<div align="center">

CMAP QC

on compliance to the standards for

Fairmode Composite Concentration and Emission Mapping

</div>

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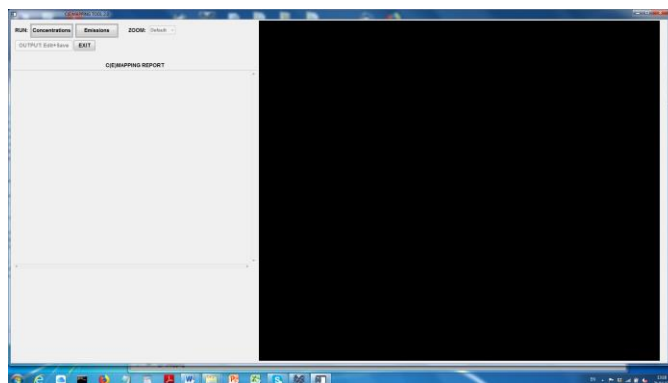Version 2.0 – 21/11/2017

Setup of the Tool:

- Install the Tool somewhere on your computer in a folder called 'CMapping'. This folder will be recognized by the Tool as the CMAP Home directory. A 'CMapping Tool' icon will appear on the desktop

- The folder structure of the Tool in CMapping:
  - <u>CMAPinput</u>: Contains some executables and input data to the Tool. Do not modify anything here.
  - <u>UserInput</u>: User input files should be put here. This can be a *.asc file or a file of type *.tif. Examples of asc files and tif files are given in Examples_ASC and Examples_TIF.
  - <u>Conversion</u>: Based on the input file (*.asc, or *.tif) the Tool generates the coordinates of the domain in the EPSG coordinate system given in the name of the input file (see below). The Tool will convert these coordinates to the EPSG4326 coordinate system (longitude, latitude). The coordinates in both systems are temporarily saved in this folder for inspection.
  - <u>UserOutput</u>: This folder contains a log file of all the checks performed in the execution of the Tool. This log is also reported in the left panel of the window. The final map is saved as PICT_CMAP_*.tif in the UserOutput folder.
  - <u>Help</u>: This document.

CMapping	=>	CMAPinput
		UserInput
		Conversion
		UserOutput
		Help

Run the Tool

Launch the Tool with a double click on the CMapping icon. This opens the following window:

Click on the 'RUN: Concentrations' or 'RUN: Emissions' button to select the compliance of the input file for Concentration Mapping (*CM*) or for Emission Mapping (*EM*), and follow the instructions and comments.

- The 'OUTPUT Edit+Save' button will edit the output log file, which can be saved then with a different name. The default output file 'OutPut.txt' will be overwritten on a new RUN of the Tool.
- The 'ZOOM ' button is to zoom into the country identified by the country code, or to zoom into a map of Europe as a whole. This option may be useful to check that small domains are geographically on the right place (i.e. in the country given by the country code in the name of the input file).
- The C(E)MAPPING REPORT (left panel of the window) will be cleared on a next 'RUN' of the Tool.

Structure of input file

- File name: Input file to be placed in the UserInput folder.
  The filename structure for *CM* is as follows:

  CMAP_*Model_CountryCode_Pollutant_EPSGxxx_info.extension.*

  The filename structure for *EM* is as follows:

  CEMAP_*InvName_CountryCode_Pollutant_Sector_EPSGxxx_info.extension*

  with
  - FileName
    - For *CM* always start with 'CMAP'
    - For *EM* always start with 'CEMAP'
  - *Model (CM):* Name/Code of the model used
  - *InvName (EM):* Name/Code of the emission inventory used
  - *CountryCode (CM* and *EM):* The air quality map belongs to the country indicated by the Country Code (see list below)

- *Pollutant:*
  - *CM*: Accepted pollutants are NO2, PM10, PM2.5, O3 with units [µg/m3]
  - *EM*: Accepted pollutants are CO, NH_3, NMVOC, NOx, PM10, PM2.5, SO_2, CH_4 with units [Ton/km2/year])
- *Sector (EM)*: *Two types of activity sectors are accepted:*
  SNAP sectors: S1, S2, …, S10
  GNFR sectors: GA, GB, …, GN
- *EPSGxxx (CM* and *EM):* 'EPSG' followed by the epsg code of the Coordinate System (CS). See complete list of epsg codes in [.].
- *Info (CM* and *EM):* Any supplementary information the user would like to add to the file name (for instance, model version, reference year, …)
- *Extension (CM* and *EM):* The following extension are accepted:
  - *ASC (asc):* For ESRI ASCII format
  - *TIF, TIFF (tif, tiff):* For tif format

Examples:
CM:
  - CMAP_CHIM_ESP_NO2_EPSG4326_annual_mean_2012.asc
  - CMAP_CHIM_PRT_NO2_EPSG3763_info.asc
  - CMAP_CAMX_SVK_PM10_EPSG2065_2011.asc
  - CMAP_DEHM_DNK_NO2_EPSG4326_info.asc
  - CMAP_CMAQ_BEL_PM10_EPSG3447_2012_raster.asc
  - CMAP_ADMS_GBR_NO2_EPSG4258_info.tif
  - CMAP_GRAL_AUT_NO2_EPSG31255_linz_total.tif
  - CMAP_CMAQ_BEL_PM10_EPSG3447_2012.tif

EM:
  - CEMAP_MACC1_ESP_NO2_S3_EPSG4326_annual_mean_2012.asc
  - CEMAP_ MACC3 _PRT_NO2_S7_EPSG3763_info.asc
  - CEMAP_ EC4MACS _SVK_PM10_S4_EPSG2065_2011.asc
  - CEMAP_ myInventory _BEL_PM10_S7_EPSG3447_2012_raster.asc
  - CEMAP_ JRCinv _GBR_NO2_S1_EPSG4258_info.tif
  - CEMAP_ anyName _BEL_PM10_S10_EPSG3447_2012.tif
  - CEMAP_ JRCinv _GBR_NO2_GB_EPSG4258_info.tif
  - CEMAP_ anyName _BEL_PM10_GK_EPSG3447_2012.tif

ASC type input files

- These files have the following contents:
  - ## Example 1

    ncols   161

    nrows   90

    xllcorner   -10.5

    yllcorner   35.500056179775

    cellsize   0.099887640449438

    NODATA_value -9999

    -9999

    -9999 -

    9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 -9999 –

    …….
  - ## Example 2

    ncols   287

    nrows   251

    xllcenter   -2331198

    yllcenter   -2682412

    cellsize   24000 24000

    NODATA_value -9999

    -9999

    -9999 0.1776378 0.1776378 0.1488556 0.1488556 -9999

    …….

The following checks are performed:
- Does the name of the input file start with CMAP/CEMAP?
- Is the extension asc or tif?
- Format of the file name ok?

- Is the Country code correct?
- Is the Pollutant and accepted one?
- Is the Sector an accepted one?
- Is the EPSG code an existing one?
- Is the line for NCOLS correct?
- Is the line for NROWS correct?
- Is the line for XLLCORNER / XLLCENTER correct?
- Is the line for YLLCORNER / YLLCENTER correct?
  - Note: XLL and YLL are given in the EPSG CS
- Is the line for CELLSIZE correct?
  - Note: CELLSIZE is in degrees, or in meters, or in inches. If one value is given, then dx is equal to dy, otherwise different.
- Is the line for NODATA_value correct?
- Are all pollutant values >= 0, or equal to NODATA_value?
- Using the GDAL cs2cs application (spawn command in IDL) the user EPSGxxx CS is converted in EPSG4326, which is the standard WGS84 CS.
- Is the centre of the domain in Europe / Country?
- Min, Max, and Mean values of the pollutant are calculated. Are they in the expected range?
- Bounds of the map are calculated. Do they fall within the bounds of the Country?
- Finally, a map is produced, and the user has to decide about the correctness of the results.

The following REPORT is produced summarizing the checks and the calculated quantities

Example 1 (*CM)*

```
Home_Directory:  C:\CMapping\
Tue Jan 24 11:44:05 2017
****************************************************************************
***********************************

Please select an ASC or GeoTIFF file...
FILE:          CMAP_CHIM_ESP_PM10_EPSG4326_annual-mean-2012.asc
FOLDER:        C:\CMapping\UserInput\Examples_ASC
FILE_TYPE:     ASC
MODEL:         CHIM
COUNTRY:       SPAIN  ESP
POLLUTANT:     PM10
```

```
EPSG:          EPSG4326
EPSG info:     # WGS 84: <4326> +proj=longlat +datum=WGS84 +no_defs  <>
NCOLS:         161
NROWS:         90
DIMENSIONS:    161        90
CELLSIZE:      0.099887640449438    0.099887640449438
NODATA_value: -9999
All Values >= 0. or equal to -9999  => ok
Domain (EPSG4326) cell corners saved in Conversion\tmpInputCoord.dat
LL_CORNER:    Lon=-10.5499     Lat=35.4501           in  EPSG4326
Start cs2cs
Done cs2cs
Domain (EPSG4326) cell corners saved in Conversion\tmpOutputCoord.dat
LL_CORNER:    Lon=-10.5499     Lat=35.4501           in  EPSG4326
POLLUTANT:    Min Max Mean  =  10.2240    36.5906    16.0481
Is this within the expected range ??  Yes
Map Bounds:     UL= [-10.5499,44.3901]     UR= [5.48200,44.3901]
                LL= [-10.5499,35.4501]     LR= [5.48200,35.4501]
Country Bounds: UL= [-11.0000, 45.0000]    UR= [6.00000, 45.0000]
                LL= [-11.0000, 34.0000]    LR= [6.00000, 34.0000]
The map is saved as ... C:\CMapping\\UserOutput\PICT_CMAP_1.tif

QUESTION !!,   , IS THIS OK ??
YES ... Input Data => OK !!
***************************************************************************
****
```
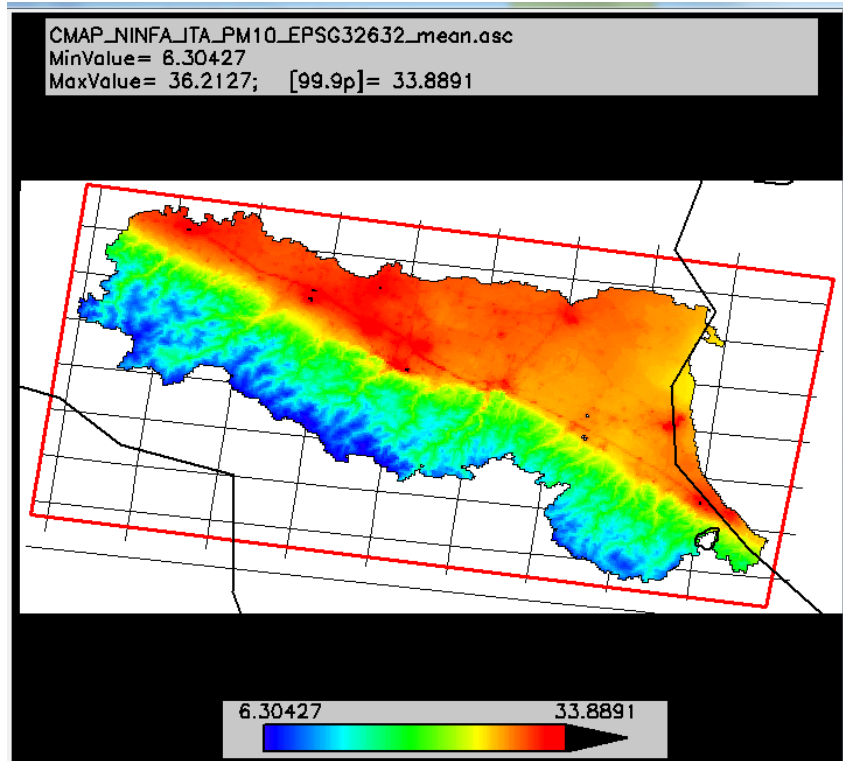
Example 2 (*CM)*

```
Home_Directory:  C:\CMapping\
Tue Jan 24 11:48:00 2017
****************************************************************************
***

Please select an ASC or GeoTIFF file...
FILE:          CMAP_DEHM_DNK_PM10_EPSG4326_info.asc
FOLDER:        C:\CMapping\UserInput\Examples_ASC
FILE_TYPE:     ASC
MODEL:         DEHM
COUNTRY:       DENMARK   DNK
POLLUTANT:     PM10
EPSG:          EPSG4326
EPSG info:     # WGS 84: <4326> +proj=longlat +datum=WGS84 +no_defs  <>
NCOLS:         180
NROWS:         80
DIMENSIONS:    180        80
CELLSIZE:      0.050    0.050
NODATA_value: -999.99
All Values >= 0. or equal to -999.990  => ok
Domain (EPSG4326) cell corners saved in Conversion\tmpInputCoord.dat
LL_CORNER:     Lon=7.02500        Lat=54.0250             in  EPSG4326
Start cs2cs
Done cs2cs
Domain (EPSG4326) cell corners saved in Conversion\tmpOutputCoord.dat
LL_CORNER:     Lon=7.02500        Lat=54.0250             in  EPSG4326
POLLUTANT:     Min Max Mean  =  6.52000    15.3000    9.24286
Is this within the expected range ??  Yes
Map Bounds:      UL= [7.02500,58.0000]    UR= [16.0000,58.0000]
                 LL= [7.02500,54.0250]    LR= [16.0000,54.0250]
Country Bounds: UL= [7.00000, 58.0000]   UR= [16.5000, 58.0000]
                LL= [7.00000, 54.0000]   LR= [16.5000, 54.0000]
The map is saved as ... C:\CMapping\\UserOutput\PICT_CMAP_2.tif

QUESTION !!,  , IS THIS OK ??
YES ... Input Data => OK !!
****************************************************************************
*
```
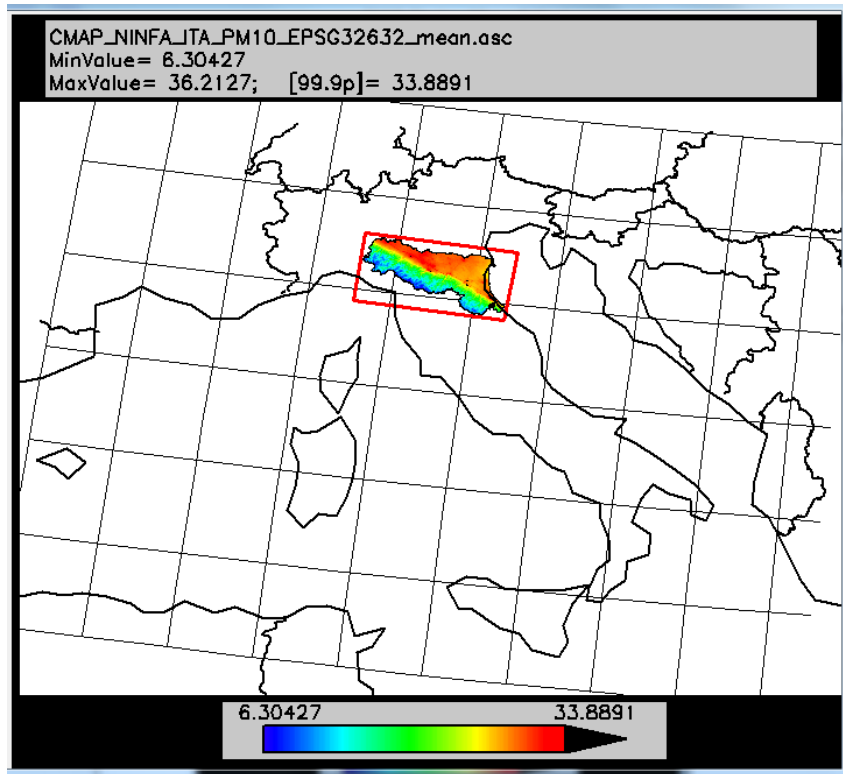
CMAP_DEHM_DNK_PM10_EPSG4326_info.asc
MinValue= 6.52000
MaxValue= 15.3000;   [99.9p]= 15.2000

6.52000   15.2000

Example 3 (*CM)*

```
Home_Directory:  C:\CMapping\
Tue Jan 24 11:50:07 2017
*********************************************************************************

Please select an ASC or GeoTIFF file...
FILE:          CMAP_NINFA_ITA_PM10_EPSG32632_mean.asc
FOLDER:        C:\CMapping\UserInput\Examples_ASC
FILE_TYPE:     ASC
MODEL:         NINFA
COUNTRY:       ITALY  ITA
POLLUTANT:     PM10
EPSG:          EPSG32632
EPSG info:     # WGS 84 / UTM zone 32N: <32632> +proj=utm +zone=32 +datum=WGS84 +units=m +nc
NCOLS:         297
NROWS:         161
DIMENSIONS:    297        161
CELLSIZE:      1000    1000
NODATA_value: -9999
All Values >= 0. or equal to -9999  => ok
Domain (EPSG32632) cell corners saved in Conversion\tmpInputCoord.dat
LL_CORNER:     Lon=509500.        Lat=4.84250e+006        in  EPSG32632
Start cs2cs
Done cs2cs
Domain (EPSG4326) cell corners saved in Conversion\tmpOutputCoord.dat
LL_CORNER:     Lon=9.11800        Lat=43.7355             in  EPSG4326
POLLUTANT:     Min Max Mean  =  6.30427     36.2127     22.9524
```
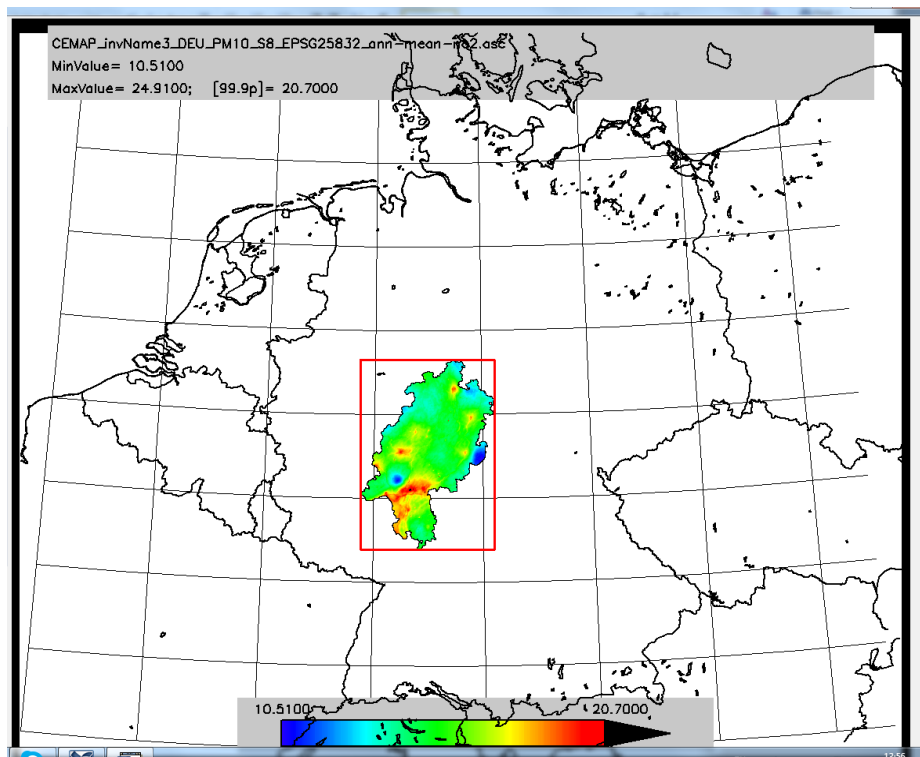
```
Is this within the expected range ??  Yes
Map Bounds:     UL= [9.12090,45.1804]     UR= [12.8902,45.1142]
                LL= [9.11800,43.7355]     LR= [12.7957,43.6725]
Country Bounds: UL= [2.66109, 47.2000]    UR= [20.4474, 47.2000]
                LL= [2.66109, 36.4000]    LR= [20.4474, 36.4000]
The map is saved as ... C:\CMapping\\UserOutput\PICT_CMAP_3.tif

QUESTION !!,  , IS THIS OK ??
YES ... Input Data => OK !!
**************************************************************************
```


A zoom-out (ZOOM button) to see the geographical (country) context of the domain.

CMAP_NINFA_ITA_PM10_EPSG32632_mean.asc
MinValue= 6.30427
MaxValue= 36.2127; [99.9p]= 33.8891

6.30427   33.8891

Example 4 (*EM)*

Home_Directory: C:\CMapping\
Tue Nov 21 13:46:47 2017
****
****
 Please select an ASC or TIF file...
FILE: CEMAP_invName3_DEU_PM10_S8_EPSG25832_ann-mean-
no2.asc
FOLDER: C:\CMapping\UserInput\Examples_ASC
FILE_TYPE: ASC
invName:
COUNTRY: GERMANY DEU
POLLUTANT: PM10
SNAP SECTOR: S8
EPSG: EPSG25832
EPSG info: # ETRS89 / UTM zone 32N: <25832> +proj=utm +zone=32
+ellps=GRS80 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs <>
NCOLS: 349
NROWS: 505
DIMENSIONS: 349   505
CELLSIZE: 500   500

```
NODATA_value: -9999
All Values >= 0. or equal to -9999  => ok
Wait ...
Domain (EPSG25832) cell corners saved in Conversion\tmpInputCoord.dat
LL_CORNER:   X0= 411750.     Y0= 5.47075e+006      in  EPSG25832
Start cs2cs
Wait ... cs2cs
Done cs2cs
Domain (EPSG4326) cell corners saved in Conversion\tmpOutputCoord.dat
Wait ...
LL_CORNER:   Lon=7.78410     Lat=49.3831          in  EPSG4326
POLLUTANT:    Min 99.9p Max Mean  =  10.5100   20.7000   24.9100
15.5077
Is this within the expected range ??  Yes
Map Bounds:    UL= [7.72440,51.6511]    UR= [10.2431,51.6514]
               LL= [7.78410,49.3831]    LR= [10.1849,49.3834]
Country Bounds:  UL= [2.14989, 55.2172]    UR= [16.9794, 55.2172]
                 LL= [2.14989, 47.0000]    LR= [16.9794, 47.0000]
Wait ...
The map is saved as ... C:\CMapping\\UserOutput\PICT_CMAP_1.tif

QUESTION !!,  , IS THIS OK ??
YES ... Input Data => OK !!
****************************************************
```
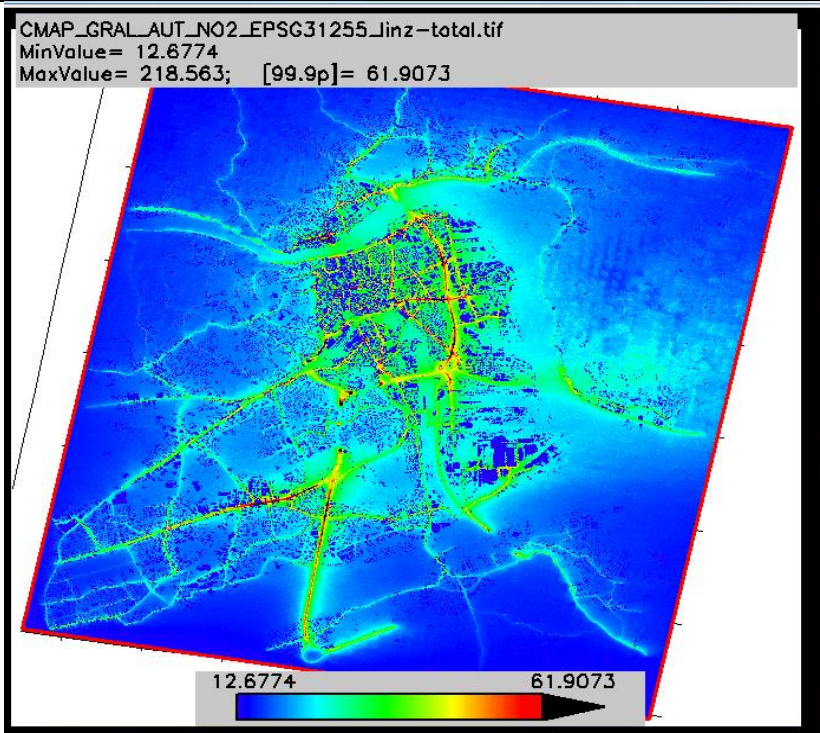
A zoom-out (ZOOM button) to see the geographical (country) context of the domain.

TIF/TIFF type input files

- Check on the existence of the *.tif file.
- 'tiff_info' and geotiff_info information regarding the tif file can be extracted. Based on this info the following checks will be performed:
- The number of tif channels must be equal to 1. If the value is equal to 3 then data is stored as colour band. Data must be stored in the grey band as actual values.
- Check on the array dimensions of the map (similar to NCOLS and NROWS above)
- Check on the number of images, must be 1. Only one pollutant per file is allowed
- Check on the orientation of the map (top, bottom, left, right), this is used to make the correct plot of the map, and not up-side down.
- Determine the position of the origin of the domain in the EPSG CS. Read from the tfw file. In tfw terms, the origin is the centre of the upper-left cell of the domain.
- Resolution in X and Y direction (similar to CELLSIZE above). Read from the tfw file.
- Using the GDAL cs2cs application (spawn command in IDL) the user EPSGxxx CS is converted in EPSG4326, which is the standard WGS84 CS.
- Min, Max, and Mean values of the pollutant are calculated. Are they in the expected range?
- Bounds of the map are calculated. Do they fall within the bounds of the Country?
- Finally, a map is produced, and the user has to decide about the correctness of the results.

The following REPORT is produced summarizing the checks and the calculated quantities

Example 1 (*CM)*

```
Home_Directory:  C:\CMapping\
```

```
Tue Jan 24 11:53:23 2017
*********************************************************************************

Please select an ASC or GeoTIFF file...
FILE:          CMAP_GRAL_AUT_NO2_EPSG31255_linz-total.tif
FOLDER:        C:\CMapping\UserInput\Examples_TIF
FILE_TYPE:     TIF
MODEL:         GRAL
COUNTRY:       AUSTRIA  AUT
POLLUTANT:     NO2
EPSG:          EPSG31255
EPSG info:     # MGI / Austria GK Central: <31255> +proj=tmerc +lat_0=0 +lon_0=13.3333333333333
5000000 +datum=h
CHANNELS:      1
DIMENSIONS:    1165      1416      (Warning: More than 5M gridcells !!)
NUM_IMAGES:    1
ORIENTATION:   1
UL-ORIGIN cell centre in  EPSG31255:          66675.0   357035.
RESOLUTION:    10.0000   -10.0000
Wait ...        100% done
Domain (EPSG31255) cell corners saved in Conversion\tmpInputCoord.dat
LL_CORNER:     Lon=66670.0       Lat=342880.             in  EPSG31255
Start cs2cs
Wait ... cs2cs
Done cs2cs
Wait ...        100% done
Domain (epsg4326) cell corners saved in Conversion\tmpOutputCoord.dat
LL_CORNER:     Lon=14.2298       Lat=48.2207             in  EPSG4326
POLLUTANT:     Min Max Mean  =  12.6774    218.563    20.6904
Is this within the expected range ??  Yes
Map Bounds:     UL= [14.2320,48.3480]      UR= [14.3891,48.3467]
                LL= [14.2298,48.2207]      LR= [14.3865,48.2194]
Country Bounds: UL= [8.63474, 49.5000]     UR= [17.4327, 49.5000]
                LL= [8.63474, 45.0000]     LR= [17.4327, 45.0000]
Wait ...        100% done
The map is saved as ... C:\CMapping\\UserOutput\PICT_CMAP_4.tif

QUESTION !!,  , IS THIS OK ??
YES ... Input Data => OK !!
*********************************************************************************
```
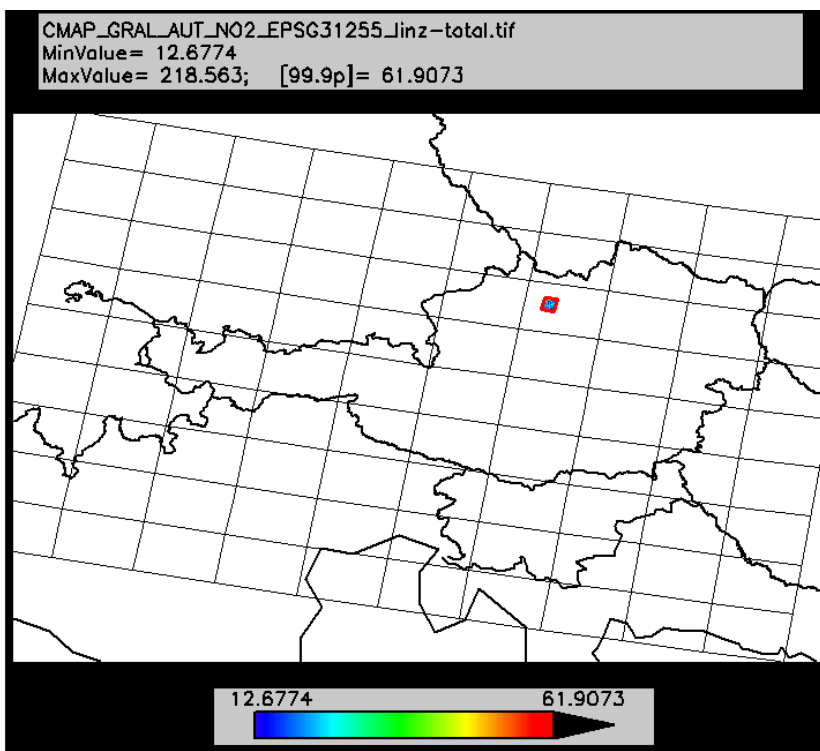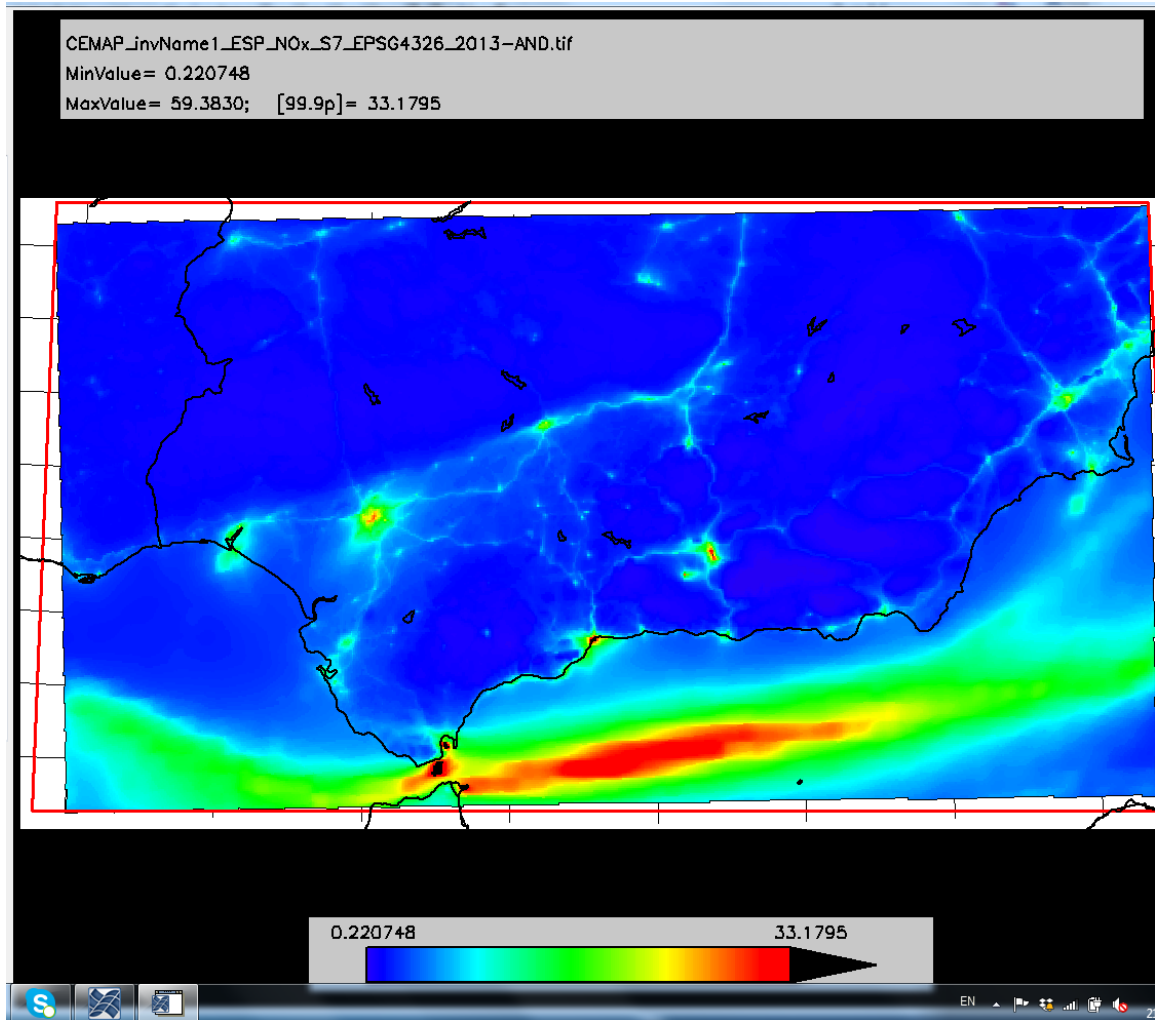
CMAP_GRAL_AUT_NO2_EPSG31255_linz-total.tif
MinValue= 12.6774
MaxValue= 218.563;   [99.9p]= 61.9073

12.6774   61.9073

A zoom-out to see the geographical (country) context of the domain.

CMAP_GRAL_AUT_NO2_EPSG31255_linz-total.tif
MinValue= 12.6774
MaxValue= 218.563;   [99.9p]= 61.9073

12.6774   61.9073

Example 2 (*EM)*

```
Home_Directory: C:\CMapping\
Tue Nov 21 13:59:40 2017
***************************************************************
Please select an ASC or TIF file...
FILE:      CEMAP_invName1_ESP_NOx_S7_EPSG4326_2013-AND.tif
FOLDER:    C:\CMapping\UserInput\Examples_TIF
FILE_TYPE:  TIF
invName:
COUNTRY:    SPAIN  ESP
POLLUTANT:  NOx
SNAP SECTOR:    S7
EPSG:      EPSG4326
EPSG info:  # WGS 84: <4326> +proj=longlat +datum=WGS84 +no_defs <>
CHANNELS:    1
DIMENSIONS:  709     308
NUM_IMAGES:  1
ORIENTATION: 1
UL-ORIGIN cell centre from geoTiff in  EPSG4326:  -8.213512539.038132
RESOLUTION:  0.01085347-0.010853473
Wait ...
Domain (EPSG4326) cell corners saved in Conversion\tmpInputCoord.dat
LL_CORNER:   X0= -8.21894    Y0= 35.7007        in  EPSG4326
Start cs2cs
Wait ... cs2cs
Domain (epsg4326) cell corners saved in Conversion\tmpOutputCoord.dat
Done cs2cs
Wait ...
LL_CORNER:   Lon=-8.21890    Lat=35.7007        in  EPSG4326
POLLUTANT:   Min 99.9p Max Mean  = 0.220748   33.1795   59.3830   4.78671
Is this within the expected range ??  Yes
Map Bounds:    UL= [-8.21890,39.0381]    UR= [-0.529300,39.0381]
               LL= [-8.21890,35.7007]    LR= [-0.529300,35.7007]
Country Bounds: UL= [-11.0000, 45.0000]    UR= [6.00000, 45.0000]
               LL= [-11.0000, 34.0000]    LR= [6.00000, 34.0000]
Wait ...
The map is saved as ... C:\CMapping\\UserOutput\PICT_CMAP_3.tif

QUESTION !!, , IS THIS OK ??
YES ... Input Data => OK !!
***************************************************************
```
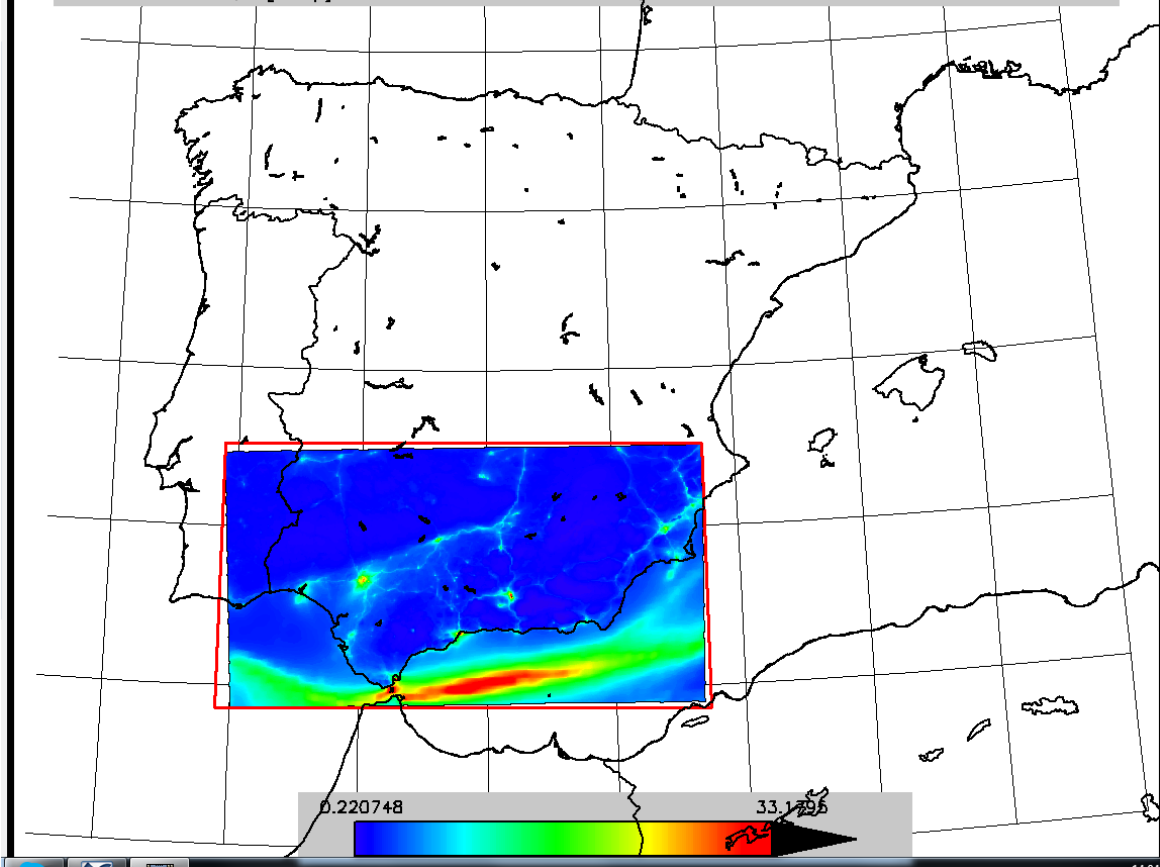
A zoom-out to see the geographical (country) context of the domain.

CEMAP_invName1_ESP_NOx_S7_EPSG4326_2013-AND.tif
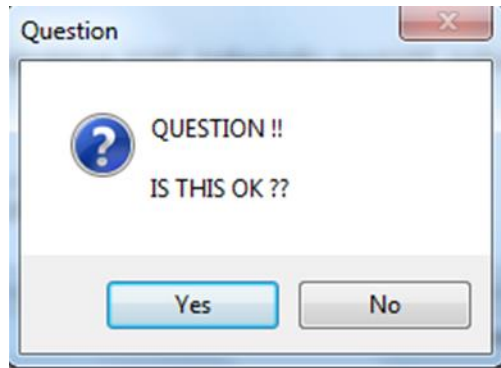MinValue= 0.220748
MaxValue= 59.3830;   [99.9p]= 33.1795

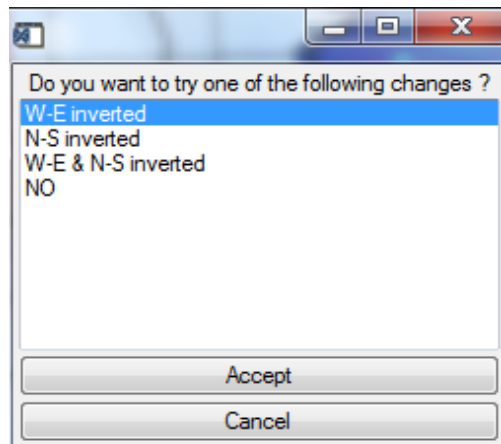0.220748   33.1795

Finally, there is the key question:

If **Yes**, then submit to the Fairmode CMAP database

If **No**, which practically means that the final map is not correct, then the following window will open to try to invert West-East, North-South, or both.

List of Countries:

CountryName	CountryCode
ALBANIA	ALB
AUSTRIA	AUT
BELGIUM	BEL
BOSNIA_HERZ	BIH
BULGARIA	BGR
CROATIA	HRV
CYPRUS	CYP
CZECH_REPUBLIC	CZE
DENMARK	DNK
ESTONIA	EST
FINLAND	FIN
FRANCE	FRA
GERMANY	DEU
GREECE	GRC
GREENLAND	GRL
HUNGARY	HUN
ICELAND	ISL
IRELAND	IRL
ITALY	ITA
LATVIA	LVA
LIECHTENSTEIN	LIE
LITHUANIA	LTU
LUXEMBOURG	LUX
MACEDONIA	MKD
MALTA	MLT
MOLDOVA	MDA
MONTENEGRO	MON
NETHERLANDS	NLD
NORWAY	NOR
POLAND	POL
PORTUGAL	PRT
ROMANIA	ROM
SERBIA	SBR
SLOVAKIA	SVK
SLOVENIA	SVN
SPAIN	ESP
SWEDEN	SWE
SWITZERLAND	CHE
UNITED_KINGDOM	GBR
EUROPE	EUR

List of Countries bounds (lon, lat):

Country Code	Bounds [LONmin, LONmax, LATmin,LATmax]
AUT	[8.63474,17.4327,45.9,49.5]
BGR	[22.0,28.8,40.9,44.5]
DNK	[7.3,13.2,54.1,57.8]
FRA	[-6.7,9.65,41.3,51.4]
DEU	[2.14989,16.9794,47.0,55.2172]
GRC	[19.5,27.0,36.2,41.8]
HUN	[15.7,23.4,45.1889,49.8344]
ITA	[2.66109,20.4474,36.4,47.2]
BEL	[2.5,6.4,49.4,51.6]
NLD	[2.,8.,50.7,53.7]
LUX	[5,7.,49.4,50.2]
ROM	[19.6,30.0,43.5,48.5]
ESP	[-11.,6.,34.,45.]
PRT	[-12.,-4.,36.75,42.4]
SWE	[3.7,24.2,54.0,70.0]
NOR	[3.7,24.2,54.0,70.0]
CHE	[5.8,10.6,45.5,48.0]
GBR	[-13.65,7.3,49.8,59.3]
IRL	[-13.,-4.,51.25,55.6]
POL	[12.2,25.8,49.,55.]
CZE	[12.,19.,48.5,51.2]
SVK	[16.6,22.8,47.7,49.6]
ALB	[19.,22.,39.,43.]
BIH	[15.,20.,42.,46.]
HRV	[13.,20.,42.,47.]
CYP	[32.,35.,34.5,36.]
EST	[21.,29.,57.,60.]
FIN	[22.,32.,55.5,70.]
GRL	[-80.,-50.,60.,87.]
ISL	[-24.,-14.,63.,67.]
LVA	[21.,29.,55.,59.]
LIE	[9.,10.,47.,47.5]
LTU	[21.,27.,53.,57]
MKD	[20.,23.,40.,43.]
MLT	[14.,14.7,35.,36.5]
MDA	[26.,31.,45.,49.]
SBR	[18.,21.,41.,44.]
SVN	[13.,17.,45.5,47.]
EUR	[-12.,30.,42.,70.]

List of checks:

- Has the input file the standard name?:
  CMAP_*Model_CountryCode_Pollutant_EPSGxxx_info.extension*
  CEMAP_*InventoryName_CountryCode_Pollutant_Sector_EPSGxxx_info.extension*
- Is the extension of ASC or TIF type?
- Does the CountryCode exists in the Cntrcodes.dat file? – see CMAPinput folder?
- Check on pollutants:
   PM10, PM2.5, NO2, O3?
  COx, NH_3, NMVOC, NOx, PM10, PM2.5, SO_2, CH_4?
- Check on SNAP or GNFR activity Sector
- Check on EPSG code: format 'EPSG' followed by a integer number?
- Is the EPSG code recognized as a registered Coordinate Reference system? – see the epsg file in the CMAPinput folder

For ASC type input files:
- Is the 1st line equal to 'NCOLS' followed by a space and an integer number?
- Is the 2nd line equal to 'NROWS' followed by a space and an integer number?
- Is the 3rd line equal to 'XXLCORNER' or XXLCENTER' followed by a space and a real number?
- Is the 4th line equal to 'YYLCORNER' or YYLCENTER' followed by a space and a real number?
- Is the 5th line equal to 'CELLSIZE' followed by a space and one or two real numbers?
- Is the 6th line equal to 'NODATA_VALUE' followed by a space and a real/integer number?
- If a decimal comma is detected, Tool can replace it into a decimal dot.
- Does the rest of the input file contain NROWS lines with NCOLS numbers?
- Are there NROWS rows with each NCOLS elements; Decimal comma's can be replaced by decimal dots.
- Are all the number >= 0, or equal to NODATA_VALUE?
- Coordinates of the cell corners in input EPSG coordinate system are saved – see Conversion folder.
- They are transformed to EPSG4326 system, and saved – see Conversion folder.
- A few simple tests to check if the domain is not empty – ie looks it topologically like a square?
- Is the centre of the domain (in EPSG4326) positioned inside Europe?
- See Make Map.

For TIF type input files:

- Is the number of CHANNELS in the input file equal to 1?
- Does the DIMENSIONS variable of the tif file have two integer numbers?
- Is the NUM_IMAGES variable of the tif file equal to 1?
- Is there an ORIENTATION variable equal to 1,2,3 or 4?
- Does the geotiff_info (i.e. modelpixelscaletag, and modeltiepointtag) exist in the tif file.
- Is the X-resolution (extracted from geotiff_info) a positive real/integer number?
- Is the Y-resolution (extracted from geotiff_info) a positive real/integer number?
- Is the X-origin (extracted from geotiff_info) a real/integer number?
- Is the Y-origin (extracted from geotiff_info) a real/integer number?
  (XY origin is the UL corner, X-resolution is positive, Y-resolution is positive but downward)
- Coordinates of the cell corners in input EPSG coordinate system are saved – see Conversion folder.
- They are transformed to EPSG4326 system, and saved – see Conversion folder.
- A few simple tests to check if the domain is not empty – ie looks it topologically like a square?
- Is the centre of the domain (in EPSG4326) positioned inside Europe?
- See Make Map.

Make Map:

- Min, Max, and Mean values of the pollutant are calculated.
- Question: Is this in the expected range?
- Coordinates of the four corners of the domain are shown.
- Coordinates of the Country (as a square) are shown.
- Question: Is this correct?
- Is the centre of the domain positioned in the Country?
- A map of the pollutant is shown with colour bar ranging from Min (pollutant) to the 99.9percentile value of the pollutant.
- Question: Is this map ok?
- If the domain is small, a ZOOM option can be chosen to visualize the map inside the whole Country or Europe.

Final Question: Is your dataset ready to be submitted to the CMapping database.