Users manual

Delta_Emis Tool V2.0

C. Cuvelier

kees.cuvelier@jrc.ec.europa.eu
kees.cuvelier@yahoo.fr
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1. Introduction

The Delta_Emis analysis/visualization tool is an IDL-based tool developed in the framework of FAIRMODE – Working Group 2 on Emissions. It is designed to screen and benchmark emission inventories, especially to compare bottom-up and top-down estimates at the country, regional and city scale.
For general information we refer to the JRC DELTA website:

http://aqm.jrc.ec.europa.eu/DELTA/

and the FAIRMODE website:

http://fairmode.jrc.ec.europa.eu/

2. Download and installation - The Delta_Emis

EB – Emis_Benchmark, Folder structure

Goto the Delta website:

http://aqm.jrc.ec.europa.eu/DELTA/

Register or log in, follow the instructions for the download of the Delta_Emis Tool
The folder structure is as follows, where 'Emis_Benchmark' stands for the 'Home' directory:

…\Emis_Benchmark\delta_emis.sav

…\Emis_Benchmark\EBInput\

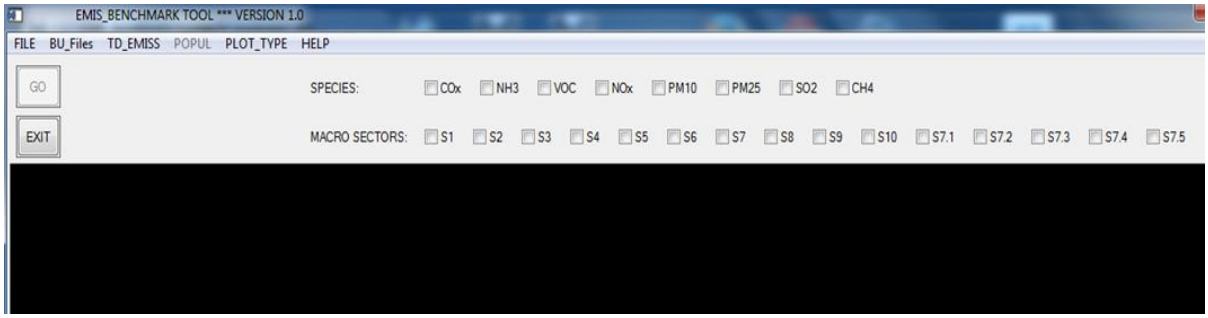
…\Emis_Benchmark\Help\

…\Emis_Benchmark\Output\

…\Emis_Benchmark\UserInput\

Here 'delta_emis.sav' is the IDL executable file to be run using the icon on the desktop.
The directory 'EBInput' contains all the Delta_Emis fixed input data (see Section 3).
The directory 'Help' contains specific files - both input and output (see Section 10).
The directory 'Output' contains all the output files.
The directory 'UserInput' contains all user defined input regarding emissions and shapefiles (see Section 4).

A double click on the icon and a 'Continue' will start the Tool's opening window. Click on 'ENTER' and the Tool is ready for use. A snapshot of part of the opening window is shown here, where we see the 8 admissible pollutants (see Section 3.a), and the 15 admissible SNAP emission sectors (see Section 3.a):



3. Delta_Emis input data:

a. Emission inventories

Two European TopDown emission inventories are available in the Tool for comparison with the user defined BottomUp information for Countries, Regions and Cities. Both inventories consider the following pollutants:

CO_x, NH_3, VOC, NO_x, PM_{10}, $PM_{2.5}$, SO_2, CH_4

SNAP sectors S1, S2,…, S10 are considered. For the TNO-MACC, and the JRC7km inventory the SNAP sector S7 is disaggregated into S7.1,…,S7.5.

EC4MACS inventory (http://www.ec4macs.eu/)
This inventory is defined on a regular 842 x 779 cell longitude-latitude grid with resolution of 0.125^o x 0.0625^o and origin (-44.375^o, 29.875^o) (Centre of lower left cell). Emissions are available for the SNAP sectors S1,S2,…,S10. Emissions of CH_4 are not available and emissions in the sectors S7.1,…,S7.5 are set equal to zero.
The reference year for EC4MACS is 2009.

TNO-MACC2 and TNO-MACC3 inventories (ref: Kuenen et al. (2014))
This inventory is defined on a regular 720 x 672 cell longitude-latitude grid with resolution of 0.125^o x 0.0625^o and origin (-29.7395^o, 30.0313^o) (Centre of lower left cell).
Emissions for CH_4 are available as well as emissions for the sectors S7.1,…,S7.5. These are subsectors of S7 and defined as follows:

- S7.1 – Exhaust emission of Gasoline road transport
- S7.2 – Exhaust emissions of Diesel road transport
- S7.3 – Exhaust emissions of LPG transport
- S7.4 – non-Exhaust volatilization (Only VOC emissions)
- S7.5 – non-Exhaust Brake wear, Tyre wear, Road wear

TNO-MACC2 is implemented for the years 2003,…,2009, TNO-MACC3 for the years 2000, …, 2011. After selection of the user input file, the TNO-MACC inventory is selected which is closest in years to the user reference year.

TNO-MACC has a combined SNAP sector 3 and 4: TNO-MACC sector S3 is equal to SNAP S3+S4, and TNO-MACC sector S4 is empty.

JRC7km inventory (ref:, http://)

This inventory is defined on a regular 782 x 592 cell longitude-latitude grid with resolution of 0.0625^{o} x 0.0625^{o} and origin (-10.4063^{o}, 34.0625^{o}) (Centre of lower left cell). The reference year for this inventory is 2010. Emissions for CH_4 are not available, in Sector 6 there are only VOC emissions; no emission for CO_x, NH_3, NO_x, SO_2 in Sector 5. As for the TNO-MACC inventories, JRC7km has a combined SNAP sector 3 and 4: JRC7km sector S3 is equal to SNAP S3+S4, and JRC7km sector S4 is empty.

See next Table:

	CO_x	NH_3	VOC	NO_x	PM_{10}	$PM_{2.5}$	SO_2	CH_4
S1	x	x	x	x	x	X	x	
S2	x	x	x	x	x	X	x	
S34	x	x	x	x	x	X	x	
S5			x		x	X		
S6			x					
S8	x	x	x	x	x	X	x	
S9	x	x	x	x	x	X	x	
S10	x	x	x	x	x	X	x	

Sector 7 is the sum of the subsectors 7.1, …, 7.5 (see above for definitions). The subsector S7.6, which is not used in the Tool, consists of emissions from Natural Gas and H2 fueled vehicles. Within these subsectors the available emissions are indicated in the next Table:

	CO_x	NH_3	VOC	NO_x	PM_{10}	$PM_{2.5}$	SO_2	CH_4
S7.1	x	x	x	x	x	X	x	
S7.2	x	x	x	x	x	X	x	
S7.3	x	x	x	x	x	X		
S7.4			x					
S7.5					x	X		
S7.6	x	x	x	x	x	X	x	

b. Shapefiles

For 39 Countries, 428 Regions, and 477 Cities, default shape files have been defined, each consisting of a set of polygonal vertices (longitude, latitude) defining the sub areas. The shape files have the following generic names:

shape_*CntrC*.dat (example: shape_FRA.dat)

shape_*CntrC*-Region-*RegC*.dat (example: shape_FRA-Region-IDF.dat)

shape_*CntrC*-City-*CityC*.dat (example: shape_FRA-City-Paris.dat)

For the Country, Region, and City codes we refer to section 3.c.

Country/Region/City shape files have the following structure:

Example: shape_FRA.dat
Line 1: Country Code
Line 2: The shape consists of Nparts (6) subshapes
Line 3 and on: For each subshape the polygonal vertices are given by
lon number of vertices (898 for 1st subshape)
lat number of vertices

Example: shape_FRA-Region-IDF.dat
Line 1: Region Code [FRA-IDF] (Nparts=1, 74 vertices)
etc

Example: shape_FRA-City-Paris.dat
Line 1: City Code [FRA-Paris] (Nparts=53; Nvertices=7 for 1st subshape)
etc

c. Country, Region, City codes and names

CRC_Codes.dat:

This file contains all the Country/Region/City codes of type:
FRANCE FRA
FRA-Region-IDF
FRA-City-Paris

CRC_Names.dat

This file contains information on available Countries, for each Country the available regions, and for each Country the available cities
Example (see above): IDF -> Ile de France

d. Population Files

One of the diagrams (TD_BU_emisCap) shows emission quantities per capita. Two population files are used – one on the EC4MACS inventory grid, the other on the TNO-MACC grid. Both population files are based on the INERIS 1x1 km^2 European Population density file (ref XXX).
The INERIS file can be replaced by the 1x1 km^2 EEA population densities (ref XXX), but Balkan states and some others are missing [Should be complemented with a 5x5 km^2 population grid. [to be done]

e. Ranking Files

One of the diagrams (TD_BU_emisCap) shows for each (user) pollutant and for each (user) macro sector the position of its emissions per capita (on the user shape) with respect to all type (Country, Region, City) related geographical default shapes available in the EBInput directory (see Section 3.b). In a preprocessing phase emissions for all pollutants, for all 15 SNAP sectors, were calculated on all the default shapes (Country, Region, City). These files are available from the EBInput directory and are named

'emisAll*xxx_type*.dat, where *xxx* stands for EC4macs, or MACC*_2006, etc, and *type* for Country, Region, or City. The corresponding *pop* files contain the population numbers on each of the Country, Region, and City default shapes.

4. Delta_Emis User input: csv input files, shapefiles

All user bottom-up emission information is contained in an excel (csv format) file of the following structure:
Name of the file must start with 'BU_' and be of csv type
(example: BU_Fra-Paris_info.csv)

First section (first line):

- The number of sub-shape files (>=0). Equal to n (n>1) if the emission domain under consideration is composed of n sub-shape files;
  Equal to 0 if the region is defined by a sequence of longitude-latitude coordinates.
- The type of domain. The domain can be of Country, Region, or City type
- Identifier whether the shape file(s) are of default type 'dat' (i.e. if taken from the Delta_Emis data base, see section 3.b), or of type 'shp' (i.e. defined by the user). A user defined shape file (of type 'shp') should be an ESRI standard shape file in a longitude-latitude coordinate system (e.g. wgs84).

Second section (n lines):

- The first line is followed by n lines with the n sub-shape file names (e.g. 'FRA-City-Paris') which form together the emission domain.
  In the case of a 'dat' type shape file, the sub-shape name is completed to shape_NAME.dat (e.g. 'shape_FRA-City-Paris.dat'). Shape files of this type must exist in the EB Input data – Shapefiles directory (see section 3.b).
  In the case of a 'shp' type shape file the name of the sub-shape is completed to 'shape_NAME.shp' and should be provided by the user and put into the User Input directory together with the provided csv (excel) file. The shape_NAME.shp file goes together with the corresponding shx, dbf, prj files (ESRI conventions).
- If the domain is defined by longitude and latitude values (number of shape files equal to 0 in first line), the second line contains the Country Code (see example 4 below).

Third section (one line):

- This line contains the reference year of the user bottom-up emissions.

Forth section:

- Lines with: Species, User defined short name of the emission macro sector; User defined long name of the emission macro sector; Correspondance of the macro sector to the SNAP sectors (S1, S2,…, S10, S7.1, S7.2,…, S7.5); The emissions in kTon/year.

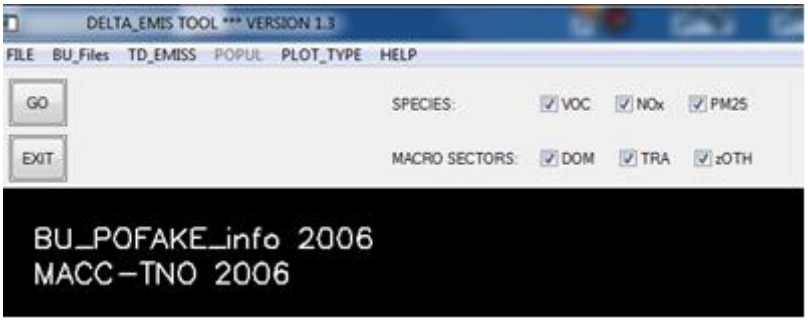
Keep the abbreviation of the macro sector short, because this identification will appear on the diagrams.
The correspondence to the SNAP sectors can be of arithmetic type, like S1+0.5*S2+0.75*S10+0.5*S7.1 The minus sign is not allowed, nor other multiplication factors than decimal numbers, nor other arithmetic operations.

Last line:

- END

After selection of the (user) BU input file, the list of species and the list of (user) macro sectors on the screen will adapt themselves. The user can make his own choice by unchecking or checking the desired species and the desired macro sectors. But before, a number of checks will be performed to ensure the correctness of the input file. If an error is detected in the input file, a window is opened with the error information, and a way is shown for correction.

Example of BU_POFAKE_info.csv



Some (fictive) examples of user input files (see also the UserInput directory of the Tool)

Example 1: BU_Fra-Paris_info.csv

Shape	1	City	Dat	Shape Nr of shapes Country/Region/City: Type of shape shp or dat: ESRI type or dat type shape
FRA-City-Paris		# Name of the shape files. See list of Country/Region/City identifiers		
2006		# Reference year		
#Species	BU sectors abbreviation	BU sectors nomenclature	Correspondance with SNAP	Domain Total kTon/year
NOx	DOM	Domestic	S2	30
NOx	TRA	Traffic	S7	300
NOx	zOTH	Others	S1+S4+S5+S6+S3+S8+S9+S10	116
PM25	DOM	S2	S2	10
PM25	TRA	S3	S7	11
PM25	zOTH	Others	S1+S4+S5+S6+S3+S8+S9+S10	12

VOC	DOM	S2	S2	25
VOC	TRA	S3	S7	140
VOC	zOTH	Others	S1+S4+S5+S6+S3+S8+S9+S10	350
END				

Example 2: BU_PoValley_info.csv

Shape	7	Region	Dat	
ITA-Region-VDA				
ITA-Region-PMN				
ITA-Region-LMB				
ITA-Region-TAA				
ITA-Region-VEN				
ITA-Region-FVG				
ITA-Region-ERM				
2006				
#Species	BU sectors abbreviation	BU sectors nomenclature	Correspondance with SNAP	Domain Total kTon/year
NOx	DOM	Domestic	S2	30
NOx	TRA	Traffic	S7	300
NOx	zOTH	Others	S1+S4+S5+S6+S3+S8+S9+S10	116
PM25	DOM	S2	S2	10
PM25	TRA	S3	S7	11
PM25	zOTH	Others	S1+S4+S5+S6+S3+S8+S9+S10	12
VOC	DOM	S2	S2	25
VOC	TRA	S3	S7	140
VOC	zOTH	Others	S1+S4+S5+S6+S3+S8+S9+S10	350
END				

Example 3: BU_France_info.csv

Shape	1	Country	Dat	
FRA				
2006				
#Species	BU sectors abbreviation	BU sectors nomenclature	Correspondance with SNAP	Domain Total kTon/year
NOx	S2	Domest	S2	5
NOx	S7	Traffic	S7	60
NOx	S1	Others	S1	12
PM25	S2	Domest	S2	2
PM25	S7	S7	S7	2
PM25	S1	Others	S1	1
VOC	S2	Domest	S2	5
VOC	S7	S7	S7	45
VOC	S1	Others	S1	0.5

END				

Example 4: BU_FakeSpanishDomain_info.csv

Shape	0	Region	Dat	
ESP		If nr shapes = 0 then give Country Code		
lon	-5.,-3.,-3.,-5.	If nr shapes = 0 then # longitudes of polygonal vertices		
lat	39.,39.,41.,41.	If nr shapes = 0 then # latitudes of polygonal vertices		
1999				
#Species	BU sectors abbreviation	BU sectors nomenclature	Correspondance with SNAP	Domain Total kTon/year
NOx	TRAc	TrafficCars	S7.1+S7.2	10
NOx	DOM	Domestic	S2	1
NOx	PTS	PointSources	0.5*S3+S1	40
NOx	OTH	Others	0.5*S3+S4+S5	9
VOC	TRAc	TrafficCars	S7.1+S7.2	14
VOC	DOM	Domestic	S2	8
VOC	PTS	PointSources	0.5*S3+S1	0.5
VOC	OTH	Others	0.5*S3+S4+S5	2
END				

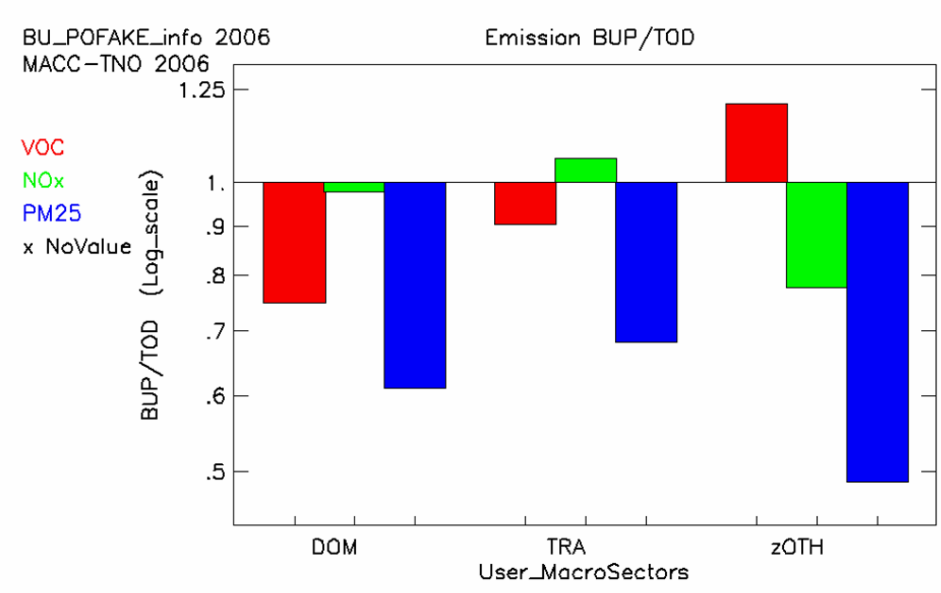
Example 5: BU_ Flanders_info.csv

Shape	2	Region	Shp	
FlandersWest_LL		# refers to ESRI shapefile: FlandersWest_LL.shp		
FlandersEast_LL		# refers to ESRI shapefile: FlandersEast_LL.shp		
2006				
#Species	BU sectors abbreviation	BU sectors nomenclature	Correspondance with SNAP	Domain Total kTon/year
NOx	DOM	Domestic	S2	30
NOx	TRA	Traffic	S7	300
NOx	zOTH	Others	S1+S4+S5+S6+S3+S8+S9+S10	116
PM25	DOM	S2	S2	10
PM25	TRA	S3	S7	11
PM25	zOTH	Others	S1+S4+S5+S6+S3+S8+S9+S10	12

5. Delta_Emis diagrams

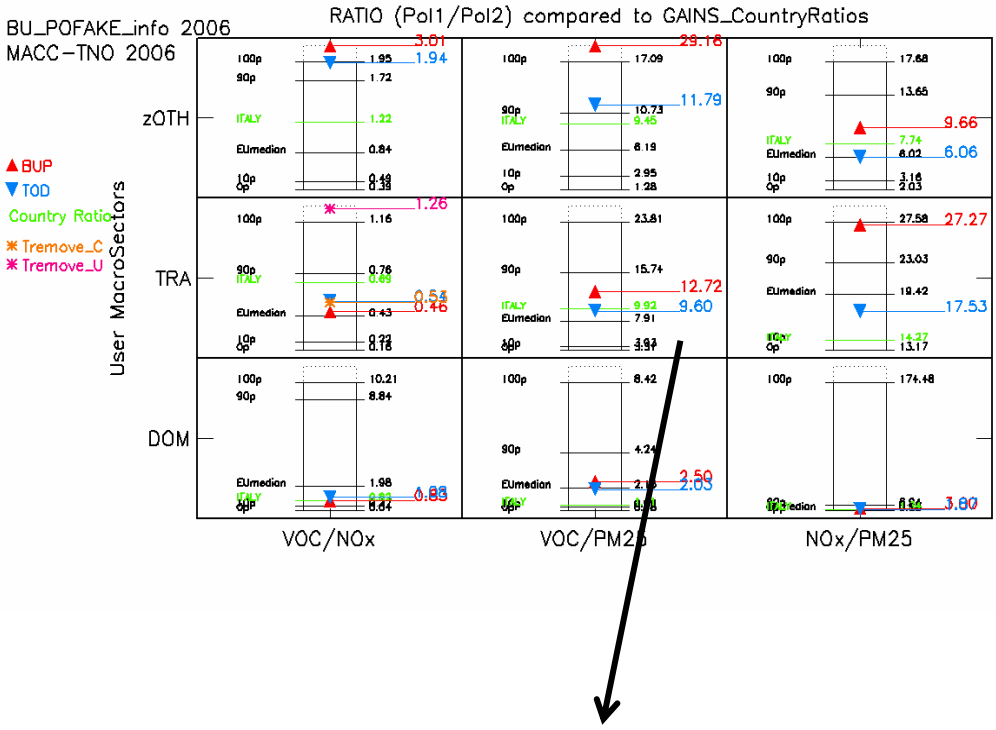
Diagrams for BU_POFAKE_info are now shown with short explanation

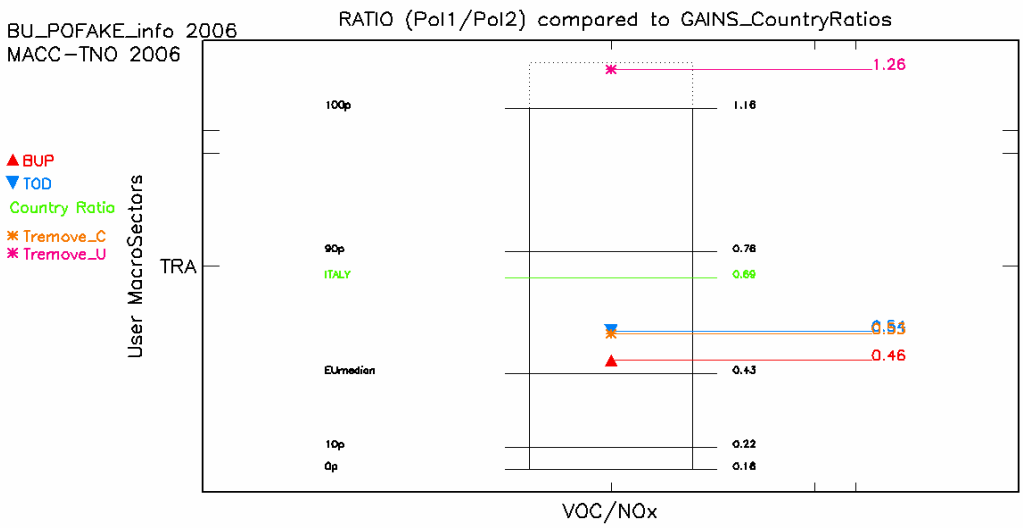
a. TD_BU_bar



For the selected species and for the selected (user) macro sectors, this plot shows the ratios of BottomUp emissions to TopDown emissions. Note that the vertical scale is logarithmic.

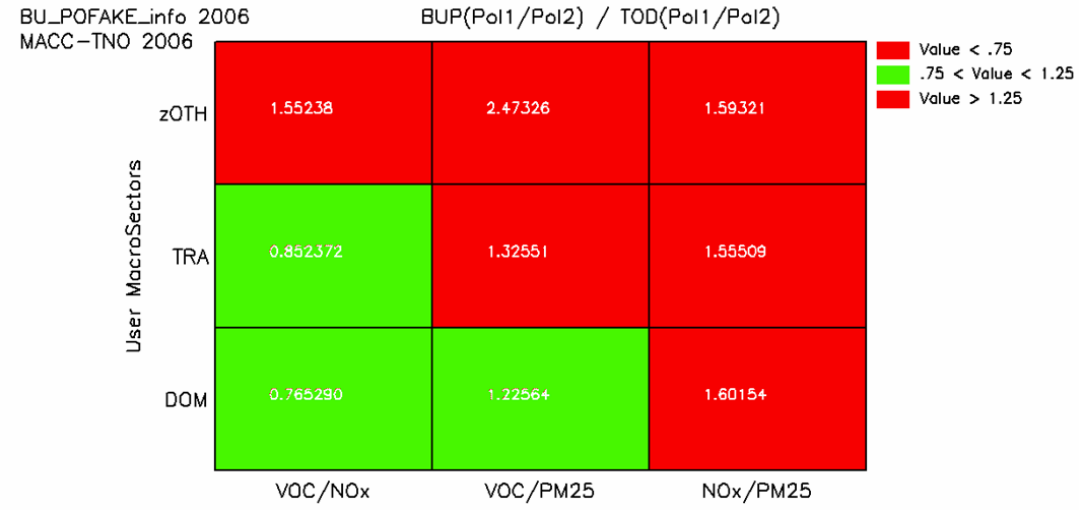
b. TD_BU_ratio





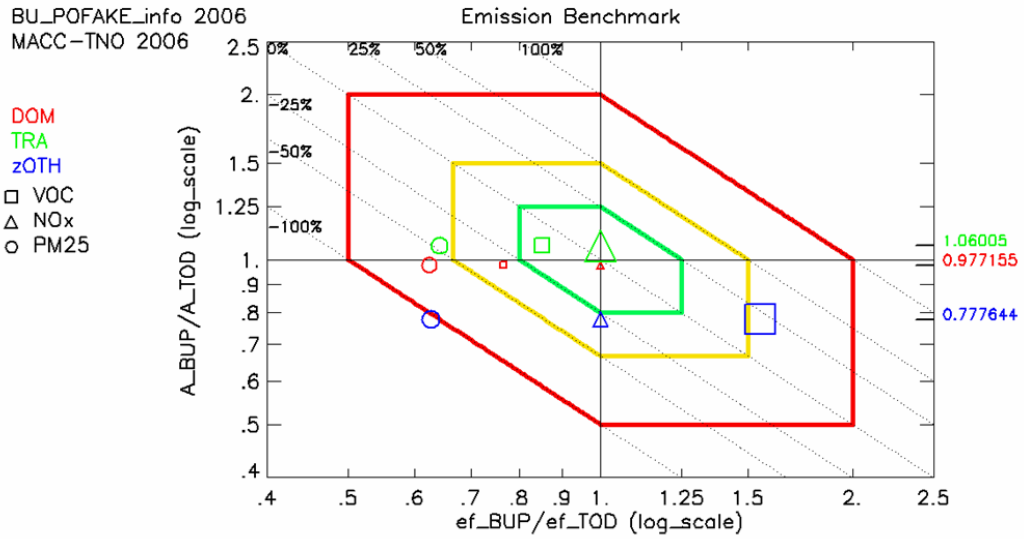
For the selected species and for the selected (user) macro sectors, this plot shows the ratios of Pollutant1 to pollutant2 (Pol1/Pol2). The red triangle represents the (user) BottomUp value, while the blue triangle shows the TopDown value of the ratio. Besides these triangles, the diagram also shows the range of GAINS Country values for the ratio ranging from the Country with the lowest value (0 percentile) to the Country with the largest value (100 percentile), as well as the EU median value and the value for the Country for the shape under consideration.

c. TD_BU_ratio2



For the selected species and for the selected (user) macro sectors, this plot shows the ratio of ratios for Pollutant1 to pollutant2 (i.e. BottomUp(Pol1/Pol2)/ TopDown(Pol1/Pol2). Values between 0.75 and 1.25 are coloured in green; outside this range in red. [value 0.75, 1.25 to be discussed]

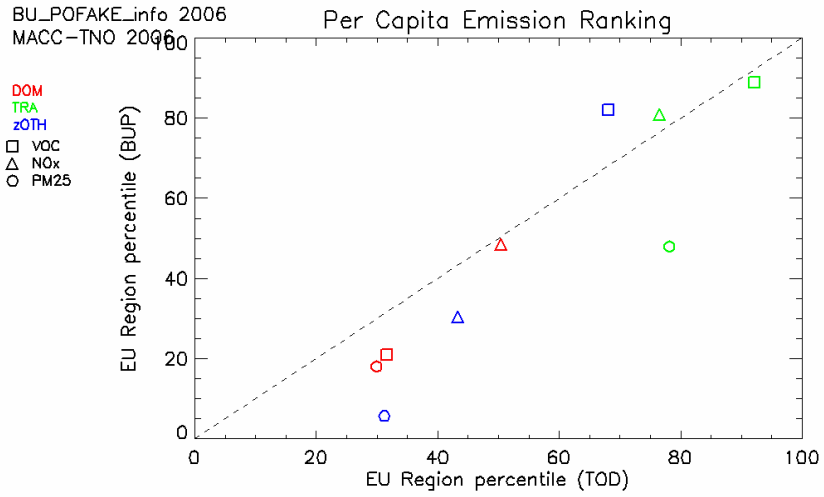
d. TD_BU-diamond



Activity- vs Emission Factor diagram. The X and Y axis indicate the discrepancies between the BottomUp and TopDown inventories in terms of emission factor and activity rate, respectively. The diagonal isolines are indicative of discrepancies in terms of total emissions. The coloured isolines delimitate the areas where the three factors: emission totals, activity rate and emission factors are all fulfilling a given threshold (e.g. red one for a factor 2 threshold). The size, shape and color of the symbols refer to the magnitude of the discrepancies, to the pollutant and to the (user) macro sector, respectively. Ref XXX.

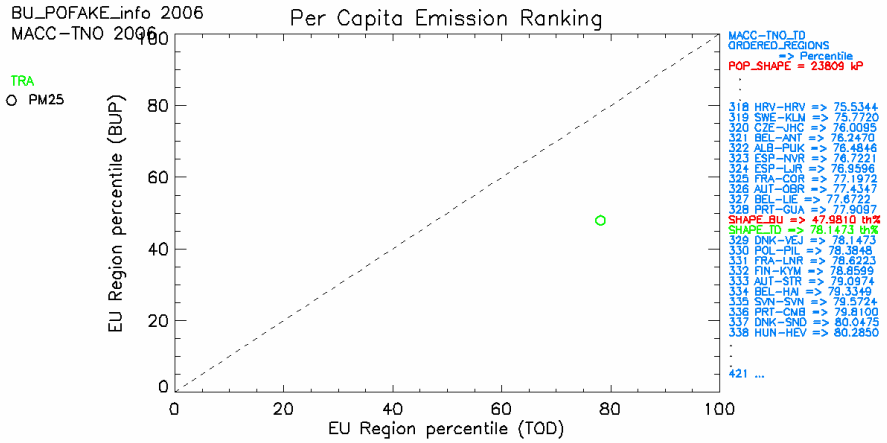
e. TD_BU_emisCap

f.



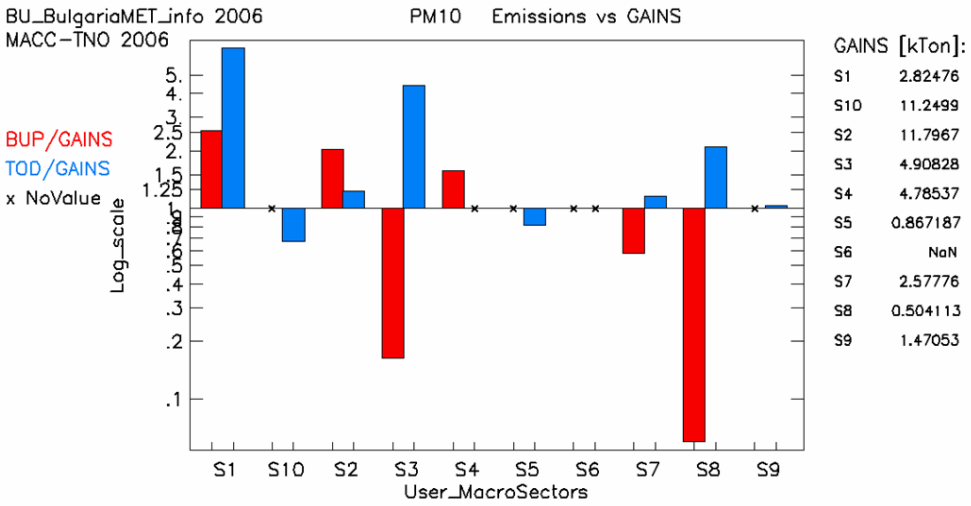
Depending on the geographical type (Country, Region, City), the x and y axis represent the sequence of emissions per capita for the (user) macro sectors, for the

selected species, and for all the default shapes of the same type – running from 0 percentile to 100 percentile. The axis always run from 0 to 100, but the underlying ranking of geographical shapes is species and macro sector dependent. The x-axis gives the TOD percentile, the y-axis the BUP percentile.



This diagram is the same as the previous one, but for one species (PM_{25}) and for one sector (TRA). The corresponding ranking of shapes ordered by emissions per capita on the default shapes is partly shown on the right-hand side of the picture, with the (user BU) shape percentile in red, and the TD percentile in green. The total population (in kPers) on the (user) shape is indicated above in red. The full ranking of default shapes can be edited from the 'PercOrderShapes' option in the 'HELP' droplist (see Section 10.e).

g. TD_BU_GAINS



This diagram shows, for one selected species, the ratios of BottomUp and TopDown to GAINS country values. BUP/GAINS and TOD/GAINS are shown in red and blue bars on a logarithmic scale, while the absolute GAINS country values for the (user) macro

sectors are tabled on the right. GAINS values are available every 5 years from 2000 until 2030; for intermediate years the GAINS values are linearly interpolated.

6. 'FILE' droplist

a. SaveImage_Wbgr: Saves the diagram (with White background) into a tiff file in the 'Output' directory. File name is 'PICT_ED_n.tif', with n equal to 1,2,3,…

b. SaveImage_Bbgr: Same as before with Black background

c. DumpData: Dumps all information and the numeric data of the diagram into the dumpfile, named 'DumpData.dat' in the 'Output' directory. Subsequent calls to 'DumpData' will add new info/data to the dumpfile (i.e. no overwrite). The contents of the dumpfile can be edited from the 'EditDump' option in the 'HELP' droplist (see Section 10.f).

d. DumpTOD: Part of the TOD emission inventory is dumped into the file 'dumpTOD.dat' in the 'Output' directory. The part of the TOD inventory is a rectangle (longitude – latitude) containing all the shapes which constitute the domain. Longitude values, Latitude values are dumped as well as all the cell emissions for all the active pollutants and all the user macro sectors.

7. 'BU_Files' droplist

User BU* files can be selected from the BU_Files droplist. These files are grouped by type: Country, Region, City. At any time the selected BU file can be edited from the 'BU_UserInput' option in the 'HELP' droplist (see Section 10.a)

8. 'TD_Emiss' droplist

Four European TopDown emission inventories are available in the Tool: EC4MACS (reference year 2009), TNO-MACC2 (for reference years 2003,…,2009), TNO-MACC3 (for reference years 2000,…,2011), and JRC7km (with reference year 2010). Switching between these inventories is done in the TD_Emiss droplist.
Remember that EC4MACS does not have CH_4 and no sectors S71,…,S7.5; TNO-MACC does have CH_4 as well as the subsectors of S7, but has a combined sector 3 and 4, where TNO-MACC sector S3 is equal to SNAP S3+S4, and TNO-MACC sector S4 is empty. JRC does not have CH_4, and a combined sector S3+S4.

9. 'PLOT_TYPE' droplist

In this droplist a choice can be made for the various diagrams (see Section 5):

a. TD_BU_bar

b. TD_BU_ratio

c. TD_BU_ratio2

d. TD_BU_diamond

e. TD_BU_emisCap

f. TD_BU_GAINS (only for Country type)

10. 'HELP' droplist

a. BU_UserInput: Edit the user BU file (see Section 3)

b. Macro=> SNAP: Correspondance between the User defined macrosectors and the SNAP sectors.

c. CRC_Codes: Edit Country/Region/City codes for which default shapefile are available (see Sections 3.b, 3.c).

d. CRC_Names: Edit full names of Country/Region/City codes (see Section 3.c)

e. PercOrderShapes: Edit the full ranking of default shapes with the corresponding percentiles produces by the TD_BU_emisCap diagram in the case of one species and one sector (see the second diagram in Section 5.e). For the situation of diagram 5.e (TRA sector, PM_{25}) the file contains the following quantities for the 421 Region shapes:

Ranking number – Percentile -- TopDown Emissions [Tons] -- Population [kPers]

```
Ranking EMIS_Benchmark
Fri Nov 28 16:42:06 2014
EB Input File = BU_POFAKE_info  2006  (type=Region)
Emission Inventory = MACC-TNO  2006
Spec=PM25   Sector=TRA
*****************************************************************

Nr  SHAPE =>                 %                 Emiss [Ton}      Pop [kP]
    Region  =>               47.9810           11000.0          23809
1   MDA-Region-MDA =>        0.237530          413.336          4219.95
2   CHE-Region-BST =>        0.475059          20.9256          193.132
3   CHE-Region-GLR =>        0.712589          7.48687          60.2000
4   GRC-Region-IIS =>        0.950119          30.5256          212.657
5   ROM-Region-BTS =>        1.18765           66.1176          446.670
6   ROM-Region-IAS =>        1.42518           120.652          798.398
7   DEU-Region-BER =>        1.66271           494.504          3266.93
8   ROM-Region-BAC =>        1.90024           118.907          775.928
9   GRC-Region-AIS =>        2.13777           67.0570          436.144
10   ROM-Region-GOR =>        2.37530           59.1113          377.977
11  …..
12  …..
-
-
-
421 ……
```

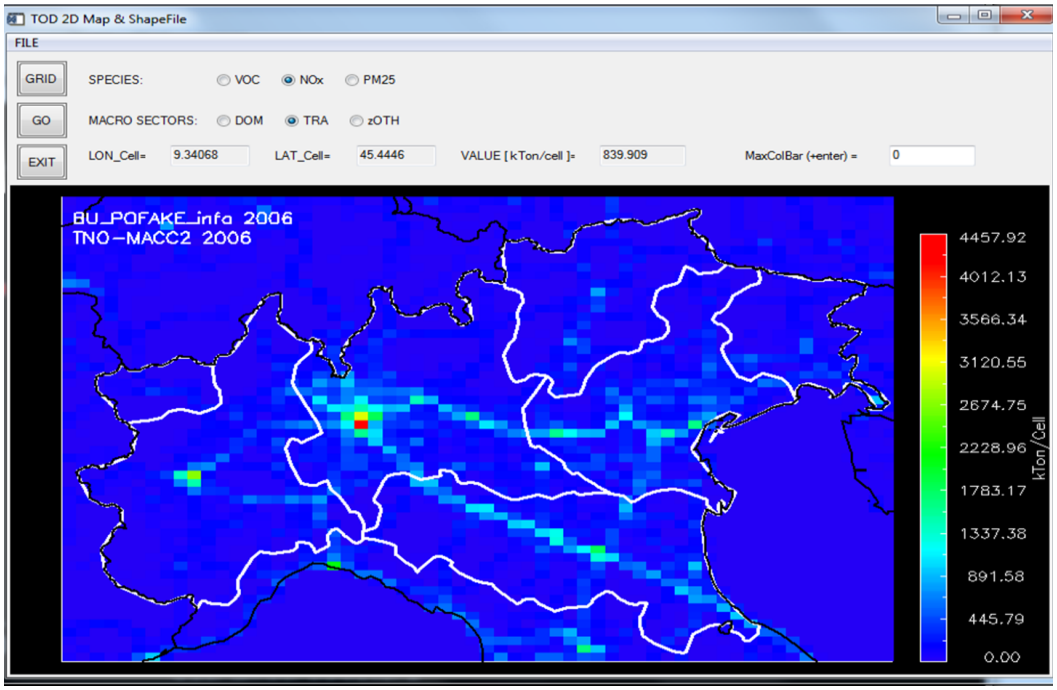
The considered region has a percentile of 47.9810 .

f. Edit Dump: Edit the dumpfile. For the bar plot, the ratio plot and the diamond plot, and for the example (BU_POFAKE_info) above, the contents of the dumpfile looks like:

```
DumpFile EMIS_BENCHMARK TOOL

Tue Nov 25 12:09:02 2014
****************************************************************

EB Input File = BU_POFAKE_info  2006  (type=Region)
Emission Inventory = MACC-TNO  2006
Diagram = BarPlot: BUP, TOD, BUP/TOD

Sector=  DOM:
 VOC:       BUP=25.0000    TOD=33.3779    BUP/TOD=0.748998
 NOx:       BUP=30.0000    TOD=30.6526    BUP/TOD=0.978710
 PM25:      BUP=10.0000    TOD=16.3638    BUP/TOD=0.611106
Sector=  TRA:
 VOC:       BUP=140.000    TOD=154.722    BUP/TOD=0.904849
 NOx:       BUP=300.000    TOD=282.601    BUP/TOD=1.06157
 PM25:      BUP=11.0000    TOD=16.1139    BUP/TOD=0.682640
Sector=  zOTH:
 VOC:       BUP=350.000    TOD=289.496    BUP/TOD=1.20900
 NOx:       BUP=116.000    TOD=148.946    BUP/TOD=0.778803
 PM25:      BUP=12.0000    TOD=24.5486    BUP/TOD=0.488826
****************************************************************

EB Input File = BU_POFAKE_info  2006  (type=Region)
Emission Inventory = MACC-TNO  2006
Diagram = Pol1/Pol2: BUP TOD GAINS_Country_Ratio p0 p100

Sector=  DOM:
 VOC/NOx:   BUP=0.833333   TOD=1.08891    GAINS=0.827507     p0=0.048     p100=10.215
 VOC/PM25:  BUP=2.50000    TOD=2.03975    GAINS=1.11261      p0=0.786     p100=8.428
 NOx/PM25:  BUP=3.00000    TOD=1.87320    GAINS=1.34453      p0=0.189     p100=174.488
Sector=  TRA:
 VOC/NOx:   BUP=0.466667   TOD=0.547492   GAINS=0.694876     p0=0.165     p100=1.162
 VOC/PM25:  BUP=12.7273    TOD=9.60176    GAINS=9.92169      p0=3.311     p100=23.817
 NOx/PM25:  BUP=27.2727    TOD=17.5377    GAINS=14.2784      p0=13.176    p100=27.583
Sector=  zOTH:
 VOC/NOx:   BUP=3.01724    TOD=1.94363    GAINS=1.22064      p0=0.394     p100=1.956
 VOC/PM25:  BUP=29.1667    TOD=11.7928    GAINS=9.45307      p0=1.285     p100=17.091
 NOx/PM25:  BUP=9.66667    TOD=6.06741    GAINS=7.74434      p0=2.037     p100=17.689
****************************************************************

EB Input File = BU_POFAKE_info  2006  (type=Region)
Emission Inventory = MACC-TNO  2006
Diagram = Diamond: E_BUP/E_TOD  A_BUP/A_TOD SymSize(1-5)

Sector=  DOM:
 VOC:       E_BUP/E_TOD=0.765290  A_BUP/A_TOD=0.978710 SymSize=1.00000
 NOx:       E_BUP/E_TOD=1.00000   A_BUP/A_TOD=0.978710 SymSize=1.11866
 PM25:      E_BUP/E_TOD=0.624400  A_BUP/A_TOD=0.978710 SymSize=2.61305
Sector=  TRA:
 VOC:       E_BUP/E_TOD=0.852372  A_BUP/A_TOD=1.06157  SymSize=2.41538
 NOx:       E_BUP/E_TOD=1.00000   A_BUP/A_TOD=1.06157  SymSize=4.95585
 PM25:      E_BUP/E_TOD=0.643050  A_BUP/A_TOD=1.06157  SymSize=2.80513
Sector=  zOTH:
 VOC:       E_BUP/E_TOD=1.55238   A_BUP/A_TOD=0.778803 SymSize=5.00000
 NOx:       E_BUP/E_TOD=1.00000   A_BUP/A_TOD=0.778803 SymSize=2.34088
 PM25:      E_BUP/E_TOD=0.627664  A_BUP/A_TOD=0.778803 SymSize=2.99720
****************************************************************
```

g. Edit dumpTOD: Edit the dump of the TOD inventory (see Section 6.d).

h. Map2dTOD: This option produces a 2d map of the domain, and a visualization of the TOD inventory for a selected user macro sector and a selected pollutant. A new window will be opened, and the 'GO' button will produce the 2d visualization.



When moving the cursor of the domain, the values for Longitude and Latitude are shown as well as the cell-emission in kTon (ie kTon/cell). The scale of the color bar can be changed using the editable MaxColBar field (+ enter). This option can be used to see more detail in the 2d map. A value of 0 gives the max cell-value of the inventory in question. The TOD grid can be superimposed by the 'GRID' button (toggle button). An example shown in the picture above is for the TNO-MACC2 inventory, user input BU_POFAKE_info, pollutant NOx, and the traffic sector TRA. The 7 subshapes of POFAKE with white borders can be distinguished.
Under FILE/Save on this window, the image can be saved using a black or a white background. Going back to the window with the original diagram, another choice (diagram, TOD inventory, etc) can be made. When a new BU* input file is selected or another TOD inventory, the TOD 2d map will disappear.

i. Save_TOD_as_BU: This option will save the selected TOD emission inventory as a 'user' BU input file in the UserInput folder. The structure of the newly created file is exactly the same as the user City/Region/Country BU file. File naming is the same with BU changed into BU_'TODemissionInventory'.
Example: The user input file BU_MadridBSC.csv will be called BU_EC4MACS_MadridBSC.csv or BU_TNO-MACC2_MadridBSC.csv. This allows the intercomparison of two TOD emission inventories on the shape defined by the City/Region/Country with its corresponding (user) macro sectors.

j. User Guide: Opens the pdf version of the User Guide.
On a Windows operating system, the program searches for the Acrobat executable under 'c:\', 'd:\', and executable names 'Acrobat.exe' and 'acroRd32.exe'. For future use, the full path to the executable is then saved into the file 'Paths.ini' in the

directory ‘UserInput’. If the executable is located at a different place from the ones mentioned above, the user can create a ‘Paths.ini’ file in ‘UserInput’ and set the first line to
PDFreader = ‘Full Path To Executable’ (without ‘ ‘).
Example:
PDFreader = C:\Program Files (x86)\Adobe\Reader 11.0\Reader\Acrobat.exe

k. Contact: C. Cuvelier kees.cuvelier@jrc.ec.europa.eu
kees.cuvelier@yahoo.fr