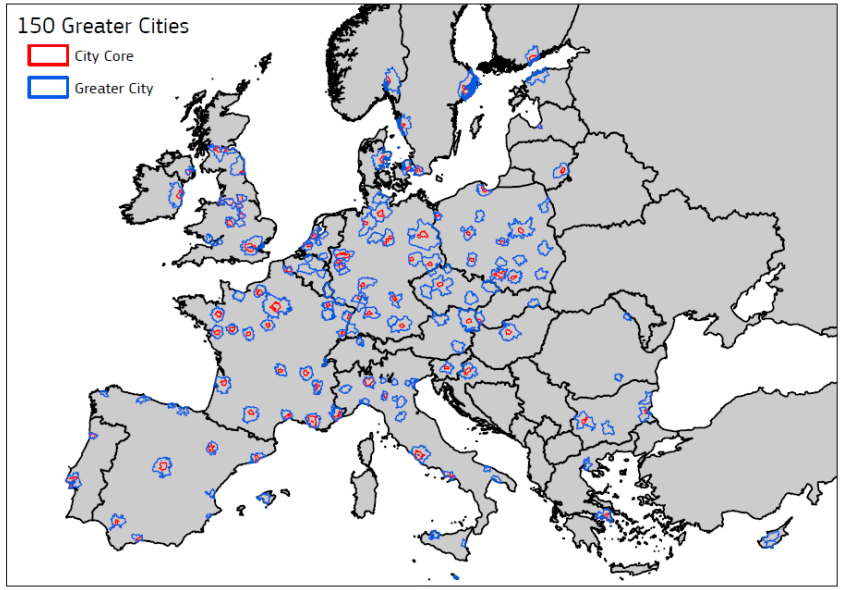
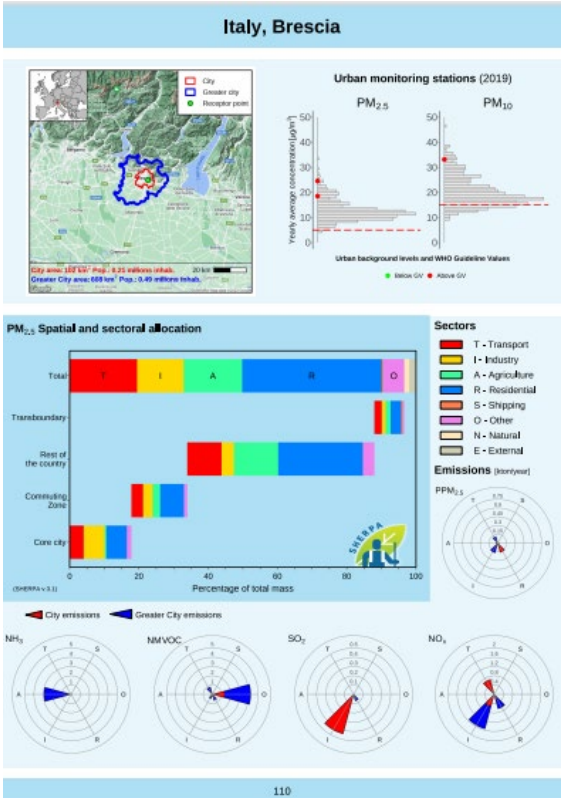
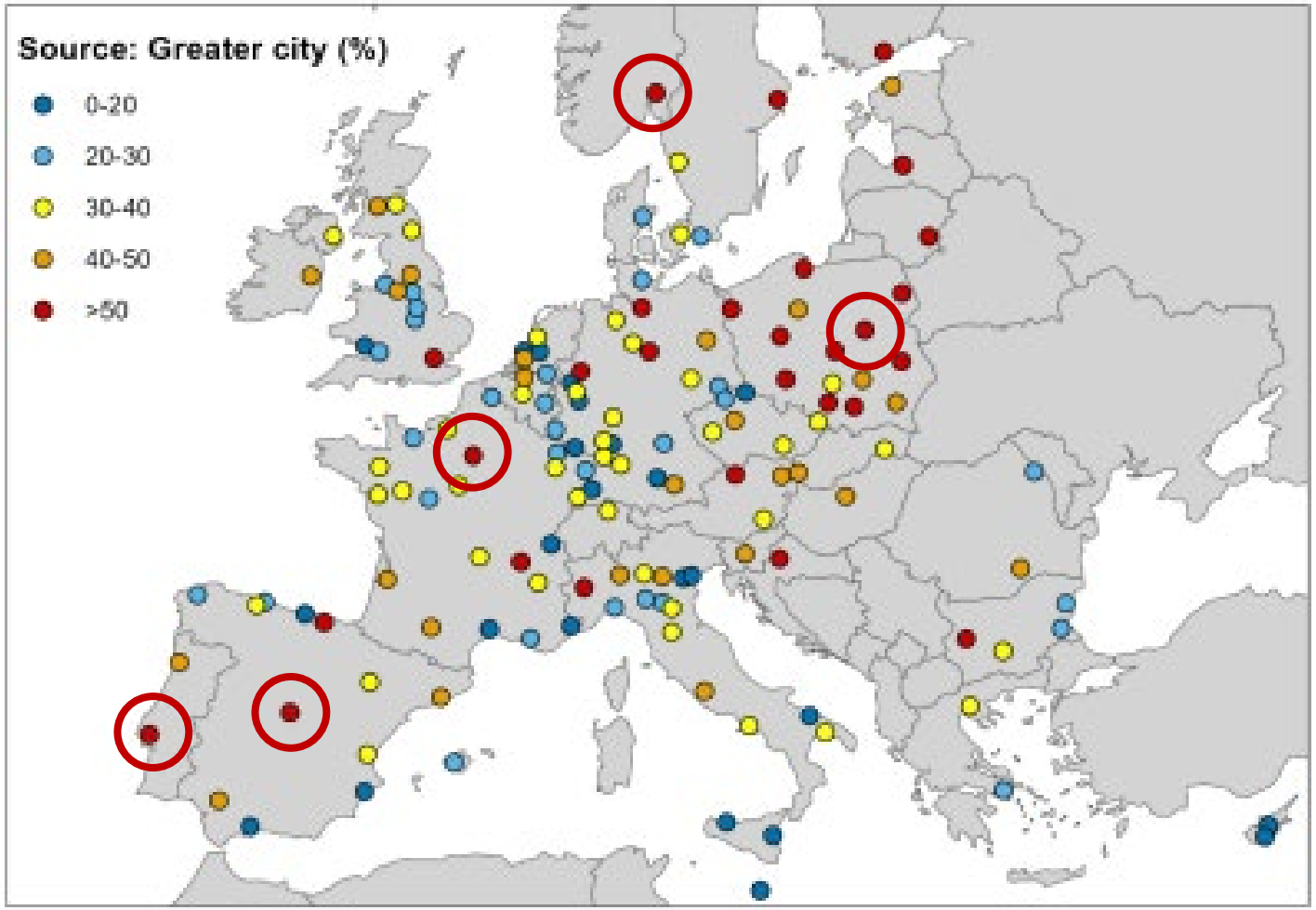
Two main visualisations







I - Local actions at the city scale are an effective means of improving air quality



In average cities (greater area) contribute to 36% of their pollution

Oslo (75%), Warszaw (72%), Lisbon(68%), Paris (65%), Madrid (63%)

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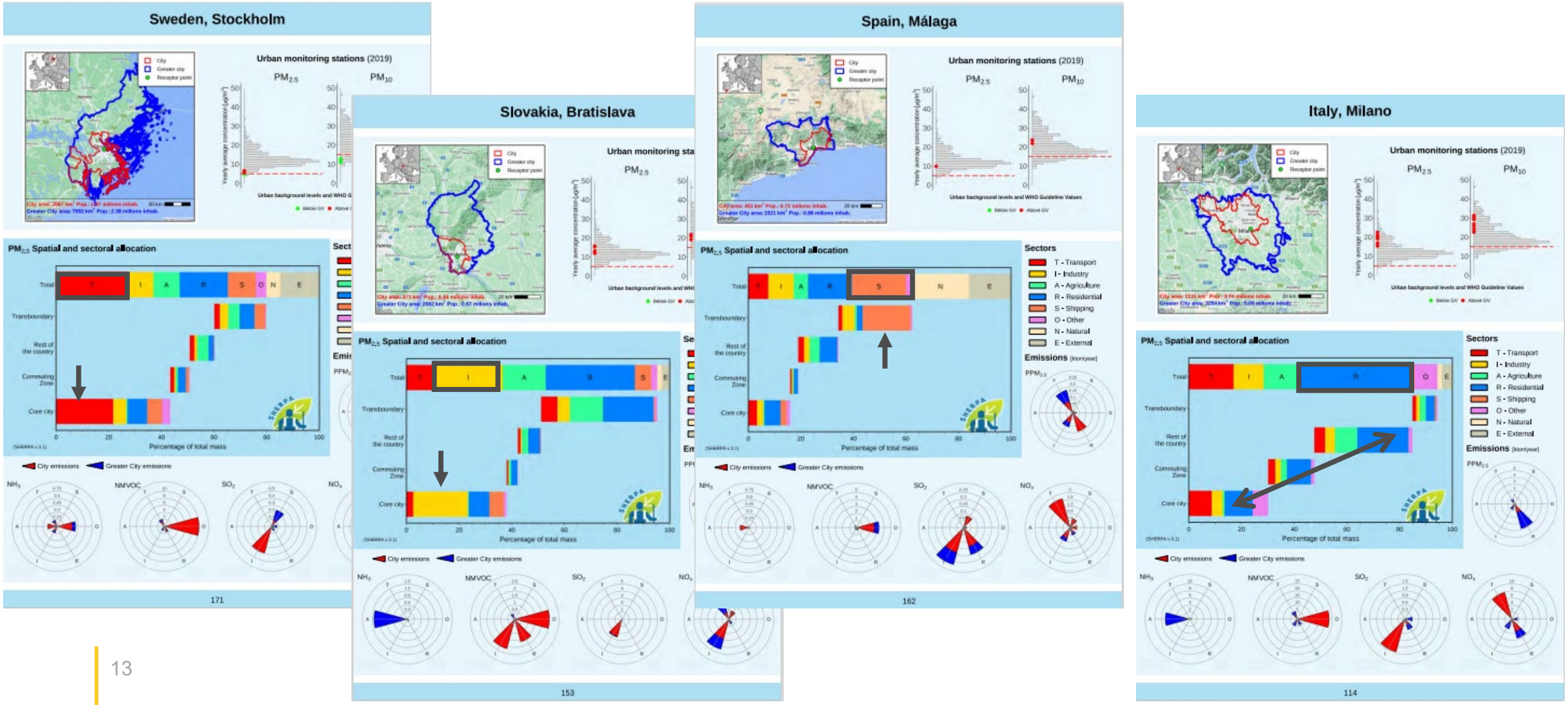
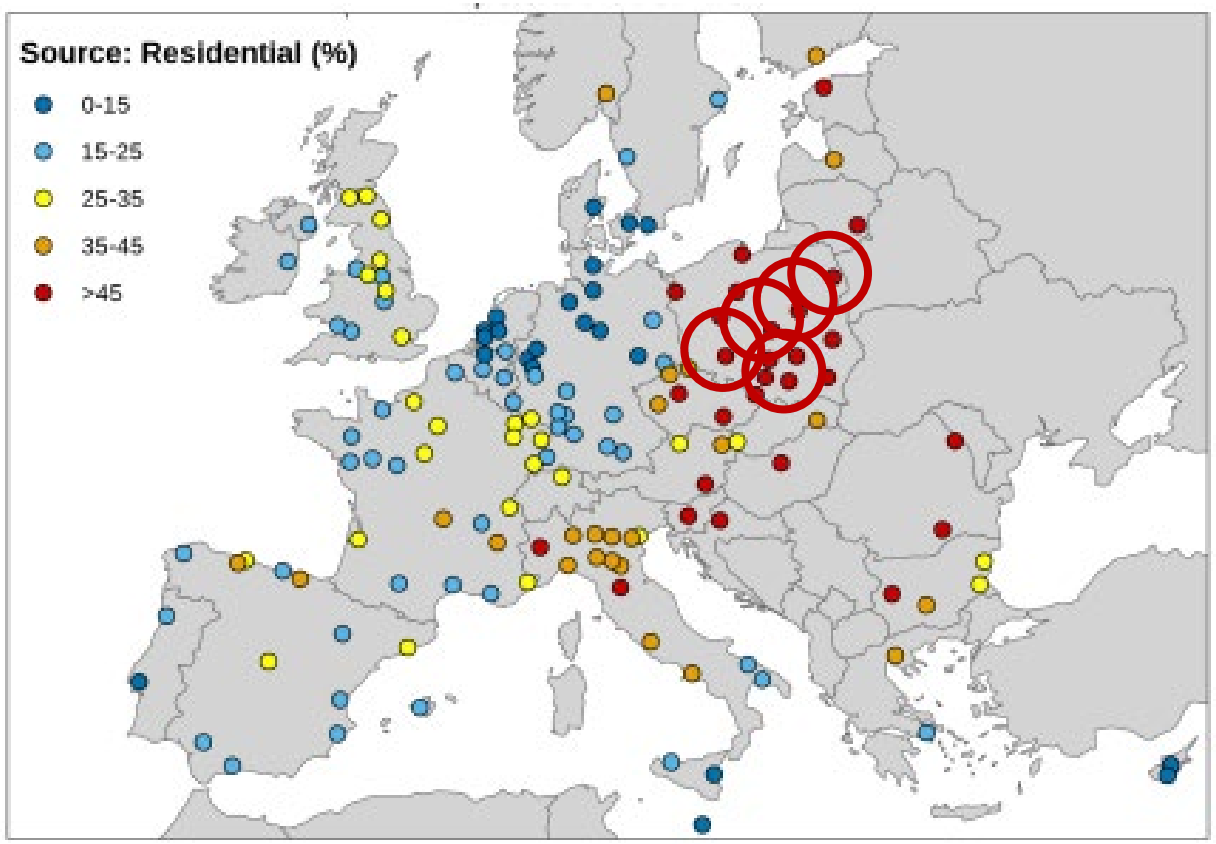
II - Target sectors and scales to abate air pollution are city specific



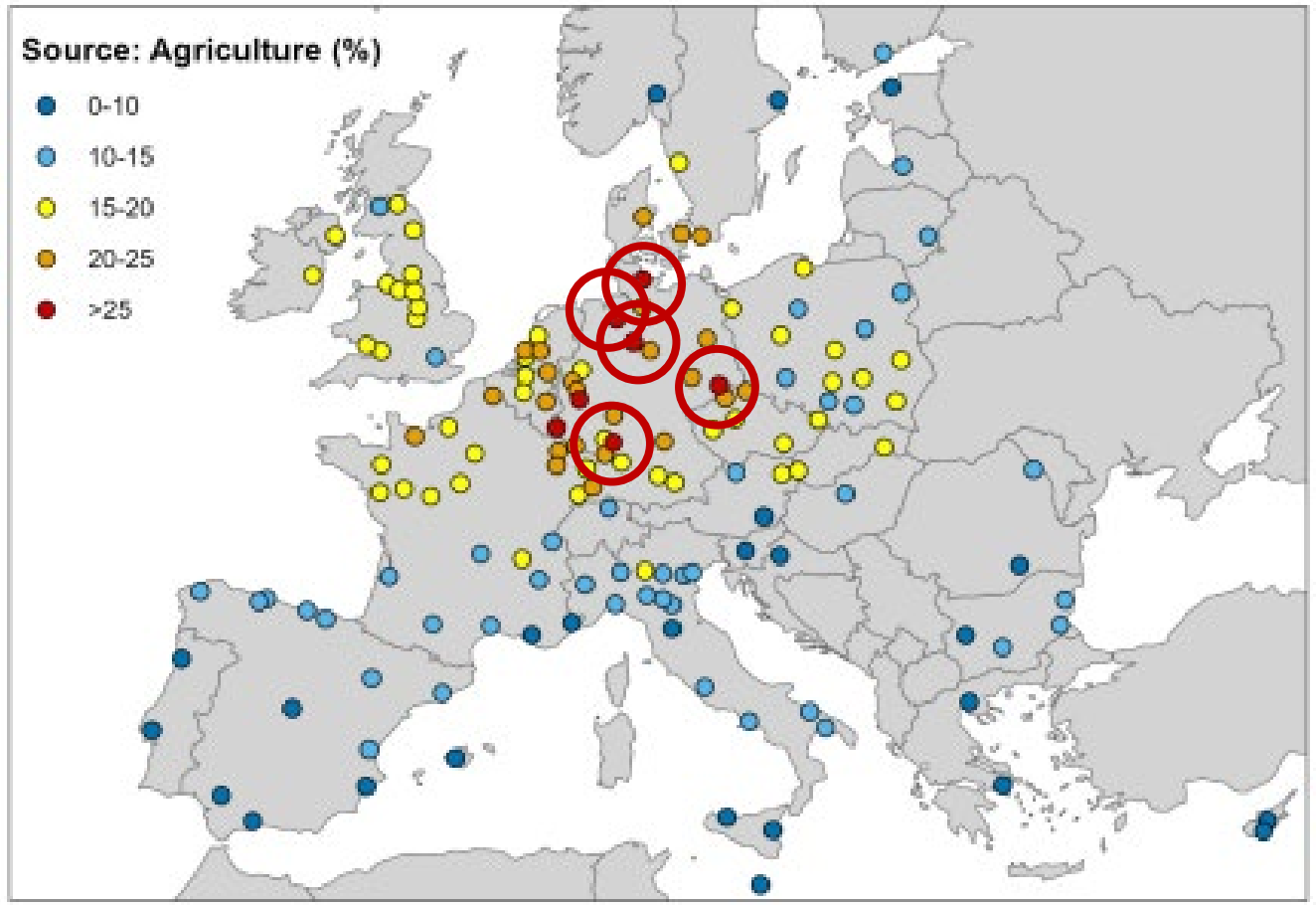
III - Measures addressing residential heating at the local level would be very effective



In average 30% of the PM2.5 pollution in cities originate from residential emissions

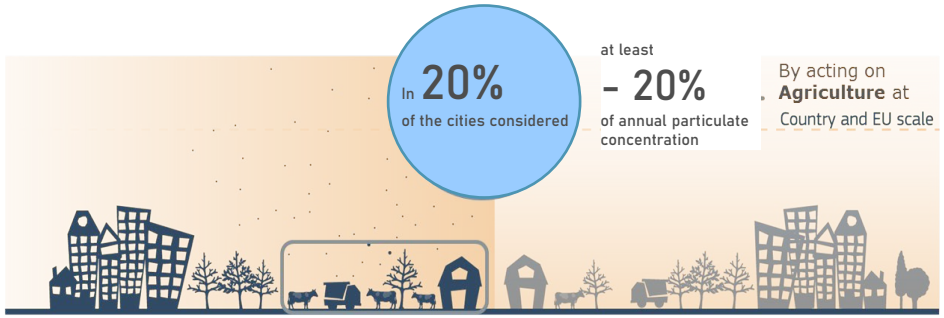
Warszaw (64%), Krakow (63%), Wroclaw (60%), Lodz (59%), Bialystok (59%)

IV - Measures addressing agriculture at country/EU scale would clearly benefit urban AQ



In average 15% of the PM2.5 pollution in cities originate from agriculture emissions

Kiel (28%), Hannover (27%), Heidelberg (27%), Dresden (27%), Bremen (26%)



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Conclusions

The SHERPA-Cloud has been updated and restructured, to provide users with different tools to simulate the impact of air quality policies, at subnational level

- Scenario analysis (including morbidity and mortality, cost and benefit)
- Sectoral allocation
    - On-the-fly sectoral-precursor source allocation (local, polygons)
    - On-the-fly sectoral-precursor source allocation (EU, squares)
    - PM2.5 Atlas, results for >700 cities

https://aqm.jrc.ec.europa.eu/Section/Sherpa/Background

https://jeodpp.jrc.ec.europa.eu/eu/dashboard/voila/render/SHERPA/Sherpa.ipynb

Conclusions

PM2.5 Atlas confirms main messages of the 2017 and 2021 versions:

- Local actions are efficient in most cities
- Abating agriculture emissions is efficient to improve urban air quality
- City specificities must be considered when designing plans
- Measures addressing residential heating at the local level would be very effective

https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/new-atlas-zooms-europes-city-specific-air-pollutants-sources-and-measures-take-2023-11-22_en

Thank you

EU Science Hub
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