Demonstration of JRC-SHERPA tool and applicability to China
JRC-SHERPA工具演示及其在中国的适用性

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March 04, 2021
2021年3月4日

SHERPA Demo
SHERPA工具演示

European Commission

Air Quality Model: CHIMERE | Spatial resolution: 7km | Governance Areas: NUTS | **SHERPA v.2.0-emep** | Help

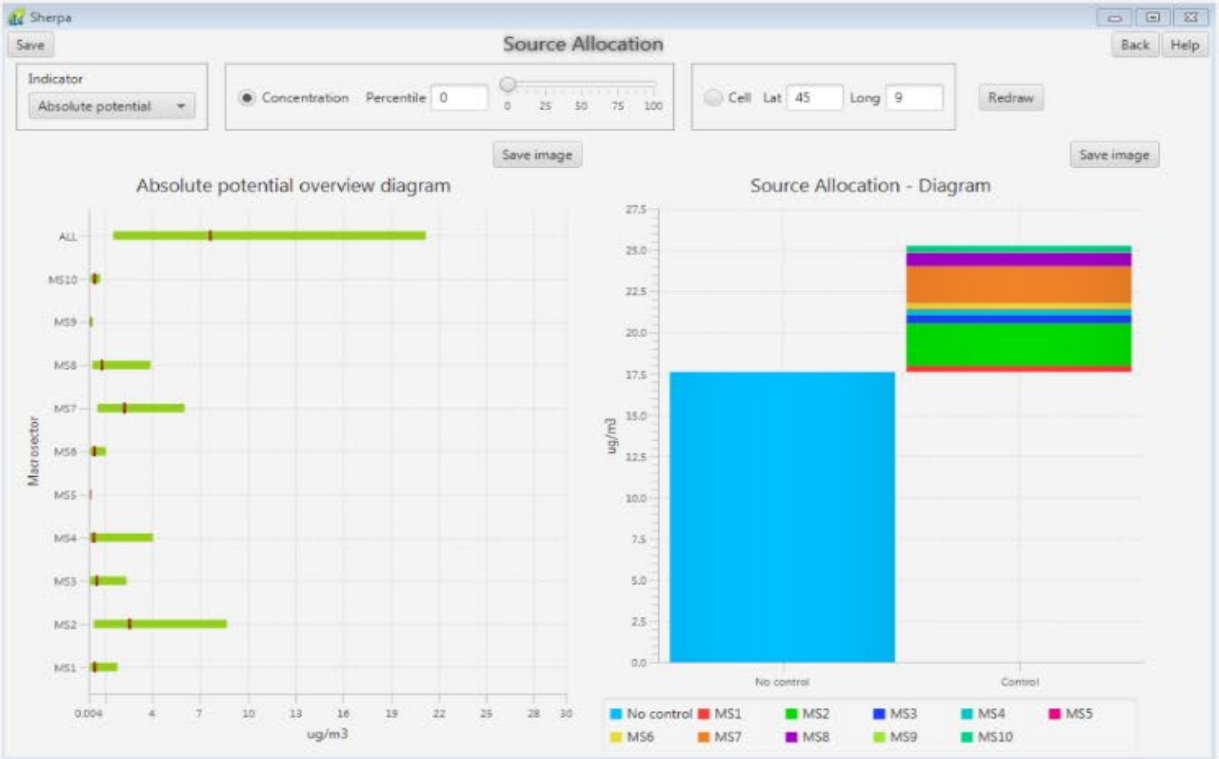
EMEP | 10km | FUA

SHERPA

Screening for High Emission Reduction Potential on Air

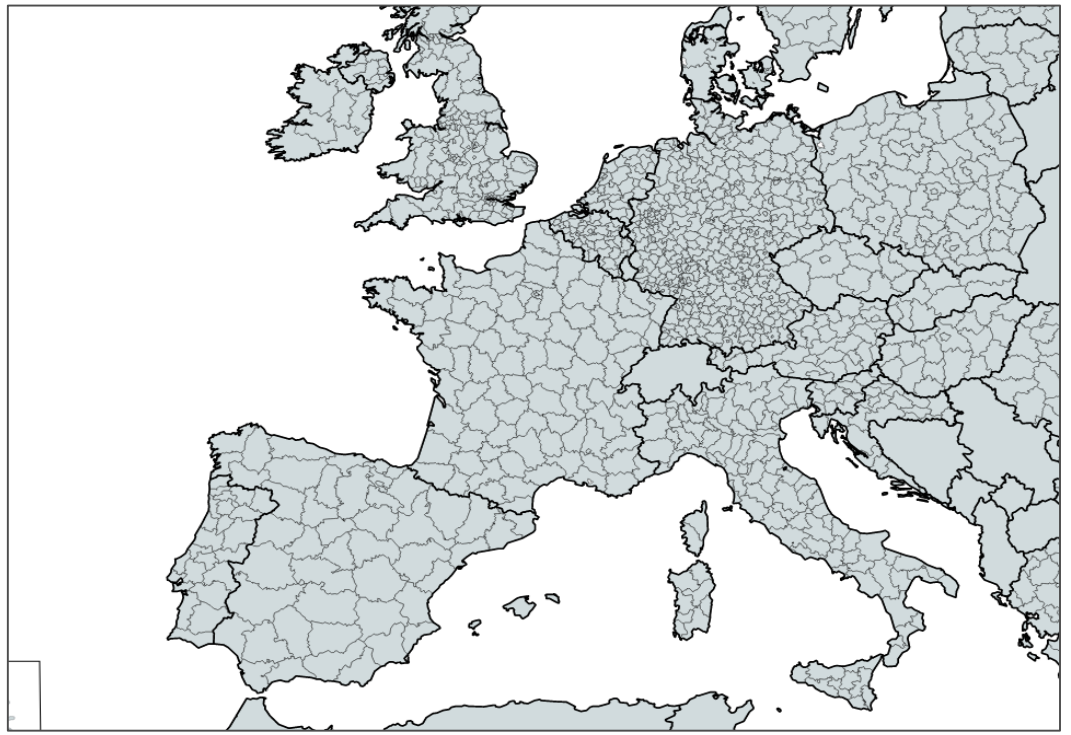
European Commission
Joint Research Centre

- Source Allocation
- Governance control area
- Scenario Assessment
- First guess RIAT+
- Support to e-Reporting



This module answers the following question:
What is relative contribution of the various emission sectors/precursors to the overall impact of an emission reduction strategy?
Based on a user selected control area where emission reductions are applied, SHERPA produces source apportionment estimates in terms of sectors and/or precursors

Spatial flexibility: city-core/FUA vs NUTS
空间灵活性：城市核心/FUA vs NUTS



FUA – City core
FUA – 城市核心

NUTS 0-1-2-3

European Commission

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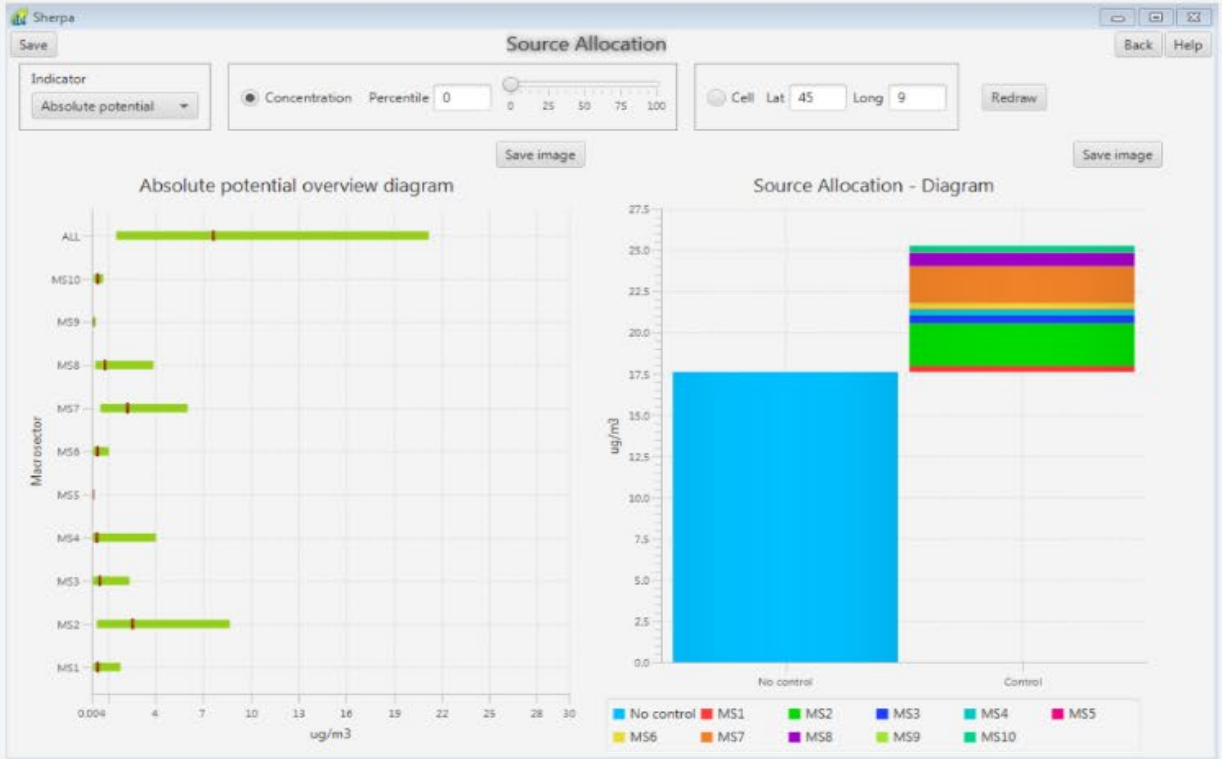

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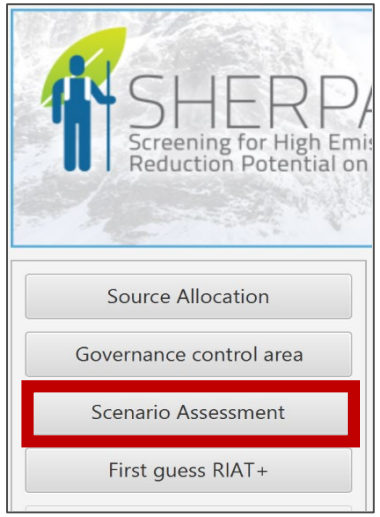
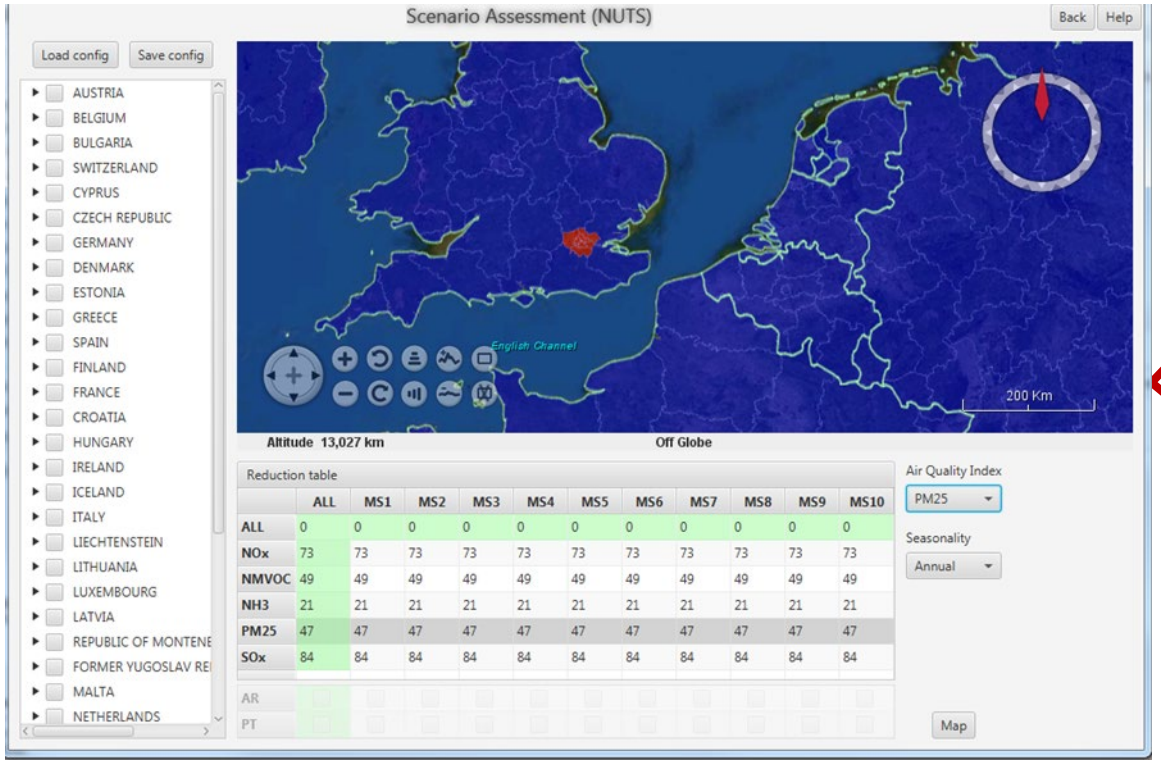
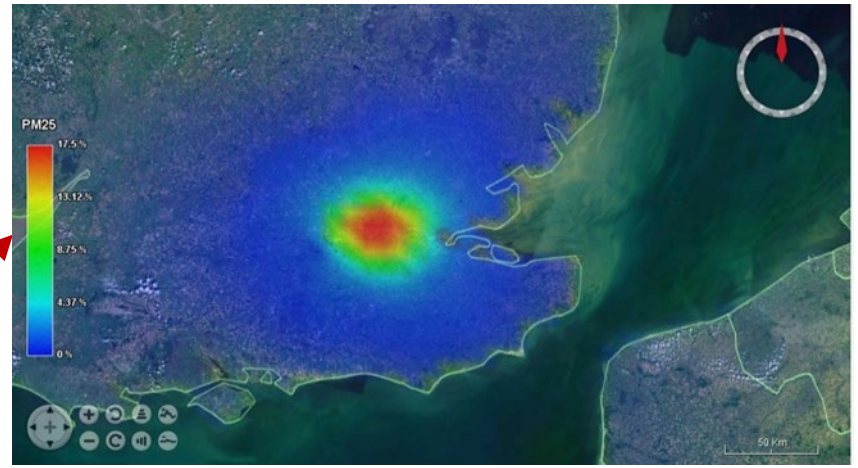
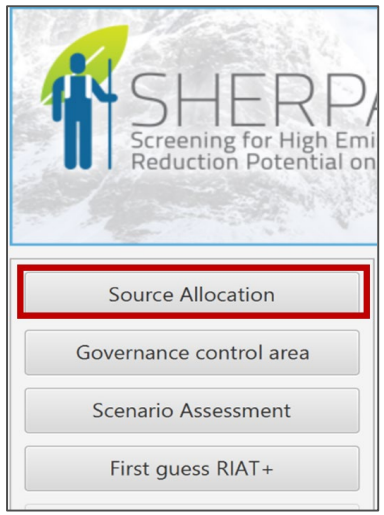

SHERPA
Screening for High Emis
Reduction Potential on
Source Allocation
Governance control area
Scenario Assessment
First guess RIAT+


Scenario Assessment (NUTS)
Back
Help
Load config
Save config
AUSTRIA
BELGIUM
BULGARIA
SWITZERLAND
CYPRUS
CZECH REPUBLIC
GERMANY
DENMARK
ESTONIA
GREECE
SPAIN
FINLAND
FRANCE
CROATIA
HUNGARY
IRELAND
ICELAND
ITALY
LIECHTENSTEIN
LITHUANIA
LUXEMBOURG
LATVIA
REPUBLIC OF MONTENE
FORMER YUGOSLAV RE
MALTA
NETHERLANDS
English Channel
200 Km
Altitude 13,027 km
Off Globe
Reduction table
ALL MS1 MS2 MS3 MS4 MS5 MS6 MS7 MS8 MS9 MS10
ALL 0 0 0 0 0 0 0 0 0 0 0
NOx 73 73 73 73 73 73 73 73 73 73 73
NMVOC 49 49 49 49 49 49 49 49 49 49 49
NH3 21 21 21 21 21 21 21 21 21 21 21
PM25 47 47 47 47 47 47 47 47 47 47 47
SOx 84 84 84 84 84 84 84 84 84 84 84
AR
PT
Air Quality Index
PM25
Seasonality
Annual
Map


PM25
17.5 %
13.12 %
8.75 %
4.37 %
0 %
50 Km


NUTS 3
17.28 %
12.96 %
8.64 %
4.32 %
0 %
London
20 Km


SHERPA
Screening for High Emi
Reduction Potential on
Source Allocation
Governance control area
Scenario Assessment
First guess RIAT+


Sherpa
Save
Source Allocation
Indicator
Relative potential
Concentration
Percentile
90.00
0 25 50 75 100
Cell
Lat
48.85
Long
2.35
Redraw
Save image
Save image
Relative potential - Overview diagram
Paris_FUA; PM25; NOx, NMVOC, NH3, PPM, SOx
ALL
MS10
MS9
MS8
MS7
MS6
MS5
MS4
MS3
MS2
MS1
Macrosector
0.01 7 13 19 25 31 37 43 49 55 60
%
Source Allocation - Diagram
Paris_FUA; PM25; NOx, NMVOC, NH3, PPM, SOx
100 95 90 85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0
%
No control
Control
No control MS1 MS2 MS3 MS4 MS5
MS6 MS7 MS8 MS9 MS10

SHERPA
Screening for High Emi
Reduction Potential on

Source Allocation

Governance control area

Scenario Assessment

First guess RIAT+

Sherpa

Save

Source Allocation

Indicator

Relative potential

Concentration Percentile 90.00 0 25 50 75 100

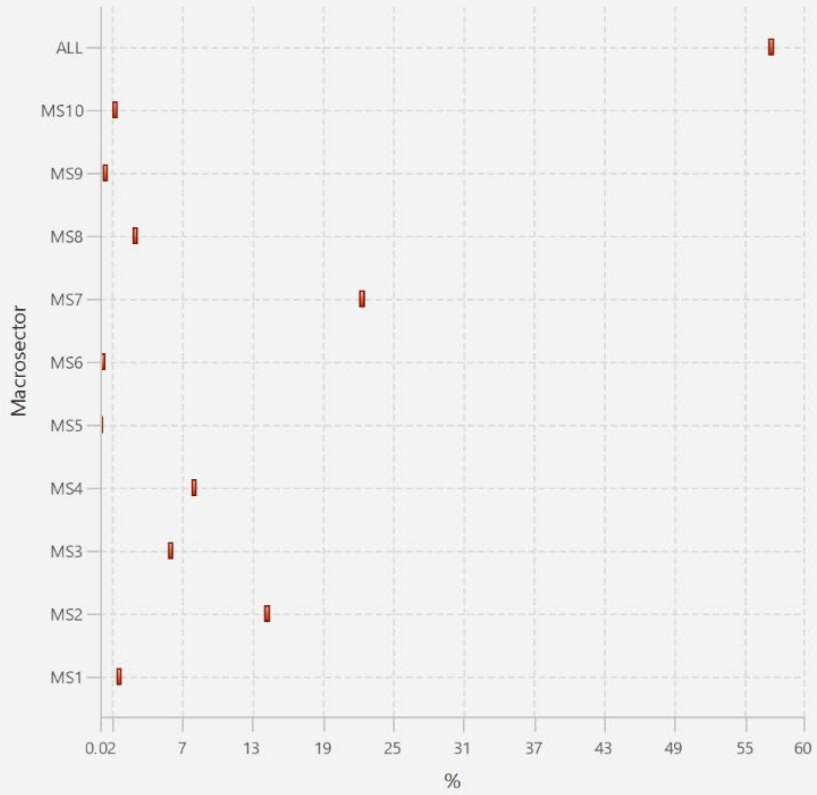
Cell Lat 48.85 Long 2.35

Redraw

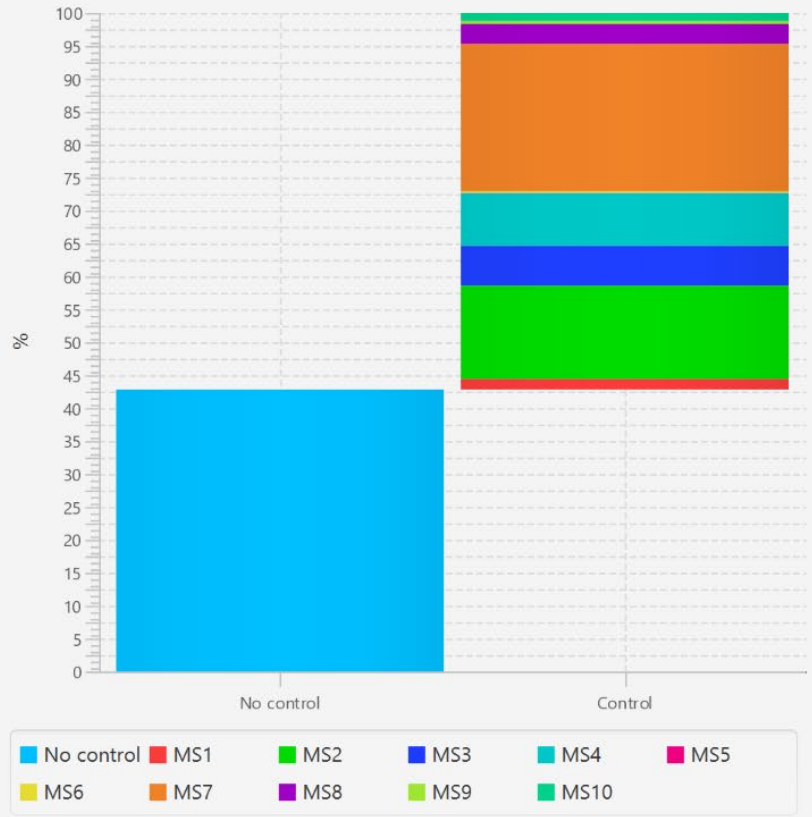
Save image

Save image

Relative potential - Overview diagram
Paris_FUA; PM25; NOx, NMVOC, NH3, PPM, SOx



Source Allocation - Diagram
Paris_FUA; PM25; NOx, NMVOC, NH3, PPM, SOx



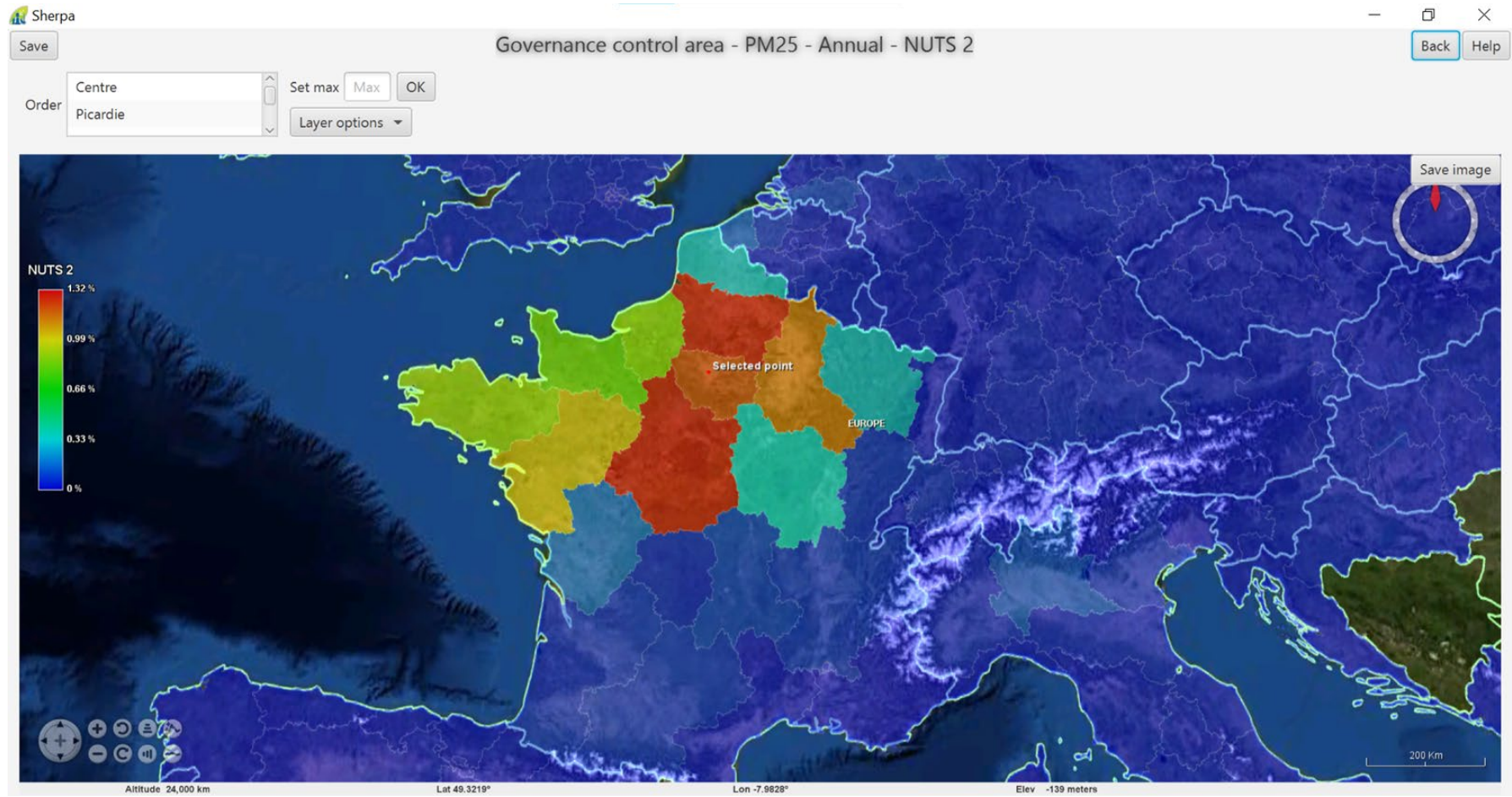
SHERPA
Screening for High Emis
Reduction Potential on

Source Allocation

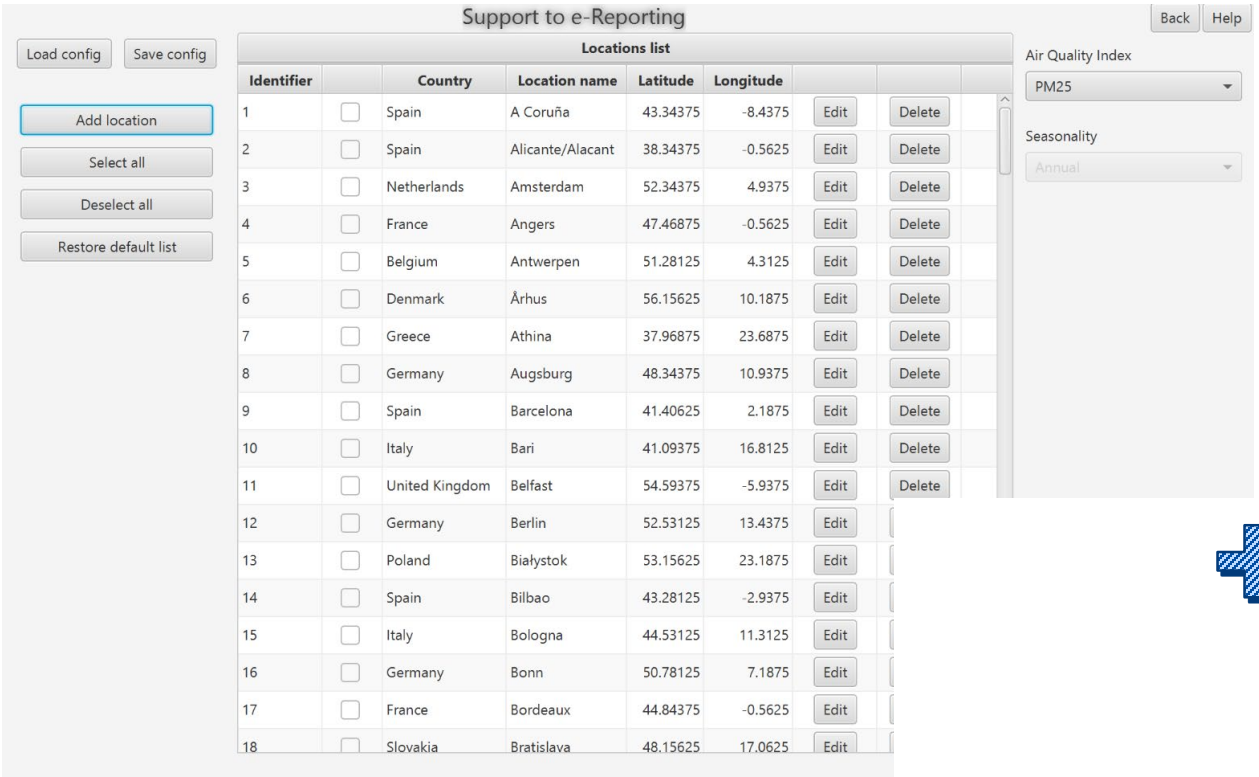
Governance control area

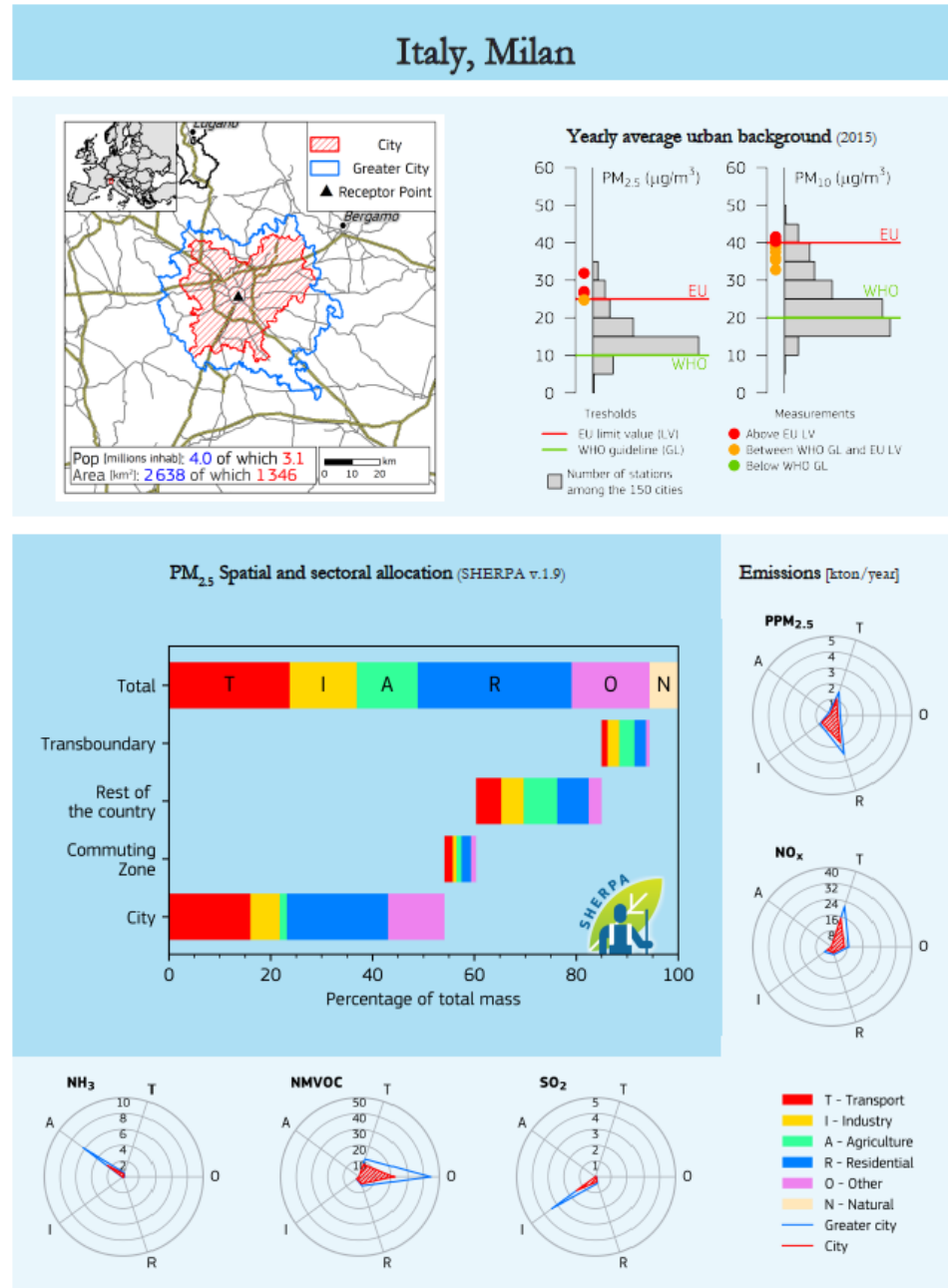
Scenario Assessment

First guess RIAT+




SHERPA
Screening for High Emi
Reduction Potential or
Source Allocation
Governance control area
Scenario Assessment
First guess RIAT+
Support to e-Reporting


Support to e-Reporting
Back
Help
Load config
Save config
Add location
Select all
Deselect all
Restore default list
Locations list
Identifier
Country
Location name
Latitude
Longitude
1 Spain A Coruña 43.34375 -8.4375 Edit Delete
2 Spain Alicante/Alacant 38.34375 -0.5625 Edit Delete
3 Netherlands Amsterdam 52.34375 4.9375 Edit Delete
4 France Angers 47.46875 -0.5625 Edit Delete
5 Belgium Antwerpen 51.28125 4.3125 Edit Delete
6 Denmark Århus 56.15625 10.1875 Edit Delete
7 Greece Athina 37.96875 23.6875 Edit Delete
8 Germany Augsburg 48.34375 10.9375 Edit Delete
9 Spain Barcelona 41.40625 2.1875 Edit Delete
10 Italy Bari 41.09375 16.8125 Edit Delete
11 United Kingdom Belfast 54.59375 -5.9375 Edit Delete
12 Germany Berlin 52.53125 13.4375 Edit
13 Poland Białystok 53.15625 23.1875 Edit
14 Spain Bilbao 43.28125 -2.9375 Edit
15 Italy Bologna 44.53125 11.3125 Edit
16 Germany Bonn 50.78125 7.1875 Edit
17 France Bordeaux 44.84375 -0.5625 Edit
18 Slovakia Bratislava 48.15625 17.0625 Edit
Air Quality Index
PM25
Seasonality
Annual


Italy, Milan
City
Greater City
Receptor Point
Bergamo
Pop [millions inhab]: 4.0 of which 3.1
Area [km²]: 2638 of which 1346
Yearly average urban background (2015)
PM2.5 (µg/m³)
PM10 (µg/m³)
EU
WHO
Tresholds
Measurements
EU limit value (LV)
WHO guideline (GL)
Number of stations among the 150 cities
Above EU LV
Between WHO GL and EU LV
Below WHO GL
PM2.5 Spatial and sectoral allocation (SHERPA v.1.9)
Total
Transboundary
Rest of the country
Commuting Zone
City
Percentage of total mass
Emissions [kton/year]
PPM2.5
NOx
NH3
NMVOC
SO2
T - Transport
I - Industry
A - Agriculture
R - Residential
O - Other
N - Natural
Greater city
City

SHERPA applicability to China
SHERPA 在中国的适用性

Joint
Research
Centre

SHERPA-China
SHERPA-中国

- Air quality model runs
  空气质量模型运行

- Training
  培训
  - Basecase
    基础案例
  - 5 scenarios reducing 50% precursors OAT
    减少50%前导OAT的5种场景
  - 1 scenario reduction 50% all precursors
    减少50%所有前导的1种场景

- Validation
  验证
  - Regional and sectoral scenarios (selected depending on your needs)
    地区和部门场景（根据您的需求选定）

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- Training and validation of SRR
  SRR的培训与验证

- Reformat input-output files from the air quality model
  重新定义空气质量模型输入-输出文件的格式
  - Emissions (yearly) – NOx, VOC, NH3, PPM, SO2
    排放（每年）– NOx、VOC、NH3、PPM、SO2
  - Concentrations (yearly, Apr-Sep aggregations) – PM10, PM2.5, NO2, O3
    浓度（每年，4月-9月累积总计）- PM10、PM2.5、NO2、O3

- Use python code to train and validate SRR
  使用python代码来培训和验证SRR
  - https://github.com/enricopisoni/SHERPA-training
  - https://github.com/enricopisoni/Sherpa

SHERPA-China
SHERPA-中国

- SHERPA simulation for policy' scenarios
  各种政策场景的SHERPA仿真模拟

- Apply SHERPA (GUI or python code) using a coherent set of:
  通过协调以下工具来应用SHERPA（GUI或python代码）：
  - Emissions
    排放量
  - SRR
  - Geographical entities definition
    地理实体的定义

- GUI is a Java tool (more complex to be adapted to a local application)
  GUI是一个Java工具（对于本地应用程序来说，使用起来更加复杂）

Thank-You
谢谢！

European Commission