Handover SHERPA

# PM2.5 Atlas: source apportionment calculations

Folder: handover\SHERPA\_PM25\_Atlas

## Python code

Folder: python\

The main script is ‘***atlas\_run\_em\_all.py***’ (renamed for handover, before called ‘fua112\_ run\_em\_all.py’). This script is a wrapper around the model6.py of the SHERPA tool. This module calculates the concentration change in one receptor cell due to the emission changes (defined in a config file) in an area (defined in a raster netcdf). The inputs are:

* The source receptor relations and the emissions. The paths to these are defined in *run\_configuration\model\_file.txt*
  + model\_name: a name for the run
  + ctm: the CTM used for training
  + pollutant: result pollutant
  + emission\_cdf: gridded emission per SNAP sector
  + concentration\_cdf: basecase concentrations
  + source\_receptor\_cdf: per cell the parameters of the SR relationship (alpha, omega)
  + cell\_surface\_cdf: path to a netcdf with the cell surfaces to convert emission density in emissions.
  + Some files are in 20170322\_v18\_SrrResults\_PotencyBased\ but the original script links to files on modelling2.
* city\_list\_fua150.txt: coordinates of the receptor cells, taken in the point with the highest concentration inside the city centre.
* reduction\_input\_files: These files have the same format as the sector-precursor reduction matrix in the GUI. In the code uncomment the one you want to use.There are several possibilities in subfolders:
  + reduction\_input\_files/allSNAP\_allPrec: 1 file reducing all emissions together
  + reduction\_input\_files/allSNAP\_perPrec: 5 files reducing each precursor for all sectors together
  + reduction\_input\_files/perSNAP\_allPrec: 10 files reducing all precursors of each sector
  + reduction\_input\_files/perSNAP\_perPrec: 50 files reducing each precursor-sector combination separately (used for the atlas)
* fua\_area\_cdfs/allAreas\_<CTM>/: path to the area netcdfs, for each cities the core zone, FUA, national and international domain

## Results

The results are stored in a folder results\ <date>\_perSNAP\_perPrec\_aggAreas\<date>\_sherpa\_chimere\_PM25\_perSNAP\_perPrec\_aggAreas.txt

The header contains information about the run (SR model,…), then results follow according to the type of emission reductions.

|  |
| --- |
| Source apportionment for 150 cities  commit BD handover version 23 March 2020  emissions cdf = ../20170322\_v18\_SrrResults\_PotencyBased/1\_base\_emissions/BC\_emi\_PM25\_Y.nc  concentrations cdf = ../20170322\_v18\_SrrResults\_PotencyBased/2\_base\_concentrations/BC\_conc\_PM25\_Y.nc  model folder = ../20170322\_v18\_SrrResults\_PotencyBased/3\_source\_receptors/SR\_PM25\_Y\_20170322\_potencyBased.nc  model;pollutant;target;source;snap;precursor;potential;relative\_potential;potency;target\_conc\_basecase;delta\_conc;DE  sherpa\_chimere;PM25;Cardiff;Cardiff\_City;10;NH3;5.091447e-02;4.532277e-01;7.341683e-04;1.123375e+01;2.545724e-02;3.467493e+01  ... |

* The file results\20171006\_perSNAP\_perPrec\_aggAreas\_Atlas\ 20171006\_sherpa\_chimere\_PM25\_perSNAP\_perPrec\_aggAreas.txt was used for the PM25 Atlas. The script that makes the barplots was made by E. Peduzzi, PhD.
* A test was done on 23/3/2020. Results are here: results\20200323\_perSNAP\_perPrec\_aggAreas\ 20200323\_sherpa\_chimere\_PM25\_perSNAP\_perPrec\_aggAreas.txt

## Auxiliary scripts

The grid intersects (netcdf with areas of city core, FUA,...) where made in a PostGIS database. That’s maybe not the best way to do it. Rather slow.

# SHERPA-CHIMERE versus SHERPA-EMEP

# SHERPA SR optimization with MCMC