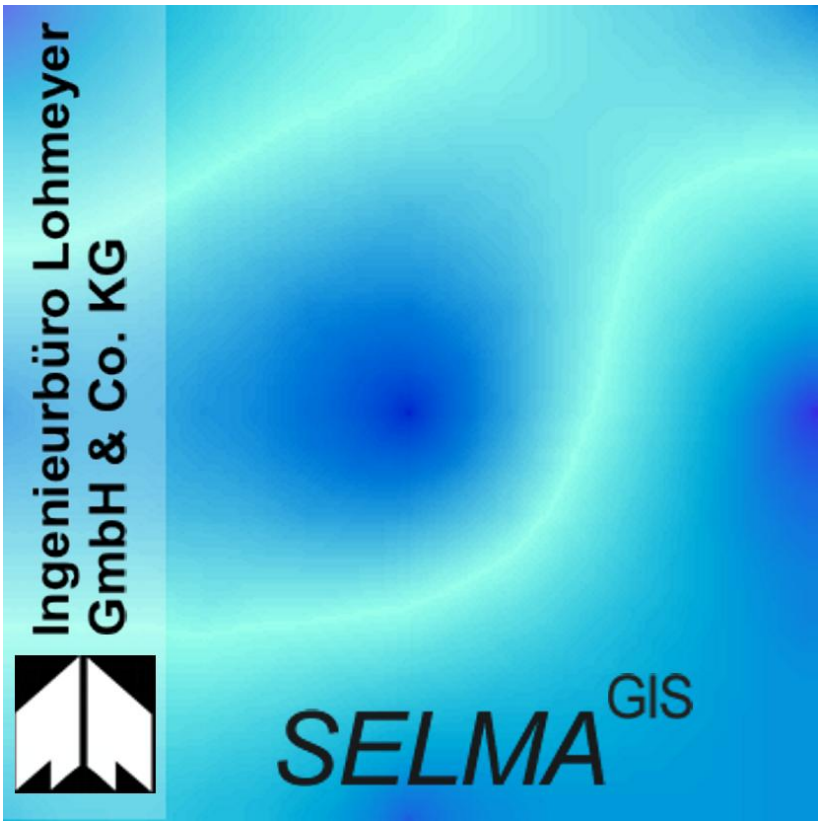
SELMA^{GIS}

Version 9.29.4

System for Calculating and Representing Air Pollutant Concentrations



By Ingenieurbüro Lohmeyer GmbH & Co. KG

Radebeul, August 2013

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Immissionsschutz, Klima, Aerodynamik, Umweltsoftware

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SELMA^{GIS}

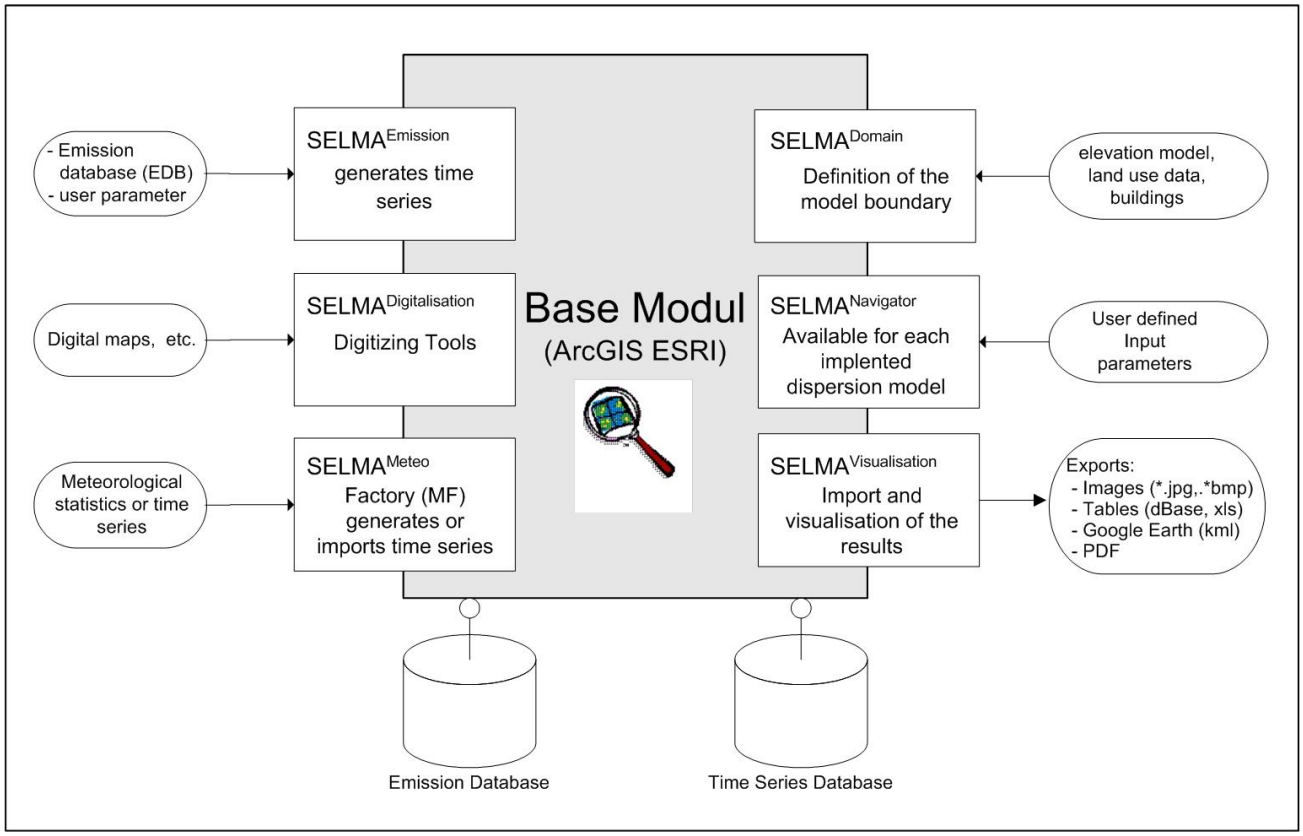
Introduction

The Emission and Dispersion Modelling System SELMA^{GIS} Version 9.29 is a modular software package which is running under ArcMap™ which is part of the geographical information system (GIS) ArcGIS™ ArcView 9.1-3 and 10 supplied by ESRI. ArcMap™ is a Windows based GIS. Its user interface is according to Windows principles (e.g. drag and drop). All modules of SELMA^{GIS} are plug-ins under ArcMap™ and can be activated by menus and buttons. SELMA^{GIS} supports data flow workaround which is usable for different dispersion models.

SELMA^{GIS} supplies the following modules:

- Emission
- Digitizing
- Meteo
- Domain
- Navigator for AUSTAL2000, MEMO/MUSE, OML-Highway and PROKAS
- Visualisation

At present, SELMA^{GIS} is in operation in Ingenieurbüro Lohmeyer GmbH & Co. KG and various clients in Germany, Bulgaria, Lithuania and Egypt, where it is utilized for calculating air pollutant concentrations with regard to environmental impact assessments for licensing procedures, as well as for calculation and representation of the spatial distribution of air pollution serving as information for the administration or for public relations activities, for cause analysis of the air pollution with harmful substances and for evaluation of the effects of emission reduction measures.



The following dispersion models are available in SELMA^{GIS}:

- AUSTAL2000 is a product of the further development of the TA Luft model. Significant parts of SELMA^{GIS} (e.g. the part for PM10 due to motor vehicle emissions) were adjusted to the requirements of the 1999/30/EG Directive.
- The mesoscale meteorological model MEMO and the dispersion model MARS/MUSE including a model for photochemical reactions. It can be used for calculation in large extents and is able to consider emission inventories. MEMO and MARS/MUSE is developed and supported by the University of Thessalonica, Greece
- We are working on implementing the dispersion model PROKAS. PROKAS is used for calculation of air pollution concentration on roads and road systems. It consists of various modules to calculate emissions on roads, pollutant dispersion on roads without or with loose developments, as well as dispersion on densely developed roads (street canyons).
- additional dispersion modules will be implemented on demand

In its Emission Factory module, the system can calculate emissions from street traffic for user defined pollutants e.g. NO_X and PM10, incl. the

traffic related whirl-ups of PM10 from roadway abrasion, dust on the street and wear of tires. The emission computation is based on emission factors appraised by the user, as well as on a representative daily traffic variation. The emission factors can be ordered from Lohmeyer GmbH & Co. KG.

For computing the traffic related emissions with the Emission Factory SELMA^{GIS} module, a file is accessed which contains the emission factors for different traffic situations and years structured by trucks and passenger cars, calculated externally in advance.

From the following sources, the system can calculate the dispersion of harmful substances, given the particular emissions, statistical wind data and initial load values:

- Single sources (point sources) of the industry/energy production (heating plants, thermal power plants) and from other relevant emitters
- Line sources (streets)
- Area sources/diffuse sources (e.g. domestic heating, industry/energy production/storage of dusty goods, as well as from dust depositions, which can be caused by certain circumstances, like strong wind).

Installation

System Requirements

System requirements for SELMA^{GIS} are Windows 2000, Windows XP, Windows VISTA or Windows 7 operating systems. Installed ArcGIS Version 9.1 or upper. A Pentium IV or equivalent on 3 GHz and min 512 MB RAM, 1GB is recommended.

Installation

1. Be sure that ArcGIS is not running and you have ***administrator rights*** on the operating system.
2. Install the Rainbow Software from the SELMA^{GIS} CD (Raindbow\Sentinel Protection Installer 7.6.5.exe or download current version from http://www.safenet-inc.com/support-downloads/sentinel-drivers/ for your operating system
3. Put the Dongle in an USB Port.
4. Execute the setup.exe from the SELMA^{GIS} installation CD (SELMAGIS\setup.exe) and follow the introductions.

5. Open the SELMA^{GIS} licence manager under the Taskbar from Windows and check if SELMA^{GIS} Basic Module and AUSTAL2000 is available.

Support Info

Support about SELMA^{GIS} user interfaces gives the

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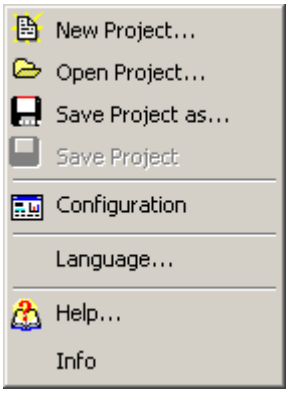
SELMA^{GIS} Project

All Parameter, Options and setting of supported Dialogs are stored in a SELMA^{GIS} project file (Extension *.sel). Use project file to store your own profiles.

If the SELMA^{GIS} project file has the same name (including the directory) like the ArcMap project file (*.mxd) the SELMA^{GIS} project file will be loaded automatically while starting ArcMap.



New Project:

creates a new SELMA^{GIS} project file.

Open Project:

opens an existing SELMA^{GIS} project file.

Save Project as:

saves a SELMA^{GIS} project file under a new file name.

Save Project:

saves the current SELMA^{GIS} project file.

Language:

opens a dialog to define language. The selected language appears in all

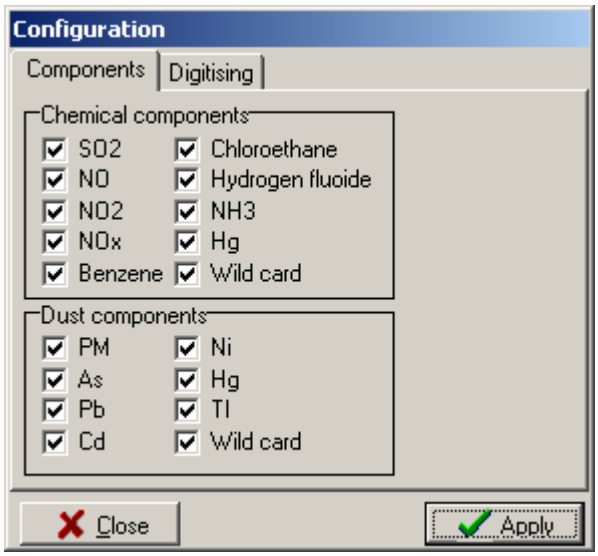
SELMA^{GIS} Dialogs of the base module, AUSTAL2000 and PROKAS (no Lithuanian Language) after restart ArcMap.

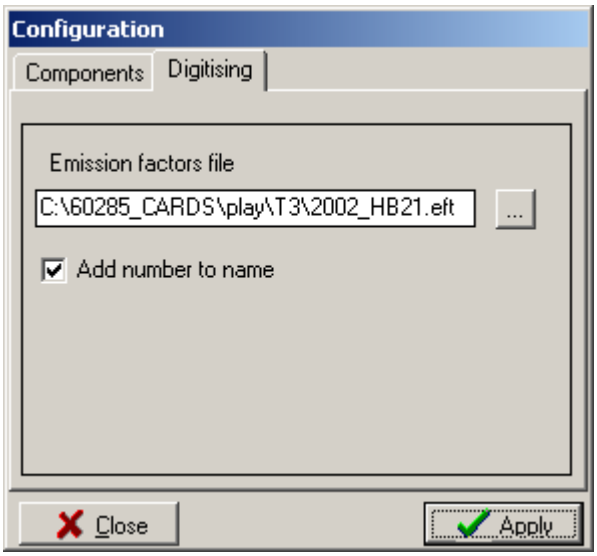
Configuration:

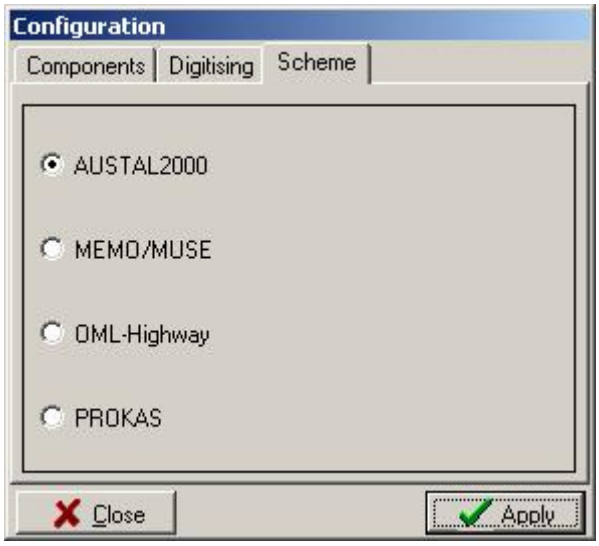
opens a dialog to define various options

SELMA^{GIS} Configuration

Dialog to define substances which will be considered in emission and dispersion calculations and options for digitising.







Register Components **:**

Only for AUSTAL2000 substances to be calculated must be selected by checking the checkboxes.

Register Digitising/ **Emissions** ***factors file*** **:**

Defines the Emission Factors file name. The names of Traffic situations

(1. column) appear in the combo box Traffic Situation in the dialog Digitising Street Sources.

***Register Digitising/ Add number to* name :**

Defines if the row number is added automatically to the source name in the dialogs Digitising Point Area and Streets.

***Register Scheme* :**

Change the scheme depended to the selected dispersion module which is available under SELMA^{GIS}. Commands in the SELMA^{GIS} Toolbar will be added or hidden.

Meteorology Factory

The Meteorology Factory provides tools to show and to generate meteorological time series in the format which is needed from the models.

Show Meteo File

Opens the window wind rose for the graphic representation and editing of an AKS-File.

In the menu File wind distributions can be opened, imported, exported or printed as a picture. It's possible to open AKS files [name].aks as well as wind distributions in the formats *.wnd, *.akt, *.tal, *.met. Each Format can be saves as Wind Dispersion Classes Statistics File which is used by e.g. PROKAS.

The wind distribution is displayed in percentage as a wind rose. Wind speed is characterized in certain colours and line widths like in the legend on the left side below. The frequencies of dispersion classes are displayed in the middle below.

The option import in the File menu allows to generate a AkTerm-File.

Settings for the graphic representation of the wind distribution can be done in the menu Graphic Window (or double click or right mouse click on the Image). Title and legend can be edited and it's possible to scale the size of the graphic. Furthermore the graphic can be displayed in black and white. The setting ABK is used to define the number of positions after decimal point.

Editing of the dispersion class statistics can be started in the menu Edit. Using the slide control Wind Direction on the right side, turns the angle of the whole wind distribution. By changing the mean wind velocity the frequencies of the dispersion classes will be adapted. If you want to change wind direction and wind velocity, keep in mind that the wind direction must be changed first. By Clicking on the button 'Save' you can store the file in the project directory.

It is possible to resize the Wind Rose Window and it is possible to export the wind rose as a graphic file (*.wmf, *.bmp, *.jpg).

Short Cuts:

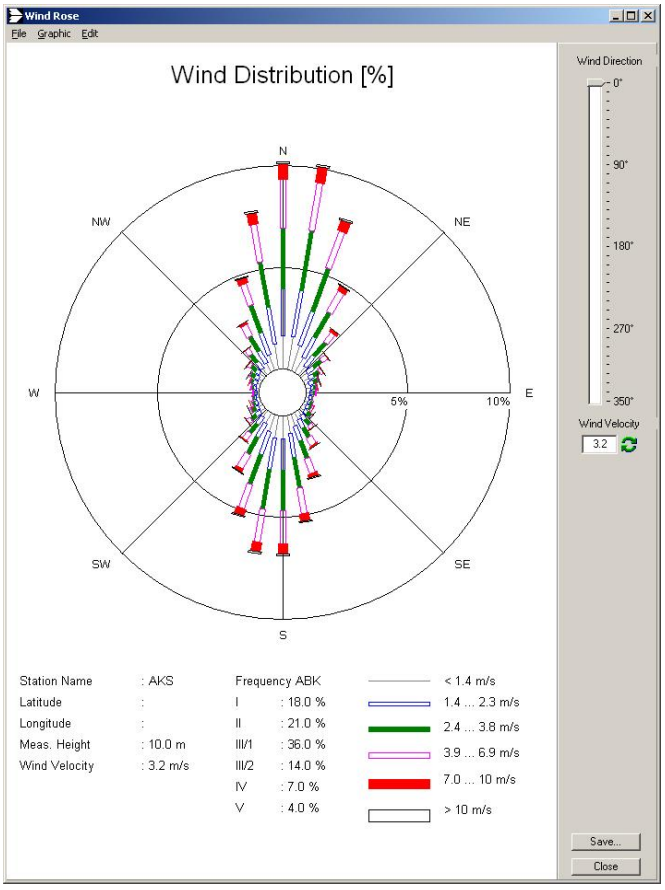
Strg+D = Print

Strg+E = Export Graphic File

Strg+C = Copy image to Clipboard

Important note:

- If you resize the dialog, please remark, that the Graphic changes the size right-left reserved.



Data formats from measurements of meteorological stations (frequency distribution of wind speed, wind direction and Monin-Obukhov dispersion category) will be convert to the AKTerm format which is needed from AUSTAL2000. For that the Monin-Obukhov dispersion categories are translated to Klug/Manier dispersion categories according to the TA-Luft.

More Convert interfaces to various formats [e.g. import from other models like the mesoscale prognostic (dynamic) wind field model METRAS or the microscale prognostic wind field model MISKAM] can be programmed on request.

Import AKTerm

Generates a meteorological time series out of at least one input file in the formats *.dbf or *.csv. The input file must contain hourly data of wind direction and wind velocity. The columns of the input file with the according information can be chosen with the drop down lists. In case the columns of the input file are already named similar, the allocation will be done automatically. Missing values are detected by the character -999.

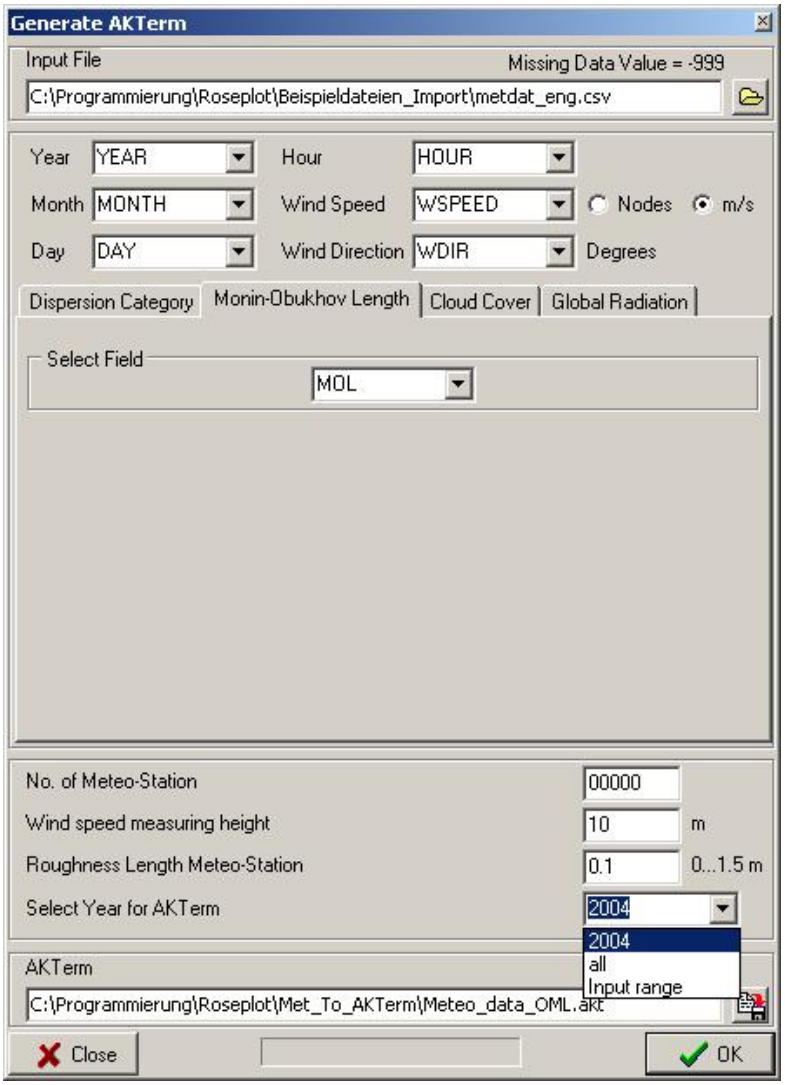
Furthermore it's necessary to specify data for the determination of the atmospheric stability conditions. Depending on the available data set 4 possibilities are given for the determination. The first possibility is to load the Dispersion category as itself. Reading in a Monin-Obukhov-Length time series is the second way to determine stability conditions. The third way is reading in cloud cover data. This information can be also imported from a separate file. The fourth possibility is to import global radiation data. Keep in mind that the third and fourth option demand location information. In case the location name is not listed on the right side, specify geographic coordinates on the right side. This information is necessary due to derive sunrise and sunset times, which are a precondition for the determination of stability conditions.

The specification of the station ID, roughness length of the measuring station and the selected year for the time series are obligatory. To start the generation select a directory and define a name for the output file.

The Date columns requires formats as follow: Year: yyyy, Month: mm, Day: dd Hour: Integer (0..23)

It is possible to import a selected year or all years in separated files or import the data sets as they are. Use the options in the combobox Selects Year for AKTerm. (Choose the year column first.)

OML and OML-Highway MET-files can be imported as well. For Met files the Import Dialog defines all parameters automatically.



Meteo File Formats

AKTerm

Format: ASCII

The wind situation will be considered in the form of a dispersion category time series. This file has information line by line about the date, time, wind direction, wind speed, dispersion category according to Klug/Manier, Turner category and ww-key number. Two formats are supported.

The format of the file is shown in the following lines.

```
10999199501010002111 3480
10999199501010102212 3480
10999199501010202613 3480
10999199501010302713 3425
10999199501010402512 34 0
10999199501010502512 34 0
10999199501010602514 34 3
10999199501010702512 3480
...
```

An AKTerm is a text file, which includes one line with 24 Sting characters for each continuous hour of the year. For each parameter are reserved digits which should not be separated by a blank. Only no values can be stored with blanks. Each character means:

Parameter	**Position of digits**	**required**
number of meteorological station	1 to 5	no
Date (JJJJMMTTSS)	6 to 15	yes
Interpolation identification	16	no
Wind direction (deca degree)	17 to 18	yes
Wind speed (notes)	19 to 20	yes
Klug/Manier class (1..6)	21	yes
Turner class	22	no
ww key	23 to 24, the weather as two figure number.	no

This file consists of a header and a data set. In the header there are maximum 5 comment lines starting with the character '*'. A line with the calculated anemometer height for different roughness lengths follows after the comment lines. It starts with the character string

```
+ Anemometerhoehen (0.1 m):
```

followed by the 9 integer anemometer heights in the unit 0.1m (for each, 4 characters without leading zero, separated with a blank), which are related to the roughness lengths 0.01 to 2 m according to the appendix 3 of the TA Luft.

The data set includes lines with 16 entries each. They are separated by one single blank.

Sample:

```
* AKTERM Time series, International broadcast service,
Nairobi. (KB1A)
```

```
* Period 01/1995 to 12/1995
* Data of Timbuktu, 11.04.2002
+ Anemometerhoehen (0.1 m):   32   41   57   74   98
144  200  244  283
AK 10999 1995 01 01 00 00 1 1 210  56 1 3 1 -999 9
AK 10999 1995 01 01 01 00 1 1 220  64 1 3 1 -999 9
AK 10999 1995 01 01 02 00 1 1 260  68 1 3 1 -999 9
AK 10999 1995 01 01 03 00 1 1 270  65 1 3 1 -999 9
AK 10999 1995 01 01 04 00 1 1 250  64 1 3 1 -999 9
AK 10999 1995 01 01 05 00 1 1 250  64 1 3 1 -999 9
...
```

The entries mean:

Significance	Position of digits	Value range
Data Identifier	1 to 2	AK
Station number	4 to 8	00001 – 99999
Year	10 to 13	1800 – 2...
Month	15 to 16	1 – 12
Day	18 to 19	1 – 31
Hour	21 to 22	0 – 23
Numerical empty field	24 to 25	0
Quality byte (Wind direction)	27	0, 1, 2, 9
Quality byte (Wind speed)	29	0, 1, 2, 3,9
Wind speed	31 to 33	0 – 360, 999
Wind speed	35 to 37	0 – 999
Quality byte (value status)	39	0 – 5, 9
Dispersion category according to Klug/Manier 41	41	1 – 7, 9
Quality byte (value status)	43	0, 1, 9
Mixture layer height (m)	45 to 48	0 – 9999
Quality byte (value status)	50	0 – 5, 9

The quality byte of the wind direction can assume the following values:

QDD	Significance
0	Wind direction in deca degrees
1	Wind direction in degrees, original in deca degrees
2	Wind direction in degrees, original in degrees
9	Wind direction is missing

The quality byte of the wind speed can assume the following values:

QFF	Significance
0	Wind speed in nodes
1	Wind speed in 0,1 m/s, original in 0,1 m/s
2	Wind speed in 0,1 m/s, original in nodes (0,514 m/s)
3	Wind speed in 0,1 m/s, original in m/s
9	Wind speed is missing

An entry of the dispersion category according to Klug/Manier is 7, if the dispersion category cannot to be defined. The failure identifier is 9.

The time is given in UTC (GMT). If the data are representative for a period of one hour, the entered time will be the end of the hour. In case data are missing, indeed station number and date are given, but the measure values are replaced with blanks. AUSTAL2000 interprets data sets as invalid or as be missing, if the value of Klug/Manier is 0.

Austal2000 ignores the Turner category and the ww-key number.

AKS file

Format: ASCII

The wind conditions are accepted in the form of a dispersion class statistics in the format of TA Luft. The file contains data about frequencies of wind direction, wind speed and dispersion classes in 1/100 per mille. For all wind directions in batches of 10-degree steps each, the wind speed classes' frequency in 9 levels and the dispersion classes' frequency in 6 groups are given. The file format is presented in the following table for the first dispersion class.

Extract from a Wind Dispersion Classes Statistics File

Name														
period														
TA Luft														
Year														
all cases														
460	710	870	940	950	890	740	540	370	240	180	140	120	.	.
160	240	300	320	320	300	250	180	120	80	60	50	40	.	.
130	210	260	280	280	260	210	150	90	60	40	30	20	.	.
0	0	0	0	0	0	0	0	0	0	0	0	0	.	.

0	0	0	0	0	0	0	0	0	0	0	0	0	.	.
0	0	0	0	0	0	0	0	0	0	0	0	0	.	.
0	0	0	0	0	0	0	0	0	0	0	0	0	.	.
0	0	0	0	0	0	0	0	0	0	0	0	0	.	.
0	0	0	0	0	0	0	0	0	0	0	0	0	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

From the 6th row on are given the frequencies of each case. AUSTAL2000 accepts and recognizes statistics divided in groups of 10 degrees each. Therefore, the data must be presented in the following form:

Columns: Wind direction: from10 to 360 degrees in groups of 10 degrees each; and

Rows: arranged by wind speeds, calculation values according to TA Luft,
i. e. 1; 1.5; 2.3; 4.5; 6; 7.5; 9; 12 m/s
and then in blocks for each dispersion class I, II, III/1, III/2, IV, V.

All frequencies must be given in 1/100 pro mille, i.e. the sum of the frequencies = 100 000.

WND-File

The dispersion model PROKAS requires the WND-File format as meteorological input data.

The wind conditions are accepted in the form of a dispersion class statistics in the format of TA Luft. The file contains data about frequencies of wind direction, wind speed and dispersion classes in 1/100 per mille. For all wind directions in batches of 10-degree steps each, the wind speed classes' frequency in 9 levels and the dispersion classes' frequency in 6 groups are given. The file format is presented in the following table for the first dispersion class.

Extract from a Wind Dispersion Classes Statistics WND-File

Anemometer_height 10 Station Example														
460	710	870	940	950	890	740	540	370	240	180	140	120	.	.
160	240	300	320	320	300	250	180	120	80	60	50	40	.	.
130	210	260	280	280	260	210	150	90	60	40	30	20	.	.
0	0	0	0	0	0	0	0	0	0	0	0	0	.	.
0	0	0	0	0	0	0	0	0	0	0	0	0	.	.
0	0	0	0	0	0	0	0	0	0	0	0	0	.	.

0	0	0	0	0	0	0	0	0	0	0	0	0	.	.
0	0	0	0	0	0	0	0	0	0	0	0	0	.	.
0	0	0	0	0	0	0	0	0	0	0	0	0	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

From the 6th row on are given the frequencies of each case. AUSTAL2000 accepts and recognizes statistics divided in groups of 10 degrees each. Therefore, the data must be presented in the following form:

Columns: Wind direction: from10 to 360 degrees in groups of 10 degrees each; and

Rows: arranged by wind speeds, calculation values according to TA Luft,
i. e. 1; 1.5; 2.3; 4.5; 6; 7.5; 9; 12 m/s
and then in blocks for each dispersion class I, II, III/1, III/2, IV, V.

All frequencies must be given in 1/100 pro mille, i.e. the sum of the frequencies = 100 000.

The **measuring or anemometer** height in meter has to be given as the second string in the first row, which has to be separated by at least one space in both directions. This number is defined as the measuring height by PROKAS. The following characters are without effect and are used for comments.

Meteoroloy Monin Obukhov Lenth file

Format: dBase IV

Field list (only required fields are listed):

field name	explanation	field type digits/Scale
WSPEED	Wind speed [m/s or nodes]	decimal 15/1
WDIR	Wind direction [degree]	decimal 15/1
LMO	Monin-Obukhov Length	decimal 15/1

Domain

Terrain Grid

The dialog Create Terrain Grid provides features to define the desired simulation area (Terrain grid) and store it in a shape file. This terrain grid shape file can be loaded in the Austal Navigator dialog.

It is possible to define terrain grid shape files by selecting a rectangle or by defining the centre of the grid and give the height and width extent. In any case the mesh size has to be defined.

Rectangle
Button X,Y:

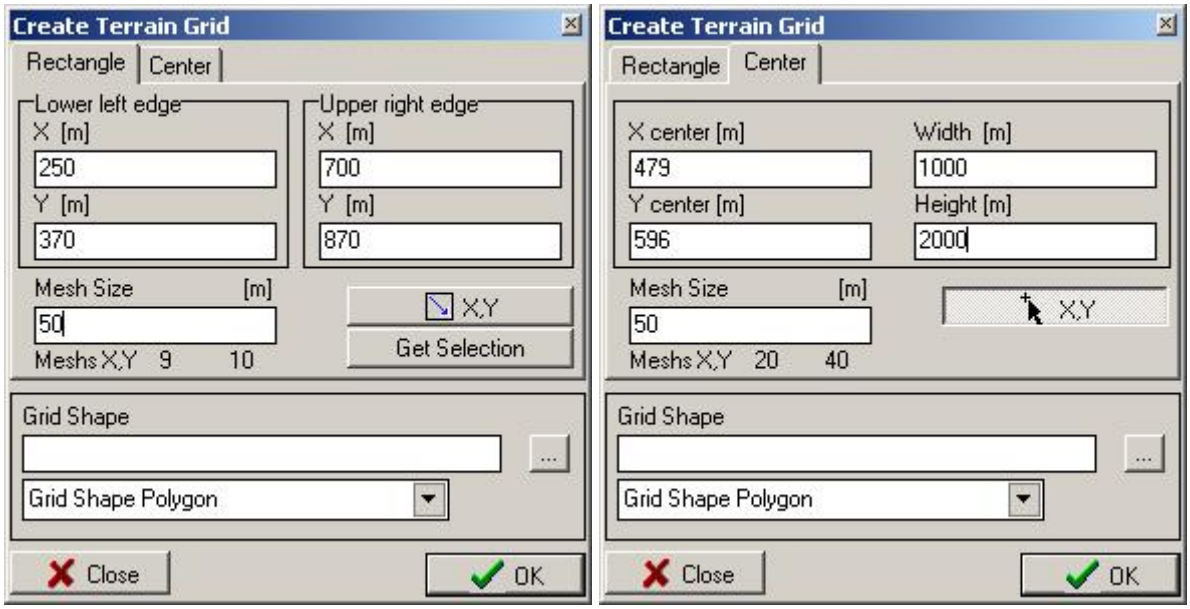
Tool to select grid area.

Button Get Selection:

Defines Extent of the terrain grid by getting the envelope of the selection of an existing and in ArcMap selected Terrain Grid shape. It is usefully to produce nesting grid shapes.

Centre
Button X,Y:

Tool to select centre of the terrain grid.



Terrain grid

The Terrain Grid dialog allows the user to define a grid of regular areas or receptor points.

For **Austal2000** here are two ways to define Terrain grid. First AUSTAL2000 creates one automatically or define it manually with Create Terrain Grid or entering Coordinates in the Terrain Grid Table in AUSTAL2000/ Terrain grid! Normally grid data means raster data, but it can also describe vector data with equidistant rectangles. All rectangles are touching the neighbours without a gap, it is a equable pattern. Create Terrain Grid produces vector based Grid shape files. These Grid shapes can be imported to AUSTAL2000 Navigator/ Terrain grid.

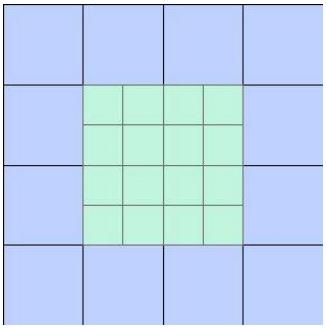
PROKAS requires receptor points. Choose the shape type “PROKAS Receptor Grid Shape Point”. The shape file can be imported to PROKAS Navigator/Receptorpoints

Using the Selecting Tool  it is possible to draw a rectangle in the map. According to the mesh size a grid apears in the Map. It is possible to move this grid with the mouse. Using the shift key at the keyboard the grid snaps to the rounded coordinates according to the magnitude order of the mesh size (e.g. mesh size: 50, the coordinate will be rounded to 10). The Coordinates and the mesh size corresonding to the grid in the map. If you draw a grid in the map, the extent of the grid will be entered into the formular. If you change coordinates or the mesh size in the formular the grid in the map will be adapted to this changes.

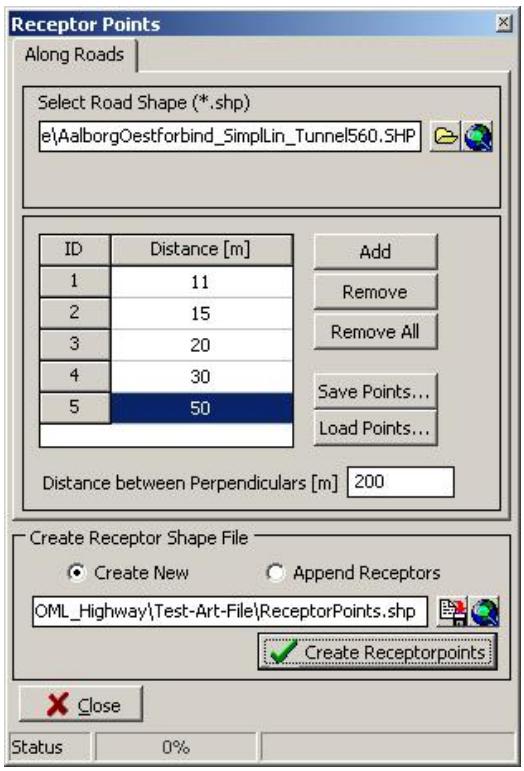
The mesh size of rectangles will proportional influence the accuracy in immission calculations.

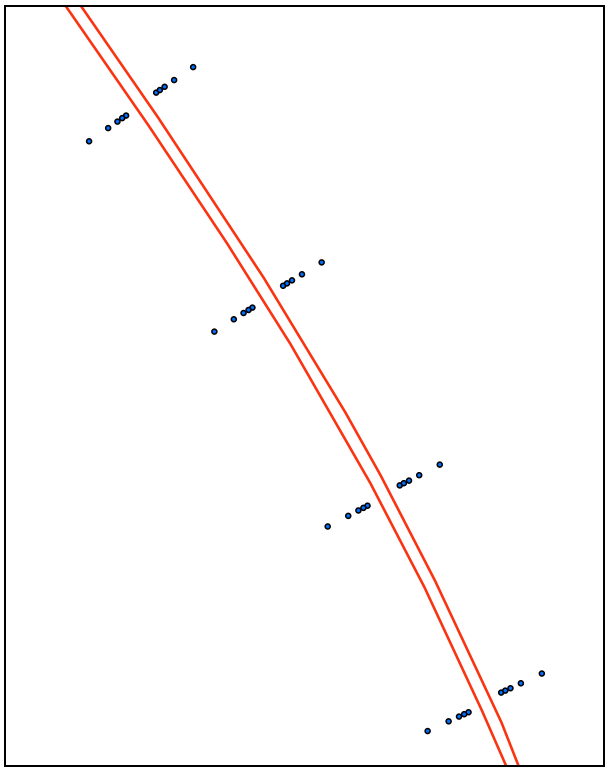
Nesting

Nested grids are grids which are located in other grids. To nesting grids has the advantage that calculations specify in a given location. Therefore the accuracy increases at this area and the analysis becomes more sophisticated! For calculation with AUSTAL2000 it is absolute necessary, that the nested matrix is congruent to the outer matrix! From this follows that the mesh size of the nested grid is exact a multiple of 2 with the size of the outer grid!



Receptors along Roads



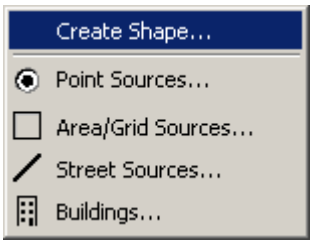


In the formular Receptor Points the user might create receptor points along roads. At least one distance parameter needs to be provided. The program considers single lines and parallel lines as well. The more distances the user provides the more points will be gradually created, orthogonal to the road segment. It is possible to create a new receptor point shapefile or add points to an existing point shapefile.
The distance list can be saved and load in an distance file (*.pli).

Digitising Tools

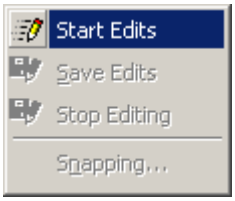
The Digitising module of SELMA[GIS] includes features to digitising the location, describing data and emission values of emissions sources. Point, street and area/grid sources must be digitised separately. The general method of digitising includes the following steps:

1. Make clear what type you want to digitise. Types: Points, Area, Grid or Street sources furthermore buildings
2. If a digitising shape doesn't exist create a new shape file according to the digitising type (Create Shape Files dialog) and load it as Layer in ArcMap.
3. Click the Command Digitising in the SELMA[GIS] Toolbar and choose the type of digitising according to the Shape type.

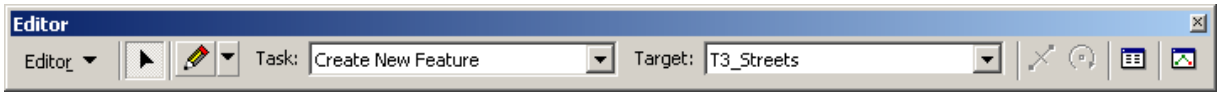


4. After selection the Digitising Menu and the Digitising dialog according to digitising types (point, street, area/grid sources or buildings) appear.

5. Start Edits.



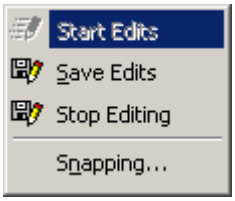
6. Choose the target layer in the editor toolbar and check the edit task (must be create new feature)



7. Create new features or select features with the edit tool according to the type of digitising and/or enter values to the attributes dialog and press **Apply**.

8. Save Edits (use this to store your digitising work during an Edit session)

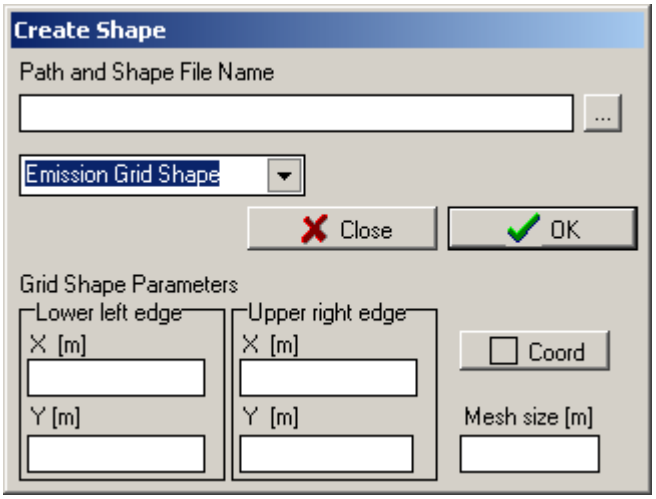
9. Stop Edits



Important note:

- Open/save and close an SELMA[GIS] edit session only with the commands of the SELMA[GIS] Digitising Toolbar.
- The Digitising Tool in the Toolbar activate them self-according to the type of the chosen target layer (street, point or area /grid shape) during an edit session.

Create Shape Files



Shape file name:

Defines the file name of the shape.

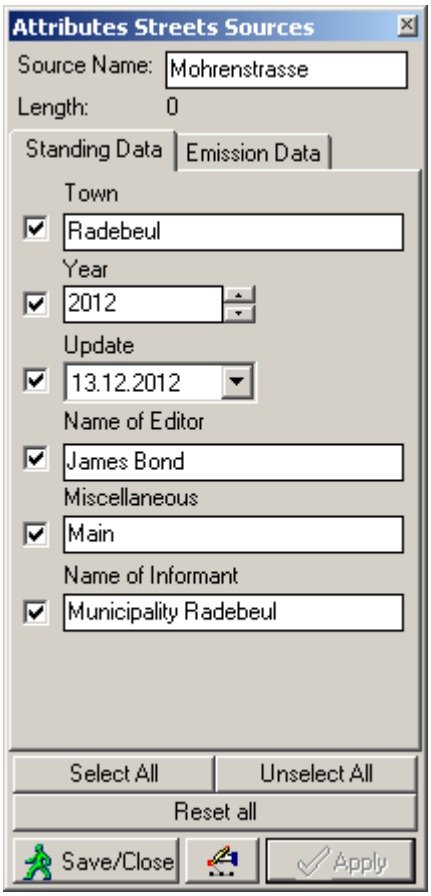
Shape type :

Defines the shape type.

Important note:

- Emission grid shapes can be created by choosing extent Coordinates with the Tool *Coord* and defining mesh size

Digitising Street Sources

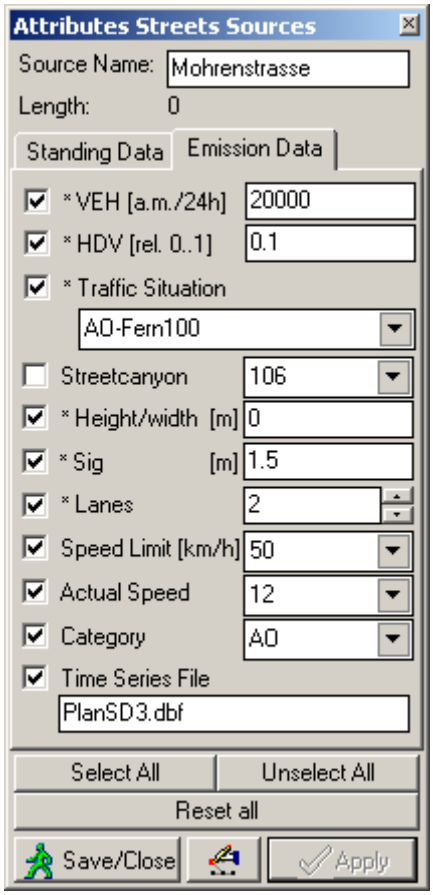


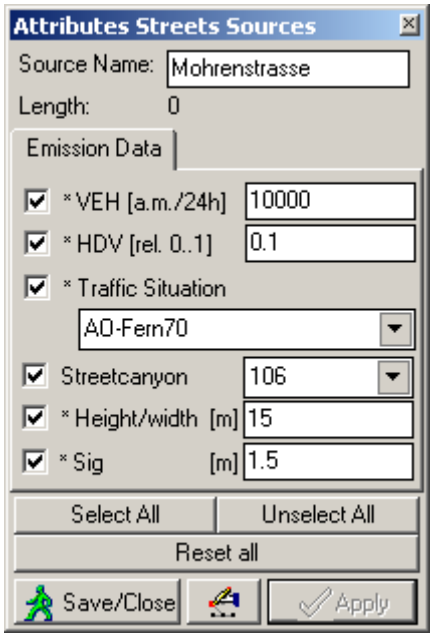
***Standing Data*:**

Defines administrative Input data.

Control Area:

See Control Area





Emission Data:

The Dialog differs according to the selected scheme (left figure scheme AUSTAL and right PROKAS) Defines parameter for traffic emission calculation and time series file. The entries of the pull down menu Traffic Situation are read from the Emission Factor file which is defined in the Configuration Dialog.

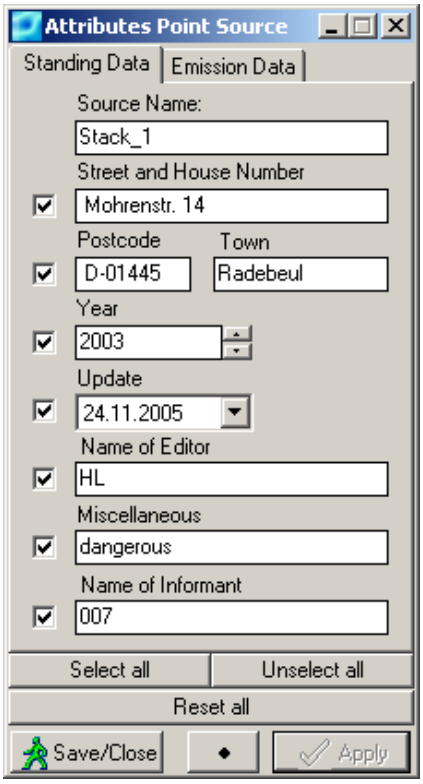
Time Serie:

Defines the Time Series file (Type: dBase IV, Streets) name. The Time series file has to be located in the same directory like the emission shape.

Important note:

- For the calculation acquired parameters are signed with *
- You can add automatically the number of the row to the source name. Define it in the Configuration Dialog.
- **Each Line has to be created only with two points. Also use the task option in the ArcGIS Edit Toolbar "Create 2-point linefeature"**

Digitising Point Sources

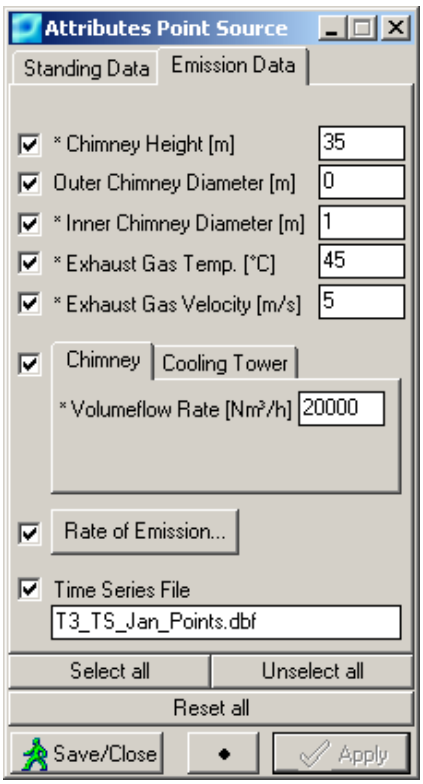


Standing Data:

Defines administrative Input data

Control Area:

See Control Area



Emission Data:

Defines parameter for plum rising and emission rates and time series file.

Emission Rate:

Open the emission rate dialog.

Time Series:

Defines the Time Series file (Type: dBase IV, Point/area/Grid) name. The Time series file has to be located in the same directory like the emission shape.

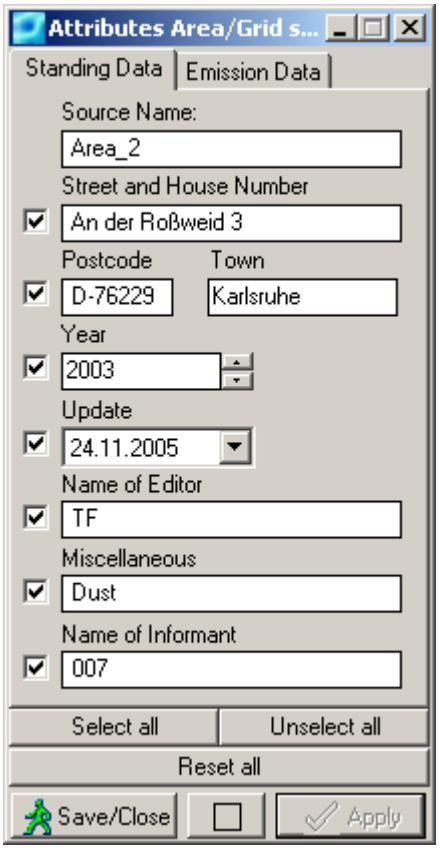
***Rate of emission..*:**

Opens the emission rate dialogue to enter annual mean emissions.

Important note:

- For the calculation needed parameters are signed with *
- You can add automatically the number of the row to the source name. Define it in the Configuration Dialog.

Digitising Area/Grid Sources

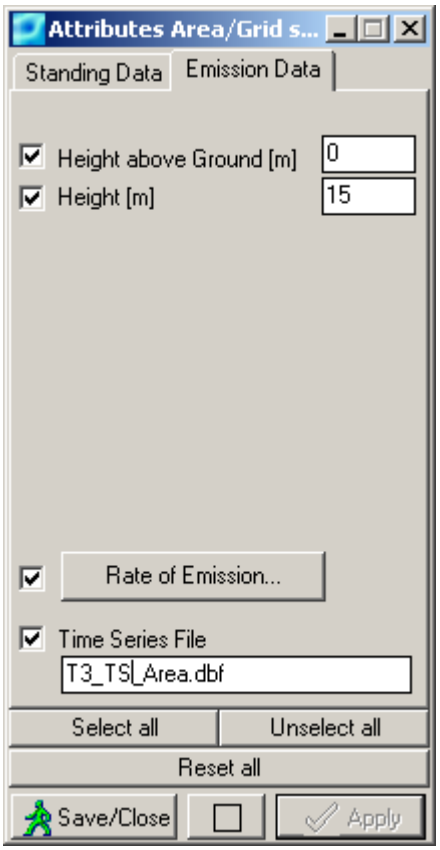


Standing Data:

Defines administrative Input data

Control Area:

See Control Area



Emission Data:

Defines height, emission rates and time series file.

Emission Rate:

Open the emission rate dialog.

Time Series:

Defines the Time Serie file (Type: dBase IV, Point/area/Grid) name. The Time series file has to be located in the same directory like the emission shape.

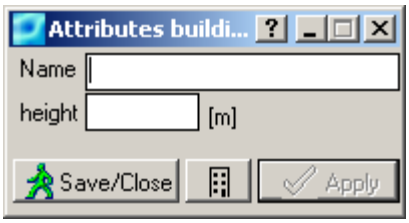
***Rate of emission..*:**

Opens the Emission Rate dialoge to enter annual mean emissions.

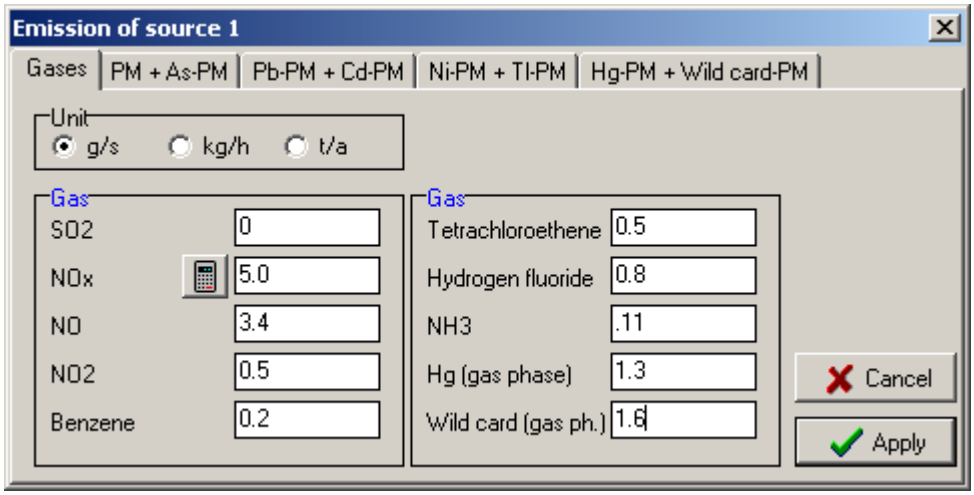
Important note:

- For the calculation needed parameters are signed with *.
- You can add automatically the number of the row to the source name. Define it in the Configuration Dialog.

Digitising Buildings



Emission rate dialog



Unit:

Defines the unit for the input emission rate. In shapes attribute table emission rate is stored as kg/h.

input fields:

defines emission rates for each chemical component.

The first record card '**Gas**' supplies input fields for the gases: sulphur dioxide (SO_2), nitrogen monoxide (NO), nitrogen dioxide (NO_2), nitric oxide (NOx), benzene, tetrachlorethen, hydrogen fluoride (which is specified as fluorine), ammonia (NH_3), mercury (Hg), as well as for an inert substance (Wild-Card Gas). The units can be entered in grammes per second (g/s), kilogrammes per hour (kg/h) or tonnes per year (t/a). Click on the selection fields of these units to enter the data. The edit fields vary from 0 to 10 000. (The programme defines the substance NOx separately from the substances NO and NO_2. That means, the same emissions should be specified like by NO and NO_2, according to the calculation rule NOx = NO2 + 1.53*NO.)

The next four record cards supply input fields for different kinds of dust. They are: general dust (PM), arsenic dust (As), lead dust (Pb), cadmium dust (Cd), nickel dust (Ni), thallium dust (Tl), mercurial dust (Hg) and any further dust (Wild-Card Dust).

Important note:

- The Wild-Card gas and the Wild-Card dust are the same substance. That means, if you enter a mass flow for gas and for dust as well, the substance will have a deposition velocity and sedimentation velocity and through them the concentration results will be influenced.

Different grain size classes (from 1 to 4 and unknown) should be distinguished for dust. When the grain size diameter of dust is greater than 10 µm and its partition in classes 3 and 4 is unknown, then choose 'unknown' in the class description. Airborne particles (PM10) are represented with the grain sizes 1 and 2. Enter the emission for each grain size class of dust in the units: grammes per second (g/s), kilogrammes per hour (kg/h) or tonnes per year (t/a).

Auastal2000 deposition calculation uses standard grain size classes with the according deposition velocity (vd) and sedimentation velocity (vs):

	Class da µm	***vd in m/s***	***vs in m/s***
1	< 2,5	0,001	0,00
2	2,5 - 10	0,01	0,00
3	10 - 50	0,05	0,04
4	>- 50	0,20	0,15

Digitising Menue

Select Tool:

Select Features of digitising shapes. Selecting a feature all attributes appear in the corresponding digitising dialog. Also in a non edit session it is possible to select features which are selected in the Content Menu of ArcMap.

Enabled: If a SELMA^{GIS} digitising shape is selected in the content menu of ArcMap or in the pull down menu Target of the Edit Toolbar of ArcMap.

Edit Tool:

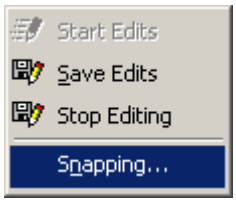
Selects and edits features during an edit session. Edit features by double click. (more about editing see ArcMap help).

Enabled: During Edit session and if a SELMA^{GIS} digitising shape is selected in the pull down menu Target of the Edit Toolbar of ArcMap.

Snap Tolerance:

Digitising Street sources it is useful to define a snap tolerance and snap

edges. The snap tolerance is defined by the radius of an opened circle with the mouse using the Snap Tolerance Tool. The Snap edges are defined by using the Snapping window of ArcMap. It is opened through the Snapping menu.



For Streets it is recommended to check the check boxes End for each shape you want. (More about Snapping options see ArcMap help)
Enabled: During Edit session and if a SELMA^{GIS} Street source shape is selected in the pull down menu Target of the Edit Toolbar of ArcMap.

Rotate:
Rotates any selected feature.
Enabled: During Edit session and a feature is selected.
Hint: Pressing key “a”, it opens an edit field for entering the rotation angle in degrees.

Split:
Splits Streets take the attributes from the non-split feature.
Enabled: During Edit session and if a SELMA^{GIS} Street source shape is selected in the pull down menu Target of the Edit Toolbar of ArcMap and a line feature is selected.

Rectangle:
Creates a Rectangle Polygon feature. All attributes of the digitising dialog are stored automatically.
Enabled: During Edit session and if a SELMA^{GIS} Area/Grid source or Building shape is selected in the pull down menu Target of the Edit Toolbar of ArcMap

Bezier:
Creates a user defined Polygon feature. All attributes of the digitising dialog are stored automatically.
Enabled: During Edit session and if a SELMA^{GIS} Building shape is selected in the pull down menu Target of the Edit Toolbar of ArcMap

Line:
Creates a line feature. All attributes of the digitising dialog are stored automatically.

Enabled: During Edit session and if a SELMA[GIS] Street source shape is selected in the pull down menu Target of the Edit Toolbar of ArcMap.
Remark: **Each Line has to be created only with two points. Also use the task option in the ArcGIS Edit Toolbar "Create 2-point linefeature"**

Point:
Creates a Point feature. All attributes of the digitising dialog are stored automatically.
Enabled: During Edit session and if a SELMA[GIS] Point source shape is selected in the pull down menu Target of the Edit Toolbar of ArcMap.

Digitising Dialog (Control Area)

All digitising dialogs have the control area above.

Reset all:
Changes all entries to the standard values.

Check boxes:
Any Entries in of the digitising dialog owns a Check box. Only if the corresponding check box is checked the entries will be stored in the attributes table of the digitising shape.

Select all:
Checks all check boxes.

Unselect all:
Uncheck all check boxes.

Save/Close:
Closes the edit session. Before closing it will be asked if edits has to be saved.

Apply:
Stores all input parameters of the dialog in the attribute table of the shape according to the selected geometry. It is also possible to select many geometries and store dialog parameters to all selected geometries.

AUSTAL2000

SELMA^{GIS} contains a wind and dispersion field model AUSTAL2000 module (www.austal.de). It is provided as a module under the ArcMap™ GUI. AUSTAL2000 is the official German Federal Environmental Agency air pollution dispersion model and meets the demands contained in appendix 3 of the German "Technical Instruction Clean Air" (TA Luft). Since October 2002 this law passed the German legislative bodies and the code AUSTAL2000 was made available.

AUSTAL2000 contains a 3-dimensional Lagrangian particle model (according to the German guideline VDI 3945 sheet 3), allowing to calculate as well concentration time series as statistical concentration parameters. AUSTAL2000 is able to describe dispersion during different physical conditions in the atmospheric boundary layer, under all types of atmospheric stability conditions. AUSTAL2000 contains a flow model being able to cope with complex terrain (mountains, hills) and also the effects of buildings. A detailed description of AUSTAL2000 is available in the internet (see: www.austal.de, in German and English). The current Manual you find in the installation of SELMA^{GIS}.

AUSTAL2000 allows up to 300 x 300 grid points in the horizontal direction, i.e. the grid resolution for a simulation of a region of 25 km x 25 km is approx. 85 m. With SELMA^{GIS}'s Terrain Factory module, the available terrain data are interpolated to the grid with a resolution necessary for the simulation selected by the user.

AUSTAL2000 uses state of the art boundary layer parameterization based on guideline VDI 3783 sheet 8 (Turbulence parameters for dispersion models supported by measurement data). The Monin-Obukhov length, which is an input parameter, can for example be calculated as a function of the Klug/Manier stability class and the roughness length z0. The mixing height can be given explicitly in the AKTerm file (see below) or is calculated as a function of the Monin-Obukhov length and the friction velocity.

AUSTAL2000 expects as input either

- a meteorological time series in the so called AKTerm format (hourly meteorological data from one meteorological station) or

- the frequency distribution of wind speed, wind direction and dispersion category from one meteorological station.

Additionally AUSTAL2000 needs as physiographic parameters

- the topography height
- the aerodynamic roughness of the surrounding
- building information (building contours and building height)

AUSTAL2000 can treat the dispersion of the following gases:

- SO2, NO, NO2, NOx (given as NO_2), Benzene, Chloroethane,
- Hydrogen Fluoride (given as F), NH_3, Hg and 1 wild card substance or odour

The following different particulate matters (dust, particles) can be distinguished:

- Dust (general), As, Pb, Cd, Ni, Hg, Tl and 1 wild card substance

Five different particle size classes can be specified (Class 1 to 4 and class “unknown particle size”). Emission data for all sources can be given as time series. AUSTAL2000 is able to handle at least 500 point and area sources and at least 5000 line sources. Emissions can be defined as

- Point source
- Area source
- Line source and
- Grid based sources

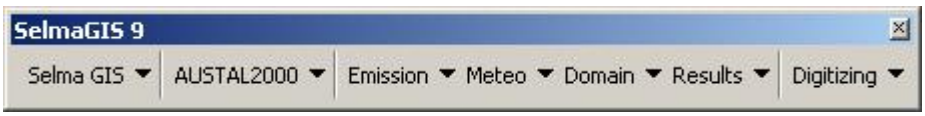
AUSTAL2000 contains a diagnostic wind field model to cope with complex terrain. Diagnostic wind field models provide mass-consistent area covering wind fields for complex terrain on the basis of measured data. Diagnostic wind field models are recommended up to a terrain slope of 1:5. AUSTAL2000 has an interface in order to be able to input meteorological fields from other models e.g. from dynamical (prognostic) wind models (Prerequisite: The meteorological fields must satisfy mass-conservation).

Controls and Commands

All functions and Dialogs of SELMA^{GIS} can be accessed with Command buttons in the SELMA^{GIS} Toolbar. You get the toolbar by selecting

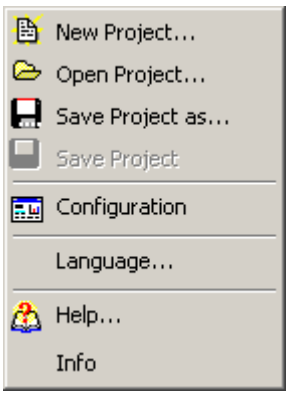
"SELMA^{GIS} 9" in the context menu which is opened by clicking the right mouse button in the menu area of ArcMap.

SELMA^{GIS} Toolbar



- SELMAGIS Menu for managing SELMAGIS project
- AUSTAL2000 Menu for prepare/execute AUSTAL2000 dispersion model
- Emission Menu for Calculating road traffic emissions and generate emission time series
- Meteo Menu with import Feature
- Domain Menu for preparing terrain grid
- Results Menu for read results of Dispersion models
- Digitising Menu with digitising tools based on ESRI shapes

SELMA^{GIS}

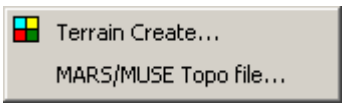


AUSTAL2000

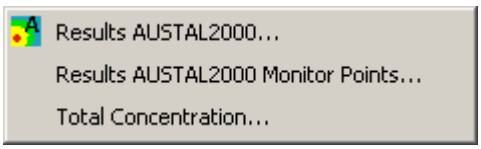
Emission Factory

Meteorology Factory

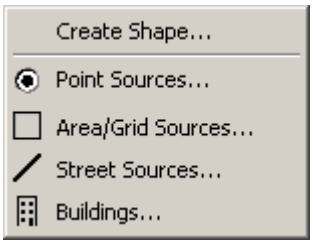
Domain



Results



Digitising



Input fields for shape files or ASCII support drag&drop files coming from the file manager (e.g. Explorer) or from ArcMap's table of content (TOC). Double click on the white area or click on the directory icon opens an open/save dialog or select directory dialog. Click on the world icon add the shape file to the TOC of ArcMap as a feature layer.

Austal Navigation

For each group of AUSTAL2000 input data AUSTAL2000 dialog provides one panel. Navigation is possible by clicking on list items in the Navigation bar left hand.

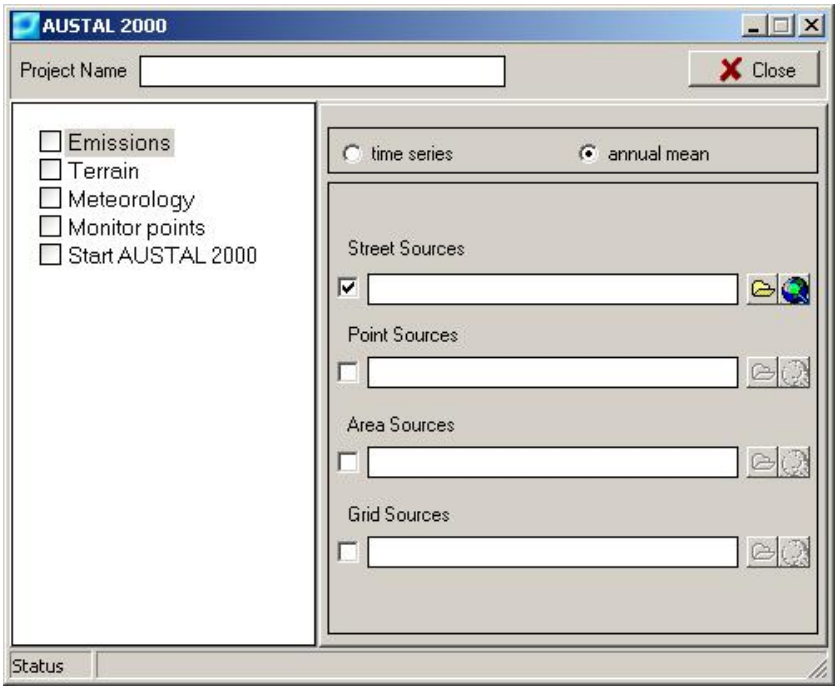
Emissions

Time series or annual mean:

Defines if AUSTAL2000 calculates with annual mean emission or time series emission.

Emission shapes:

All different emission shapes are loaded separated as sources type. Every emission shape file are defined by file name by clicking on the open button or double click on the edit fields.



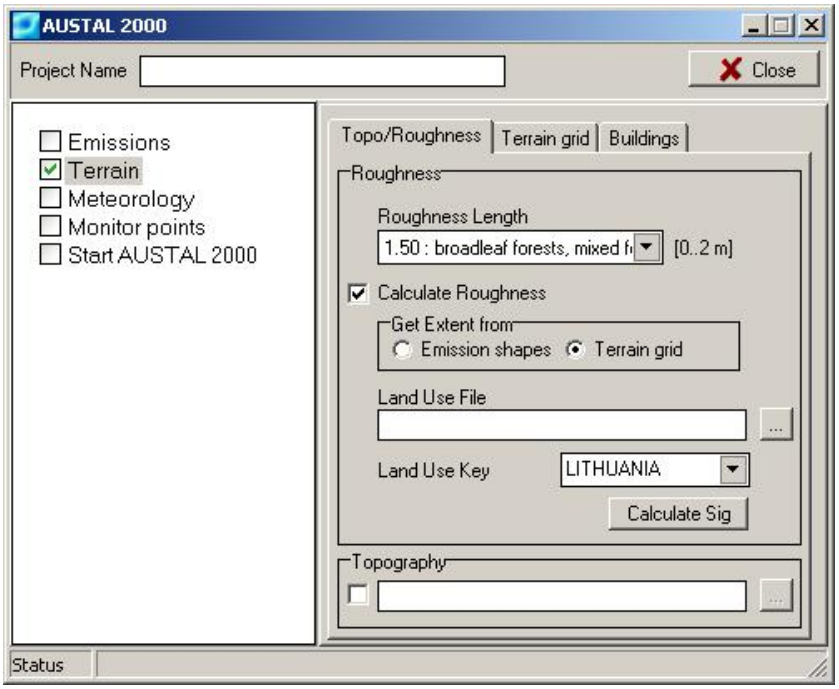
Important note:

- Check boxes must be activated for each source type which should be considered.
- For time series calculation must be defined time series file names and annual mean emissions in Shape files.
- For Street emissions generate emission with Emission Factory Street Emission before.
- For annual mean calculation must be define only annual mean emissions.

Terrain

The AUSTAL Terrain dialog provides an import for supplied elevation models, buildings, and land use data.

Data are interpolated to the required horizontal grid resolution by AUTAL2000 automatically. Therefore the user selects the desired simulation area from several hundreds of meters up to 25 km and SELMA^{GIS}'s Terrain Factory module generates the appropriate terrain input file.



Roughness length:

Defines roughness length. The roughness length can be defined according to the land cover type which are listed in the following table.

z0 in m	Land cover types with CORINE–Classes
0.01	Beaches, dunes, sands (331); Water bodies (512),
0.02	Dump sites (132); Pastures (231); Natural grasslands (321); Sparsely vegetated areas (333); Salt marshes (421); Intertidal flats (423); Water courses (511); Estuaries (522)
0.05	Mineral extraction sites (131); Sport and leisure facilities (142); Non-irrigated arable land (211); Glaciers and perpetual snow (335); Coastal lagoons (521)
0.10	Airports (124); Inland marshes (411); Peat bogs (412); Sea and ocean (523)
0.20	Road and rail networks and associated land (122); Green urban areas (141); Vineyards (221); Complex cultivation patterns (242); Land principally occupied by agriculture, with significant areas of natural vegetation (243); Moors and heathland (322); Bare rocks (332)
0.50	Port areas (123); Fruit trees and berry plantations (222); Transitional Woodland-shrub (324)
1.00	Discontinuous urban fabric (112); Industrial or commercial units (121); Construction sites (133); Coniferous forest (312)
1.50	Broad-leaved forest (311); Mixed forest (313)
2.00	Continuous urban fabric (111)

Calculate Roughness :

Generates representative Roughness length based on land use data grid (Format ESRI ASCII grid) and an area according to the extent of the defined terrain grid or all emission shape files. Requires a defined Terrain Grid of at least one Emission file.

Topography:

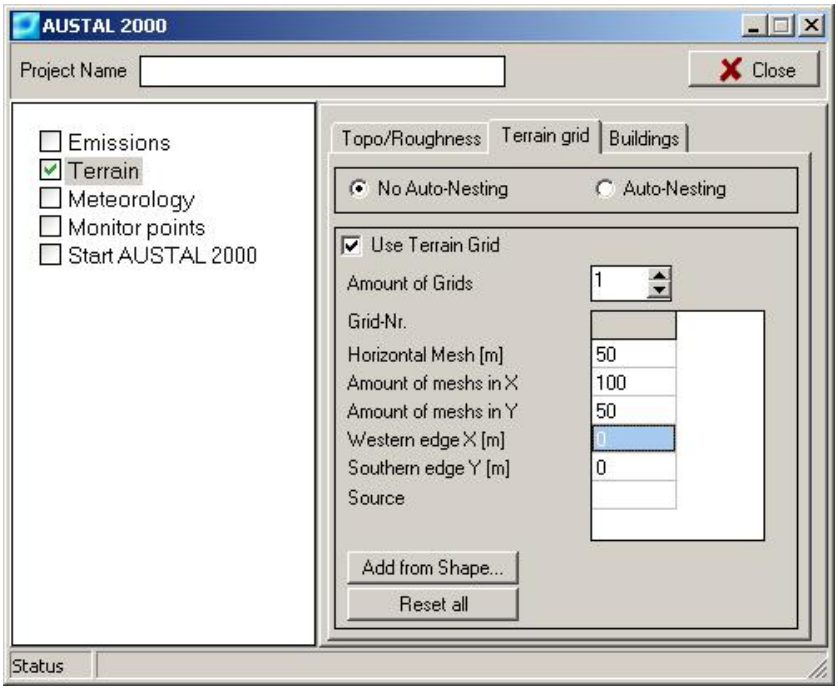
defines elevation grid file (Format ESRI ASCII grid).

Important note:

- Check boxes *Topography* must be Austal2000 should consider topography.

The Terrain Grid defines the extent of the dispersion modelling. AUSTAL2000 allows up to 300 x 300 grid points in the horizontal direction, i.e. the grid resolution for a simulation of a region of 25 km x 25 km is approx. 85 m. Furthermore nesting is possible.

There are two ways to define Terrain grid. First AUSTAL2000 creates one automatically or define it manually with Create Terrain Grid as a shape or entering Coordinates in the *Terrain Grid Table* in.



No-Auto nesting/Auto-Nesting:

For choosing if AUSTAL2000 should generate an own Terrain grid with nesting or without nesting.

Terrain grid list:

For nesting different grids are possible. The nest with smaller horizontal mesh must be added at first. Nested grids are grids which are located in other grids. To nesting grids has the benefit that calculations specify in a

given location. Therefore the accuracy increases at this area and the analysis becomes more sophisticated! For calculation with AUSTAL2000 it is absolute necessary, that the nested matrix is congruent to the outer matrix! From this follows that the mesh size of the nested grid is exact a multiple of 2 with the size of the outer grid!

Add from shape:

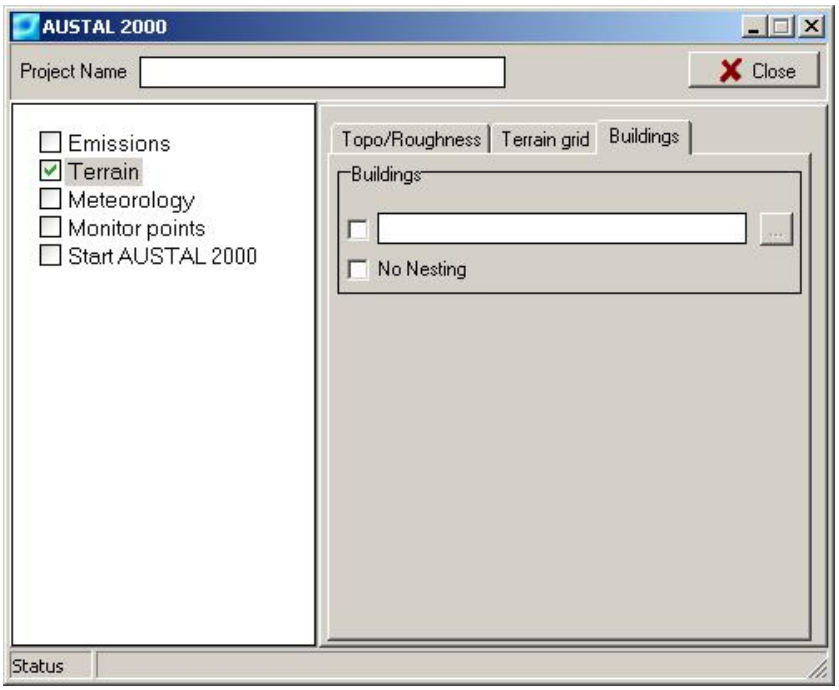
Adds terrain grid from Shape which are generated with the Terrain Factory/Terrain grid dialog.

***Reset all*:**

Deletes all entries in the terrain grid list.

Important note:

- If *Auto-Nesting* is chosen, a user terrain grid couldn't be defined. The Use Terrain grid Field will be disabled.



Buildings:

defines building shape which digitised with SELMA^{GIS} *Digitising Tools*.

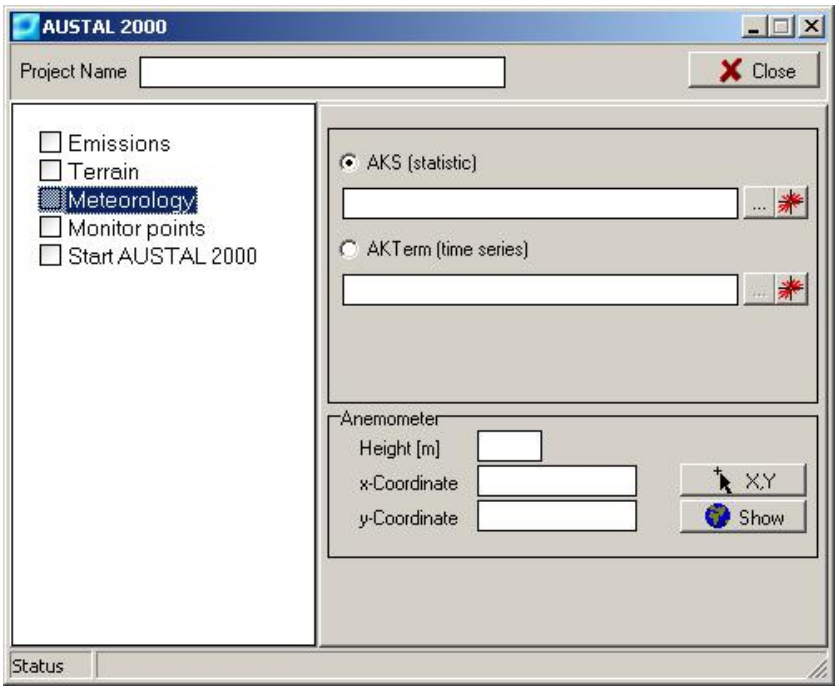
No Nesting:

If Austal2000 consider buildings it is useful to let generate an automatically Terrain grid. Therefore AUSTAL2000 always generates nested grids. For not generate nested grids check *No Nesting.*

Important note:

- Check box *Buildings* must be Austal2000 should consider buildings.

Meteorology



AKS:

Defines the file name of the dispersion class statistics

***AKTerm*:**

Defines the file name of AKTerm file, which stores in each row a single hour of the year with meteorological data.

***Height*:**

Defines the height of the anemometer.

y,x Coordinates:

Defines the local Coordinates of the anemometer.

XY:

Tool to get Coordinates from ArcMap.

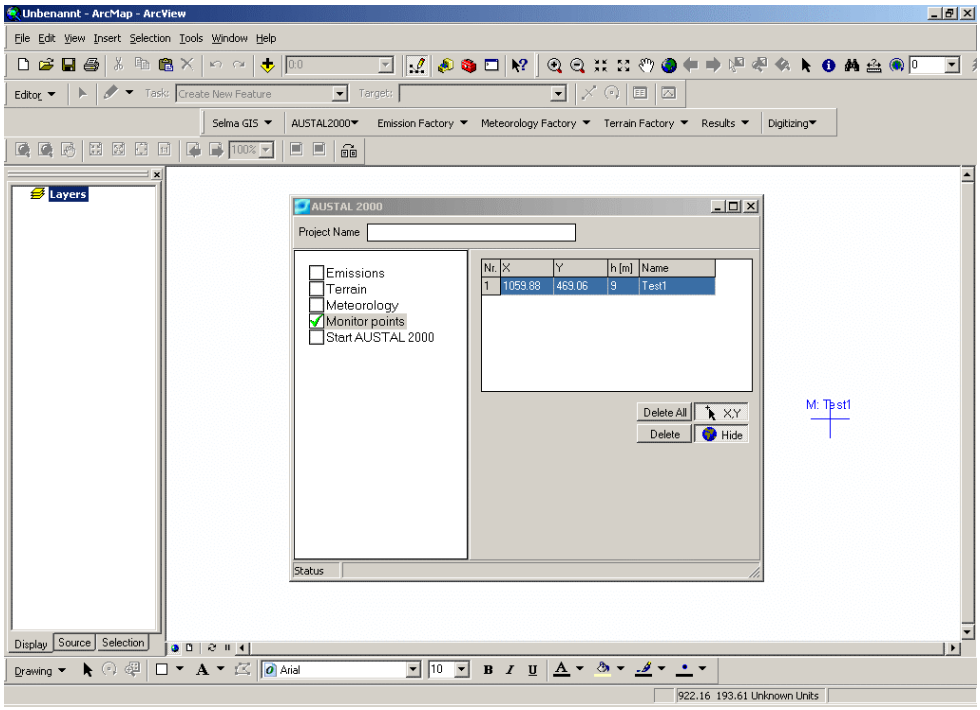
Show/Hide:

Tool to show/hide Coordinates in ArcMap as an cross.

Important note:

- For *time* series calculation it must be defined a AKTerm file

Monitor Points



Define monitor points to get more information (time series result as dBase file) of the results.

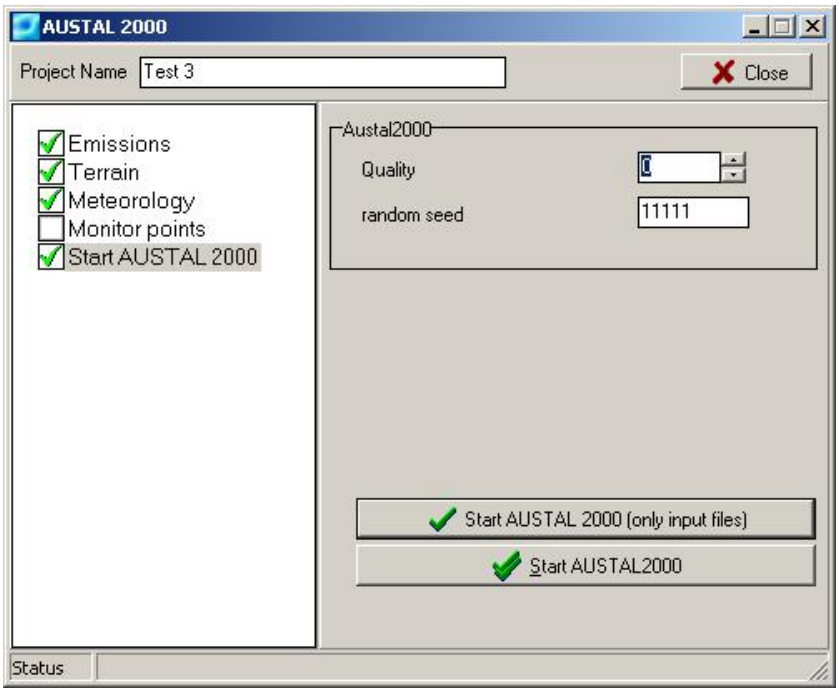
XY:

Tool to add monitor points in ArcMap.

Show/Hide:

Tool to show/hide Coordinates in ArcMap as an cross.

Start AUSTAL2000



Quality:

The entry of the quality level appoints the release rates of particles. The input can be defined from -4 to 4.
Increasing one step causes a doubling of the number of particles and with it a reduction of the statistical uncertainty (scattering) of the factor 1/(root of 2). Indeed the calculation time doubles too. The reduction of the value leads to the opposite. An AKS is normally calculated with at least 43 000 000 particles and an AKTerm with at least 63 000 000 particles.

random seed:

Defines the first random count for the dispersion model.

Start AUSTAL2000 (only input files):

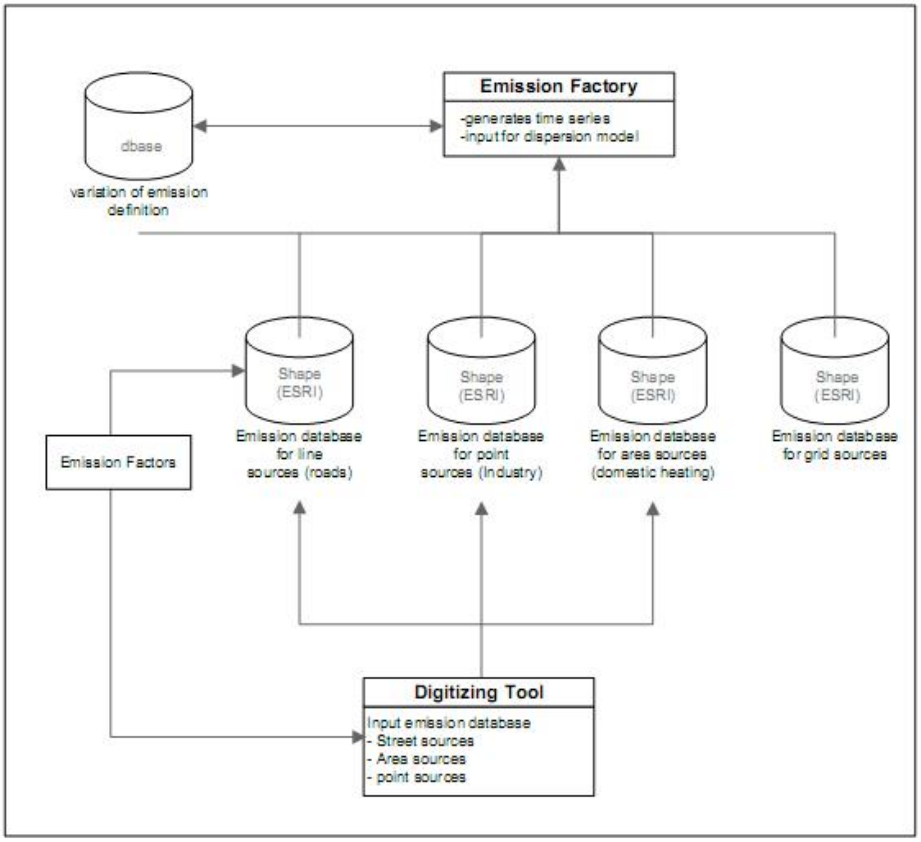
generates AUSTAL2000 input files without starting AUSTAL2000.

Start AUSTAL2000:

generates AUSTAL2000 input files and starts the dispersion model AUSTAL2000.

Emissions Factory

Emission data are held in database ESRI Shape file format separated for line (roads), point (e.g. industry), area (e.g. domestic heating) and grid sources. The geographical position for each source is stored in the ESRI Shape file and the specific emission data and describing data are stored in dBase files that are part of the Shape format. The structure of the specific shape files are described in chapter AUSTAL File Formats.



The SELMA^{GIS} module emission factory prepares emission data as input for the dispersion module AUSTAL2000.

It is possible to run AUSTAL2000 with annual mean emission or time series emissions.

The **annual mean** emission must be stored in the emission source shapes points, area and grid source shapes the input of the annual mean emissions realised by the Digitising Tools of SELMA^{GIS}. For street sources the module Street emission calculates annual mean emission for and store it in the emission shape.

For working with **time series** emissions it needs to generate time series files which are standardised (values for each hour in the year, the sum of one year =100). The standardised time series must be allocated to each source (the filename of a time series is stored in the emission source shape). The real emission time series which is used for AUSTAL2000 is generated by the Street Emission (street sources) or AUSTAL2000 (point, area and grid sources). The time series will be multiplied with the annual mean emissions.

The emission factory provides a time series generator for street sources and point, area/grid sources.

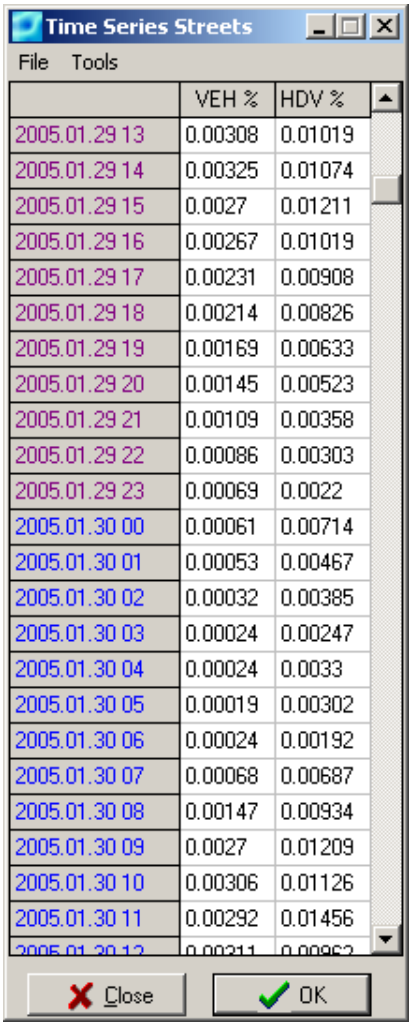
The emission factory module reads the emission database and generates emission time series considering the above mentioned constraints.

The database input must be prepared by the user, assisted by the SELMA^{GIS} module Digitizing Tool . Point and area source data can be imported from dBase files with the separate delivered program dBaseToSelmaShape.exe (SELMA^{GIS} CD\Tools).

Traffic emissions can be estimated using vehicle emission factors which are depended to the region vehicle fleet an specific traffic situations. The emission factors must be create in a separate project. COPERT III can be used to generate emission factors. The program Cop2Sel_int.exe (SELMA^{GIS} CD\Tools) provides an interface which stores emission factory files for SELMA^{GIS}.

Generate Time Series Streets

Time series can be opened and saved with the Dialog Time Series Streets (Command: Emission Factory/Streets/Time Series). Time series files are shown in the table for each hour in the year the proportion (standardised to 100%) of all vehicles (VEH) and heavy duty vehicles >3.5 t (HDV). Working days are displayed black, Saturdays magenta Sundays blue and days with no emission red.



Times series can be generates with the Dialog *Emission Cycles Streets* (Command: Tools/ Generate Time Series). Time series are be defined with year, week and day cycles with the proportion (standardised to 100%). For each cycle exists a register.

All entries are can be saved/loaded in a vtc-file (Command: File/save, open).

Year cycle:

Year: Definition of the represented year

Grid: Year cycle defined by monthly traffic separated in VEC and HDV.

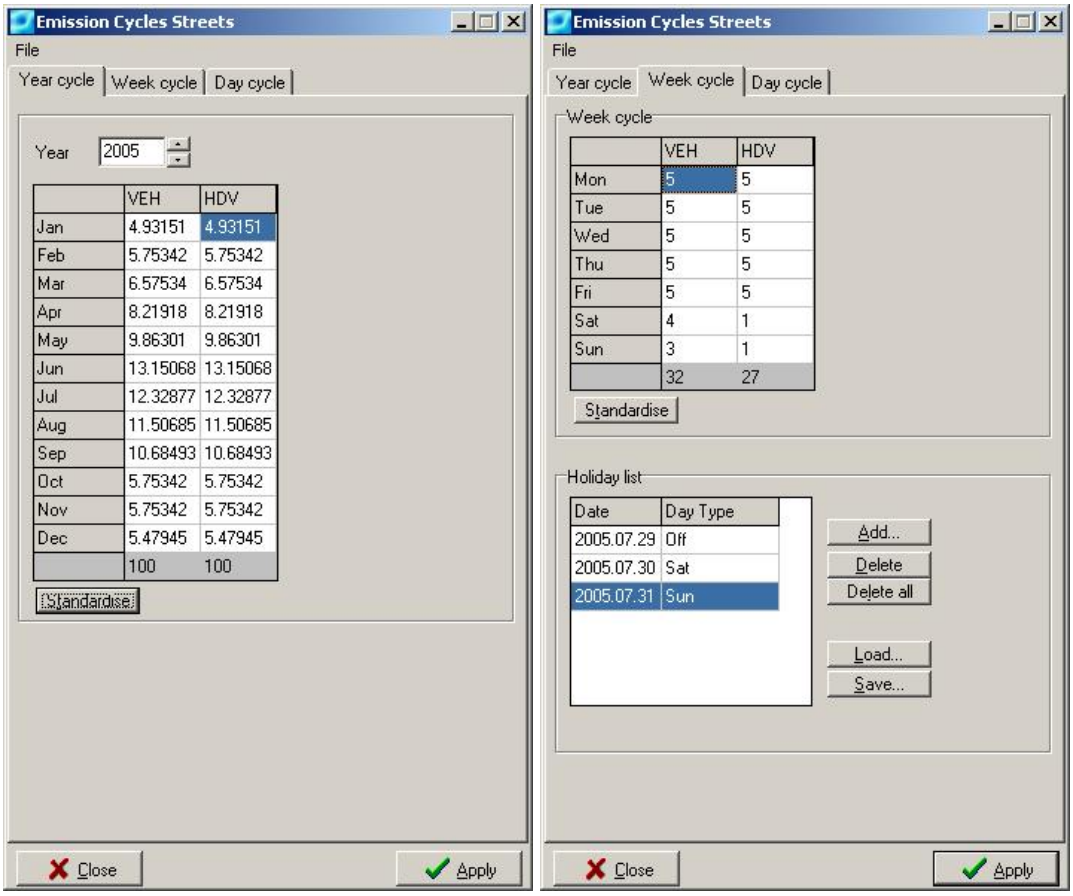
Week cycle:

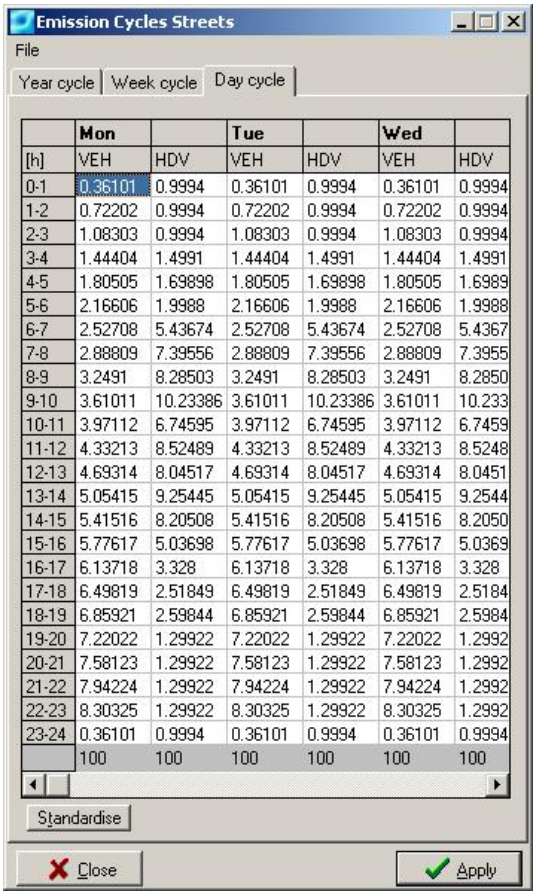
Grid: Week cycle defined by daily traffic separated in VEC and HDV.

Holiday list: Any day of the year can be redefined to a typical Saturday (enter Sat) or Sunday (enter Sun). Furthermore it is possible to define any day of the year without emissions (enter Off).

Day cycle:

Grid: Day cycle defined by hourly traffic separated in VEC and HDV.





	Mon		Tue		Wed	
[h]	VEH	HDV	VEH	HDV	VEH	HDV
0-1	0.36101	0.9994	0.36101	0.9994	0.36101	0.9994
1-2	0.72202	0.9994	0.72202	0.9994	0.72202	0.9994
2-3	1.08303	0.9994	1.08303	0.9994	1.08303	0.9994
3-4	1.44404	1.4991	1.44404	1.4991	1.44404	1.4991
4-5	1.80505	1.69898	1.80505	1.69898	1.80505	1.6989
5-6	2.16606	1.9988	2.16606	1.9988	2.16606	1.9988
6-7	2.52708	5.43674	2.52708	5.43674	2.52708	5.4367
7-8	2.88809	7.39556	2.88809	7.39556	2.88809	7.3955
8-9	3.2491	8.28503	3.2491	8.28503	3.2491	8.2850
9-10	3.61011	10.23386	3.61011	10.23386	3.61011	10.233
10-11	3.97112	6.74595	3.97112	6.74595	3.97112	6.7459
11-12	4.33213	8.52489	4.33213	8.52489	4.33213	8.5248
12-13	4.69314	8.04517	4.69314	8.04517	4.69314	8.0451
13-14	5.05415	9.25445	5.05415	9.25445	5.05415	9.2544
14-15	5.41516	8.20508	5.41516	8.20508	5.41516	8.2050
15-16	5.77617	5.03698	5.77617	5.03698	5.77617	5.0369
16-17	6.13718	3.328	6.13718	3.328	6.13718	3.328
17-18	6.49819	2.51849	6.49819	2.51849	6.49819	2.5184
18-19	6.85921	2.59844	6.85921	2.59844	6.85921	2.5984
19-20	7.22022	1.29922	7.22022	1.29922	7.22022	1.2992
20-21	7.58123	1.29922	7.58123	1.29922	7.58123	1.2992
21-22	7.94224	1.29922	7.94224	1.29922	7.94224	1.2992
22-23	8.30325	1.29922	8.30325	1.29922	8.30325	1.2992
23-24	0.36101	0.9994	0.36101	0.9994	0.36101	0.9994
	100	100	100	100	100	100

Generate Time Series Point Sources

Analogue to Time series Streets.

Generate Time Series Area Sources

Analogue to Time series Streets.

Generate Time Series Grid Sources

Analogue to Time series Streets.

Calculation Street Emission

The Dialog Emission Streets provides features to calculate emissions occurred by street traffic. For the calculation street source shape and a emission factor file is needed. Please make sure, that substances are selected in the SELMA^{GIS} Configuration dialog and the selected Emission names of the emission factor file are the same as defined in the street emission source shape.

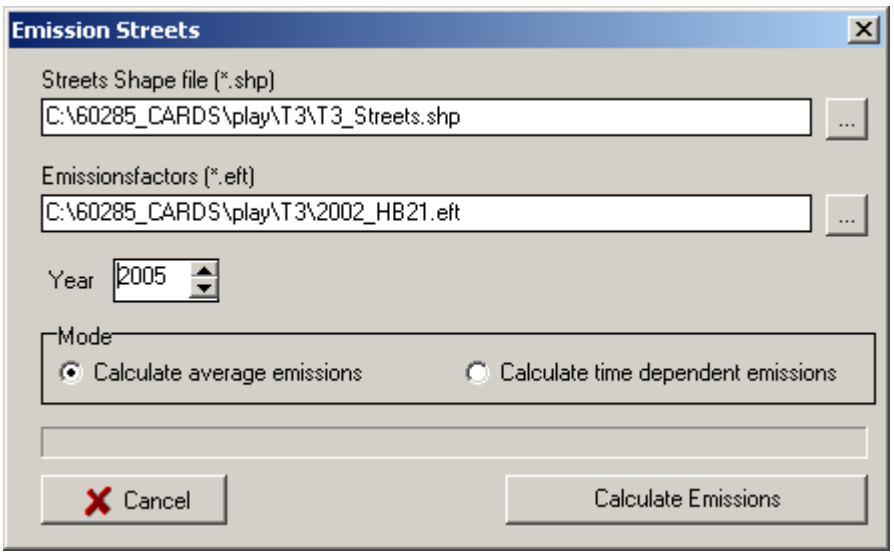
There are two possibilities to calculate street emissions:

Calculating average emissions (annual mean):

Calculates an average emission rate and store it to the street source shape file.

Calculating time dependent emissions (time series):

Calculates an average emission rate and store it to the street source shape file and generate an emission time series, which depends to the time series created in the Emission Factory /Streets. The time series dBase file must be stored for each segment in the street source shape file. The generate Time series emission files are stored in the same folder as the street source shape file. They are needed for AUSTAL2000 calculations.



Street shape file:

Define the street shape file name.

Emission factors:

Defines the emission factors file name.

Mode:

Defines calculation mode

Year:

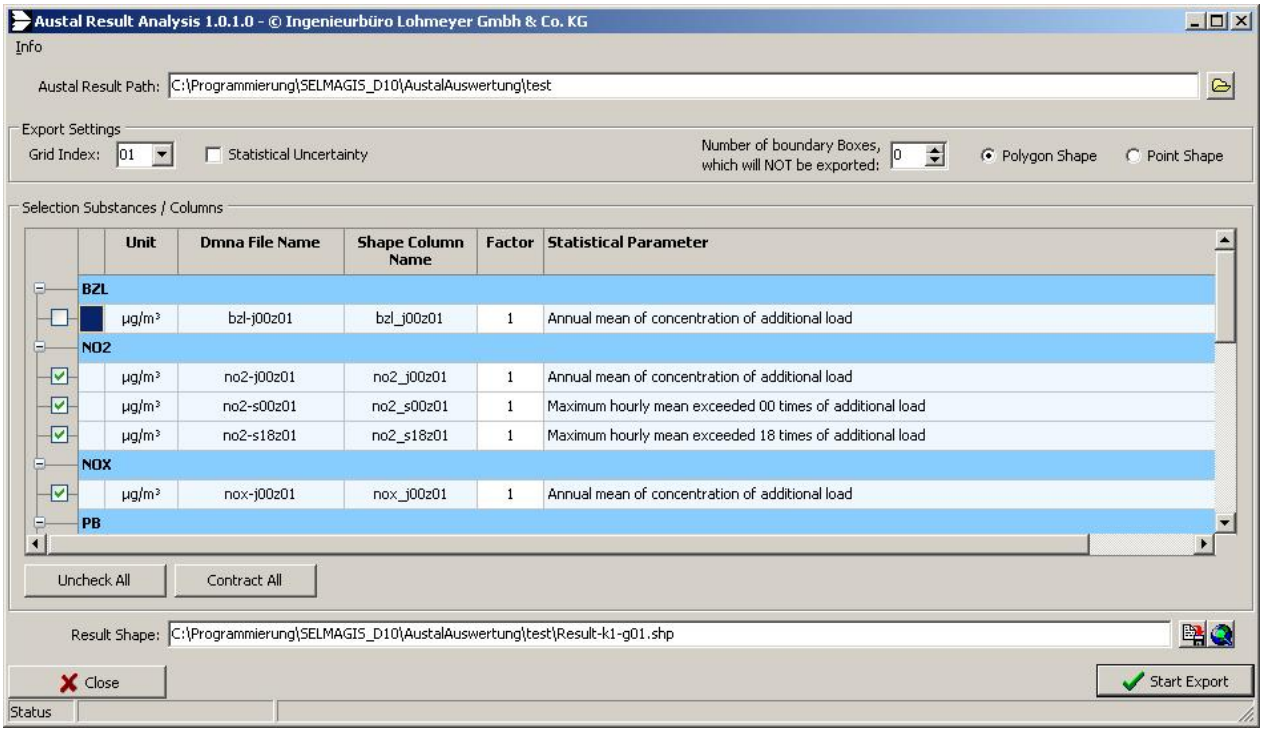
Defines Year of the emission factor file

Results

AUSTAL2000 results are stored in various files in the Austal2000 result directory. The Result module of SELMA^{GIS} can import the results to ArcMap. The following functionality is provided:

1. Reading AUSTAL2000 immission concentrations and convert it to shape format. Optionally it is possible to add preload concentration.
2. Reading monitor point time series immission concentrations.
3. Generate isolines shapes based on the point grid immission shape

Results AUSTAL2000



***Austal Result Path*:**

Defines the directory of the AUSTAL2000 results. After loading the AUSTAL2000 result directory the system identify which chemical components, nesting results and which heights are available.

Grid Index:

Grid Index defines the nesting number of the grid which will be exported. To export all nesting in one shape file is possible as well

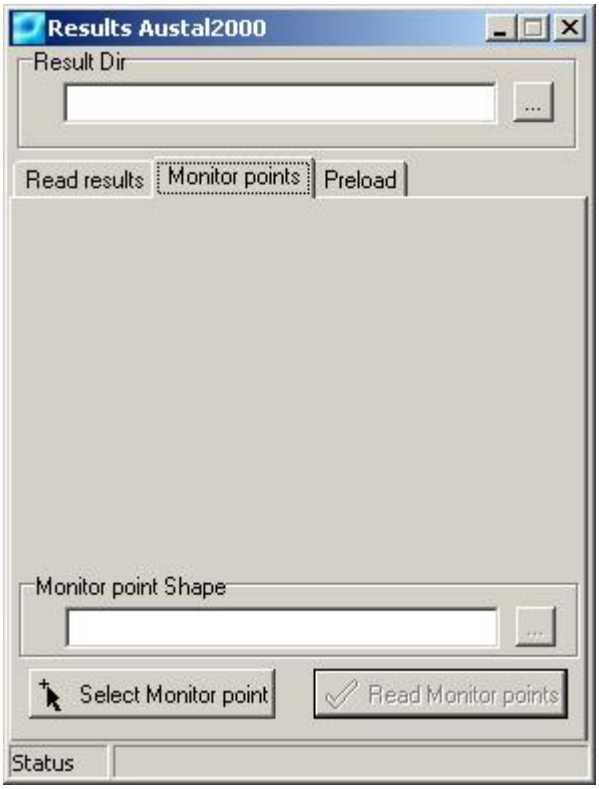
Display Type

Defines which Shape type will be produced. Points shape or Area shapes are possible.

Result shape:

Defines the file name of the Austal2000 result shape file.

Monitor points



Monitor Point Shape:

Defines the file name of the result monitor point shape. It is only visible if there are monitor point results in the AUSTAL2000 result directory. Immission concentration time series are stored separately by monitor point name in dBase files under the directory “MoniDBF” which is placed under the same directory of the monitor point shape. Monitor dBase time series are possible to import in the Excel templates which are available on the SELMA^{GIS} CD /Tools/ excel Templates.

Select Monitor point:

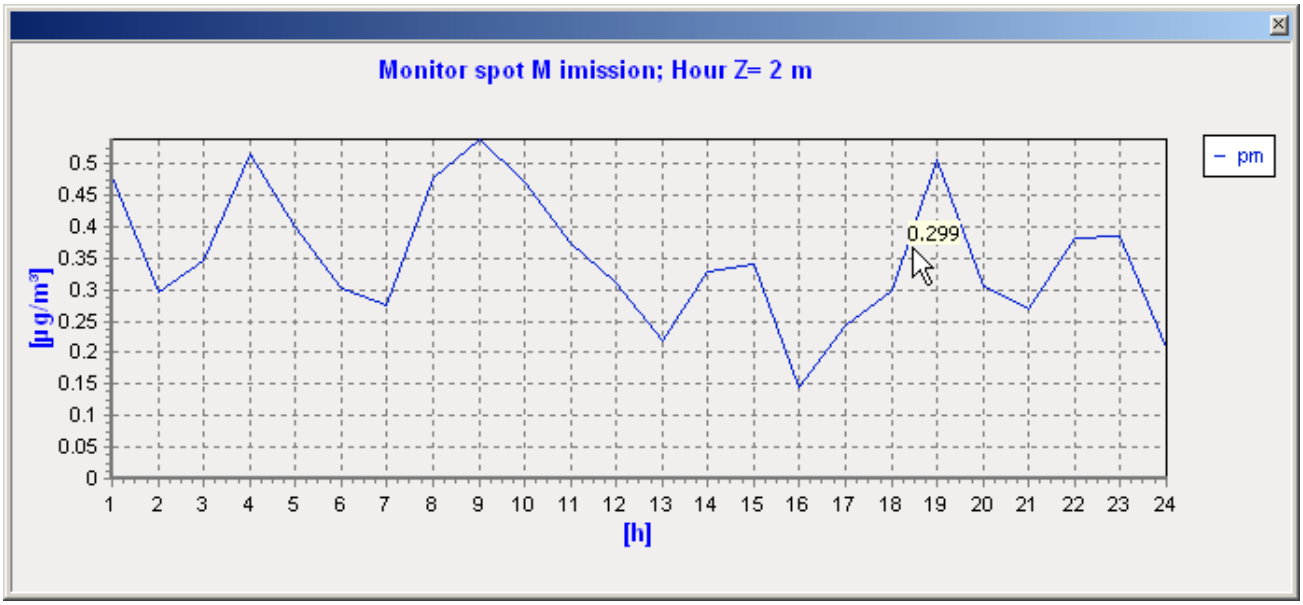
Tool to select a monitor point in a loaded monitor shape in ArcMap. Usage: 1. Select the monitor shape layer in the table of content. 2. Select a monitor point in the Map. After selecting a monitor point a time series chart is appearing.

The time series chart shows for each hour the calculated concentration. By clicking on the line chart the concentration value will be shown as a hint. Delete the value by pressing *backspace* key on the key board.

Zooming in is possible by drawing a rectangle from right to left side with the mouse. Zooming back is possible by drawing a rectangle from left to right side.

The chart can be moved with right mouse click and dragging.

The chart can be copied to the clipboard with the short cut *STR+C*.



AUSTAL File Formats

Point emission source shape

Format: ESRI Shape

Attributable:

field name	explanation	unit	field type digits/Scale
name	name of the source	-	string 30
adress	address (Street and house number)	-	string 30
code	code postal	-	string 5
town	town	-	string 30
year	representative year	-	string20
update	update date	-	string20
editor	Name of the editor	-	string 30
informant	Name of the information	-	string 30
misc	miscellaneous	-	string 30
chi_height	chimney height	m	decimal 10/2
chi_ou_dia	optionally: outer chimney	m	decimal 10/2
chi_in_dia	inner chimney diameter chimney / cooling tower	m	decimal 10/2
ex_temp	exhaust gas temperature	°C	integer 5

	chimney / cooling tower		
ex_velo	velocity exhaust gases/particles chimney / cooling tower	m/s	decimal 10/2
ex_water	water content of exhaust only for cooling tower	kg/kg	decimal 10/2
ex_volfr	volume flow rate only for chimney	Nm³/h	decimal 10/2
ex_moist	relative moisture content of exhaust only for cooling tower	%	decimal 10/2
ldtimserie	name of time series file	-	string 100
eSO2	emission rate annual mean SO2	kg/h	decimal 15/5
eNo	emission rate annual mean NO	kg/h	decimal 15/5
eNo2	emission rate annual mean NO2	kg/h	decimal 15/5
eNOx	emission rate annual mean NOx	kg/h	decimal 15/5
ebenzol	emission rate annual mean Benzene	kg/h	decimal 15/5
ef	emission rate annual mean Hydrogen Fluoride, given as F	kg/h	decimal 15/5
etce	emission rate annual mean Chloroethane	kg/h	decimal 15/5
enh3	emission rate annual mean NH3	kg/h	decimal 15/5
ehg	emission rate annual mean HG	kg/h	decimal 15/5
exx	emission rate annual mean wild card gas	kg/h	decimal 15/5
epm1	emission rate annual mean particle matter 2.5 µm	kg/h	decimal 15/5
epm2	emission rate annual mean particle matter 2.5 -10 µm	kg/h	decimal 15/5
epm3	emission rate annual mean particle matter 10 - 50 µm	kg/h	decimal 15/5
epm4	emission rate annual mean particle matter > 50 µm	kg/h	decimal 15/5
epmx	emission rate annual mean particle matter unknown	kg/h	decimal 15/5
eas1	emission rate annual mean Arsenic PM 2.5 µm	kg/h	decimal 15/5
eas2	emission rate annual mean Arsenic PM 2.5 -10 µm	kg/h	decimal 15/5
eas3	emission rate annual mean Arsenic PM 10 - 50 µm	kg/h	decimal 15/5
eas4	emission rate annual mean Arsenic PM > 50 µm	kg/h	decimal 15/5
easx	emission rate annual mean Arsenic PM unknown	kg/h	decimal 15/5
epb1	emission rate annual mean Lead PM 2.5 µm	kg/h	decimal 15/5
epb2	emission rate annual mean Lead PM 2.5 -10 µm	kg/h	decimal 15/5
epb3	emission rate annual mean Lead PM 10 - 50 µm	kg/h	decimal 15/5
epb4	emission rate annual mean Lead PM > 50 µm	kg/h	decimal 15/5
epbx	emission rate annual mean Lead PM unknown	kg/h	decimal 15/5

ecd1	emission rate annual mean Cadmium PM 2.5 µm	kg/h	decimal 15/5
ecd2	emission rate annual mean Cadmium PM 2.5 -10 µm	kg/h	decimal 15/5
ecd3	emission rate annual mean Cadmium PM 10 - 50 µm	kg/h	decimal 15/5
ecd4	emission rate annual mean Cadmium PM > 50 µm	kg/h	decimal 15/5
ecdx	emission rate annual mean Cadmium PM unknown	kg/h	decimal 15/5
eni1	emission rate annual mean Nickel PM 2.5 µm	kg/h	decimal 15/5
eni2	emission rate annual mean Nickel PM 2.5 -10 µm	kg/h	decimal 15/5
eni3	emission rate annual mean Nickel PM 10 - 50 µm	kg/h	decimal 15/5
eni4	emission rate annual mean Nickel PM > 50 µm	kg/h	decimal 15/5
enix	emission rate annual mean Nickel PM unknown	kg/h	decimal 15/5
ehg1	emission rate annual mean Mercury PM 2.5 µm	kg/h	decimal 15/5
ehg2	emission rate annual mean Mercury PM 2.5 -10 µm	kg/h	decimal 15/5
ehg3	emission rate annual mean Mercury PM 10 - 50 µm	kg/h	decimal 15/5
ehg4	emission rate annual mean Mercury PM > 50 µm	kg/h	decimal 15/5
ehgx	emission rate annual mean Mercury PM unknown	kg/h	decimal 15/5
etl1	emission rate annual mean Thallium PM 2.5 µm	kg/h	decimal 15/5
etl2	emission rate annual mean Thallium PM 2.5 -10 µm	kg/h	decimal 15/5
etl3	emission rate annual mean Thallium PM 10 - 50 µm	kg/h	decimal 15/5
etl4	emission rate annual mean Thallium PM > 50 µm	kg/h	decimal 15/5
etlx	emission rate annual mean Thallium PM unknown	kg/h	decimal 15/5
exx1	emission rate annual mean Wild card PM 2.5 µm	kg/h	decimal 15/5
exx2	emission rate annual mean Wild card PM 2.5 -10 µm	kg/h	decimal 15/5
exx3	emission rate annual mean Wild card PM 10 - 50 µm	kg/h	decimal 15/5
exx4	emission rate annual mean Wild card PM > 50 µm	kg/h	decimal 15/5
exxx	emission rate annual mean Wild card PM unknown	kg/h	decimal 15/5

Area/Grid source shape

Format: ESRI Shape

Attributable:

field name	explanation	unit	field type digits/Scale
z	Geographical location (vertical extent)	m	decimal 10/2
zGround	Geographical location (Height above ground)	m	decimal 10/2
name	name of the source	-	string 30
adress	address (Street and house number)	-	string 30
code	code postal	-	string 5

town	town	-	string 30
year	representative year	-	string20
update	update date	-	string20
editor	Name of the editor	-	string 30
informant	Name of the information	-	string 30
misc	miscellaneous	-	string 30
ldtimserie	name of time series file	-	string 100
eSO2	emission rate annual mean SO2	kg/h	decimal 15/5
eNo	emission rate annual mean NO	kg/h	decimal 15/5
eNo2	emission rate annual mean NO2	kg/h	decimal 15/5
eNOx	emission rate annual mean NOx	kg/h	decimal 15/5
ebenzol	emission rate annual mean Benzene	kg/h	decimal 15/5
ef	emission rate annual mean Hydrogen Fluoride, given as F	kg/h	decimal 15/5
etce	emission rate annual mean Chloroethane	kg/h	decimal 15/5
enh3	emission rate annual mean NH3	kg/h	decimal 15/5
ehg	emission rate annual mean HG	kg/h	decimal 15/5
exx	emission rate annual mean wild card gas	kg/h	decimal 15/5
epm1	emission rate annual mean particle matter 2.5 µm	kg/h	decimal 15/5
epm2	emission rate annual mean particle matter 2.5 -10 µm	kg/h	decimal 15/5
epm3	emission rate annual mean particle matter 10 - 50 µm	kg/h	decimal 15/5
epm4	emission rate annual mean particle matter > 50 µm	kg/h	decimal 15/5
epmx	emission rate annual mean particle matter unknown	kg/h	decimal 15/5
eas1	emission rate annual mean Arsenic PM 2.5 µm	kg/h	decimal 15/5
eas2	emission rate annual mean Arsenic PM 2.5 -10 µm	kg/h	decimal 15/5
eas3	emission rate annual mean Arsenic PM 10 - 50 µm	kg/h	decimal 15/5
eas4	emission rate annual mean Arsenic PM > 50 µm	kg/h	decimal 15/5
easx	emission rate annual mean Arsenic PM unknown	kg/h	decimal 15/5
epb1	emission rate annual mean Lead PM 2.5 µm	kg/h	decimal 15/5
epb2	emission rate annual mean Lead PM 2.5 -10 µm	kg/h	decimal 15/5
epb3	emission rate annual mean Lead PM 10 - 50 µm	kg/h	decimal 15/5
epb4	emission rate annual mean Lead PM > 50 µm	kg/h	decimal 15/5
epbx	emission rate annual mean Lead PM unknown	kg/h	decimal 15/5
ecd1	emission rate annual mean Cadmium PM 2.5 µm	kg/h	decimal 15/5
ecd2	emission rate annual mean Cadmium PM 2.5 -10 µm	kg/h	decimal 15/5
ecd3	emission rate annual mean Cadmium PM 10 - 50 µm	kg/h	decimal 15/5

ecd4	emission rate annual mean Cadmium PM > 50 µm	kg/h	decimal 15/5
ecdx	emission rate annual mean Cadmium PM unknown	kg/h	decimal 15/5
eni1	emission rate annual mean Nickel PM 2.5 µm	kg/h	decimal 15/5
eni2	emission rate annual mean Nickel PM 2.5 -10 µm	kg/h	decimal 15/5
eni3	emission rate annual mean Nickel PM 10 - 50 µm	kg/h	decimal 15/5
eni4	emission rate annual mean Nickel PM > 50 µm	kg/h	decimal 15/5
enix	emission rate annual mean Nickel PM unknown	kg/h	decimal 15/5
ehg1	emission rate annual mean Mercury PM 2.5 µm	kg/h	decimal 15/5
ehg2	emission rate annual mean Mercury PM 2.5 -10 µm	kg/h	decimal 15/5
ehg3	emission rate annual mean Mercury PM 10 - 50 µm	kg/h	decimal 15/5
ehg4	emission rate annual mean Mercury PM > 50 µm	kg/h	decimal 15/5
ehgx	emission rate annual mean Mercury PM unknown	kg/h	decimal 15/5
etl1	emission rate annual mean Thallium PM 2.5 µm	kg/h	decimal 15/5
etl2	emission rate annual mean Thallium PM 2.5 -10 µm	kg/h	decimal 15/5
etl3	emission rate annual mean Thallium PM 10 - 50 µm	kg/h	decimal 15/5
etl4	emission rate annual mean Thallium PM > 50 µm	kg/h	decimal 15/5
etlx	emission rate annual mean Thallium PM unknown	kg/h	decimal 15/5
exx1	emission rate annual mean Wild card PM 2.5 µm	kg/h	decimal 15/5
exx2	emission rate annual mean Wild card PM 2.5 -10 µm	kg/h	decimal 15/5
exx3	emission rate annual mean Wild card PM 10 - 50 µm	kg/h	decimal 15/5
exx4	emission rate annual mean Wild card PM > 50 µm	kg/h	decimal 15/5
exxx	emission rate annual mean Wild card PM unknown	kg/h	decimal 15/5

Street Emission Source Shape

Format: ESRI Shape from type Polyline. **Each Line is created only with two points.**

Attributable:

field name	explanation	unit	field type digits/Scale
STR_name	name of the source	-	string 30
town	town	-	string 30
year	representative year	-	string20
update	update date	-	string20
editor	Name of the editor	-	string 30
width	width of the street	m	decimal 8/2
FBHoehe	-	-	decimal 8/2

informant	Name of the information	-	String 30
KennNr	Number of the street segment	-	integer 10
INfz	-	-	integer 10
misc	miscellaneous	-	String 30
IDTV	daily mean traffic of all categories	-	integer 10
height	height above ground	m	decimal 8/2
PLV	daily mean traffic of lorries (>3.5 t, 0..1)	-	decimal 4/2
nr_lanes	number of traffic lanes	-	integer 10
CanyonTyp	-	-	integer 4
SIG	height of the emission	-	decimal 4/2
STR_KATEGO	type of street	-	String 10
speed_lim	speed limits	-	integer 10
speed_akt	actual speeds	-	integer 10
Fahrmuster	traffic situation	-	String 30
Idtimserie	number of the standardised time series file	-	string 60
eSO2	emission rate annual mean SO2	kg/h	decimal 15/5
eNo	emission rate annual mean NO	kg/h	decimal 15/5
eNo2	emission rate annual mean NO2	kg/h	decimal 15/5
eNOx	emission rate annual mean NOx	kg/h	decimal 15/5
ebenzol	emission rate annual mean Benzene	kg/h	decimal 15/5
ef	emission rate annual mean Hydrogen Fluoride, given as F	kg/h	decimal 15/5
etce	emission rate annual mean Chloroethane	kg/h	decimal 15/5
enh3	emission rate annual mean NH3	kg/h	decimal 15/5
ehg	emission rate annual mean HG	kg/h	decimal 15/5
exx	emission rate annual mean wild card gas	kg/h	decimal 15/5
epm1	emission rate annual mean particle matter 2.5 µm	kg/h	decimal 15/5
epm2	emission rate annual mean particle matter 2.5 -10 µm	kg/h	decimal 15/5
epm3	emission rate annual mean particle matter 10 - 50 µm	kg/h	decimal 15/5
epm4	emission rate annual mean particle matter > 50 µm	kg/h	decimal 15/5
epmx	emission rate annual mean particle matter unknown	kg/h	decimal 15/5
eas1	emission rate annual mean Arsenic PM 2.5 µm	kg/h	decimal 15/5
eas2	emission rate annual mean Arsenic PM 2.5 -10 µm	kg/h	decimal 15/5
eas3	emission rate annual mean Arsenic PM 10 - 50 µm	kg/h	decimal 15/5
eas4	emission rate annual mean Arsenic PM > 50 µm	kg/h	decimal 15/5
easx	emission rate annual mean Arsenic PM unknown	kg/h	decimal 15/5

epb1	emission rate annual mean Lead PM 2.5 µm	kg/h	decimal 15/5
epb2	emission rate annual mean Lead PM 2.5 -10 µm	kg/h	decimal 15/5
epb3	emission rate annual mean Lead PM 10 - 50 µm	kg/h	decimal 15/5
epb4	emission rate annual mean Lead PM > 50 µm	kg/h	decimal 15/5
epbx	emission rate annual mean Lead PM unknown	kg/h	decimal 15/5
ecd1	emission rate annual mean Cadmium PM 2.5 µm	kg/h	decimal 15/5
ecd2	emission rate annual mean Cadmium PM 2.5 -10 µm	kg/h	decimal 15/5
ecd3	emission rate annual mean Cadmium PM 10 - 50 µm	kg/h	decimal 15/5
ecd4	emission rate annual mean Cadmium PM > 50 µm	kg/h	decimal 15/5
ecdx	emission rate annual mean Cadmium PM unknown	kg/h	decimal 15/5
eni1	emission rate annual mean Nickel PM 2.5 µm	kg/h	decimal 15/5
eni2	emission rate annual mean Nickel PM 2.5 -10 µm	kg/h	decimal 15/5
eni3	emission rate annual mean Nickel PM 10 - 50 µm	kg/h	decimal 15/5
eni4	emission rate annual mean Nickel PM > 50 µm	kg/h	decimal 15/5
enix	emission rate annual mean Nickel PM unknown	kg/h	decimal 15/5
ehg1	emission rate annual mean Mercury PM 2.5 µm	kg/h	decimal 15/5
ehg2	emission rate annual mean Mercury PM 2.5 -10 µm	kg/h	decimal 15/5
ehg3	emission rate annual mean Mercury PM 10 - 50 µm	kg/h	decimal 15/5
ehg4	emission rate annual mean Mercury PM > 50 µm	kg/h	decimal 15/5
ehgx	emission rate annual mean Mercury PM unknown	kg/h	decimal 15/5
etl1	emission rate annual mean Thallium PM 2.5 µm	kg/h	decimal 15/5
etl2	emission rate annual mean Thallium PM 2.5 -10 µm	kg/h	decimal 15/5
etl3	emission rate annual mean Thallium PM 10 - 50 µm	kg/h	decimal 15/5
etl4	emission rate annual mean Thallium PM > 50 µm	kg/h	decimal 15/5
etlx	emission rate annual mean Thallium PM unknown	kg/h	decimal 15/5
exx1	emission rate annual mean Wild card PM 2.5 µm	kg/h	decimal 15/5
exx2	emission rate annual mean Wild card PM 2.5 -10 µm	kg/h	decimal 15/5
exx3	emission rate annual mean Wild card PM 10 - 50 µm	kg/h	decimal 15/5
exx4	emission rate annual mean Wild card PM > 50 µm	kg/h	decimal 15/5
exxx	emission rate annual mean Wild card PM unknown	kg/h	decimal 15/5

Time serie Point/Area/Grid

Format: dBase IV

Field list:

field name	explanation	field type digits/Scale

Date	every hour in the year (year, month, day, hour, minute)	Date 30
prozent	proportion of the emission rate	decimal 15/5

Time serie Street sources

Format: dBase IV

Field list:

field name	explanation	field type digits/Scale
Date	every hour in the year (year, month, day, hour, minute)	Date 30
LKW	proportion of heavy lorries (> 3.5 t)	decimal 15/5
PKW	proportion of vehicles (< 3,5 t)	decimal 15/5

Emission factor file

Format: ASCII

Separator: blank

You can choose an Emission Factors file ([Name].EFT) by clicking on the OPEN symbol.

In this ASCII file are listed the route-related emission factors per vehicle for all vehicles (VEC) and heavy duty vehicles (HDV) for various substances. Names of the substances (2. line) must have the same name of the fieldnames defined in the Street source shape. For each substance the measuring units are [mg/m] or [g/km].

The emission factors correspond to the freely selectable annual average traffic situations (e.g. AB>120), which contain cold start share and Stop&Go share.

The traffic Situations bust be stored in the Street emission shape and can be load to the Digitising Street sources dialog.

Emission factors PKW/LKW:+year: 2005 Comments												
	NO_X		Benzol		Particle		Dummy		Dummy		Dummy	
	vhcl	trucks	vhcl	trucks	vhcl	trucks	vhcl	trucks	vhcl	trucks	vhcl	trucks
AB>120	0.00246	0.00631	0.296	2.90	0.00769	0.0293	0.00998	0.0508	-99	-99	-99	-99
AB>100	0.00113	0.00688	0.128	2.81	0.00403	0.0304	0.00389	0.0535	-99	-99	-99	-99
AB_100	0.00157	0.00631	0.206	2.90	0.00644	0.0293	0.00790	0.0508	-99	-99	-99	-99
AB_100	0.00157	0.00631	0.206	2.90	0.00644	0.0293	0.00790	0.0508	-99	-99	-99	-99
HVS4	0.00157	0.00631	0.206	2.90	0.00644	0.0293	0.00790	0.0108	-99	-99	-99	-99

Building Shape

Format: ESRI Shape

Attributable:

field name	explanation	unit	field type digits/Scale
B_height	Height of building	m	decimal 10/2
B_Name	Name of Buliding	-	string 30

Austal2000 Result Shape

Format: ESRI Shape

Attributable:

field name	explanation	unit	field type digits/Scale
[substance]tot	Substance annual mean including background concentration	[µg/m³]	decimal 10/1
[substance]ext	Substance short time value according to the eu directive.	-	decimal 10/1

PROKAS

Introduction

SELMA^{GIS} contains a dispersion field model PROKAS module (http://www.lohmeyer.de/prokas). It is provided as a module under the ArcMap™ surface.

The mathematical model PROKAS is designed to calculate the immission of an investigation point. It considers the influence of the surrounding road grid on the point of investigation up to a distance of several kilometers. It consists of the basis module PROKAS_V (Gaussian plume model). Besides this emission model the integrated building module PROKAS_B is used for calculating the immissions of densely developed roads.

Calculation of immissions with PROKAS_V
In the draft of the guideline VDI 3782, Sheet 8 “Ausbreitungsrechnung für Kfz-Emissionen”, PROKAS_V is designated as a dispersion model to

analyze the concentration distribution both for calculating the pollution load in areas with or without loose development, and for calculating the background pollution concentration of densely developed areas.
The Gaussian approach within PROKAS_V corresponds to the "Ausbreitungsmodell für Luftreinhaltepläne" guideline VDI 3782 Sheet 1. The air pollutants of the exhaust plumes are moving with a typical transport velocity u_t, which results from a weighted averaging of the vertical wind profile over the concentration distribution in the exhaust plume. Because the vertical concentration profile changes with the distance to the source, u_t also becomes a function of the distance to the source. This assures that the continuity equation for the pollutants is valid for any distance from the road to be analyzed.
For calculations, the total road grid is divided into short line sources and the emission of each line source is distributed to several point sources. The distance between the point sources belonging to one line source is at most 1/10 of the distance of the point source to the investigation point. All together, the road grid is approximated by several 10.000 point sources depending on its density. Sensitivity investigations have proven that the calculation results are not affected by a further shortening of the distances between the point sources. For example, the division into single sources can also incorporate the case that emissions vary along a road, for instance if some parts are subject to speed limits. In this case, the point sources in the limited part will emit with a different intensity than those without limitation.
Thanks to the procedure mentioned above it is assured that each road segment can emit simultaneously, i.e. that the whole road grid always emits. This also allows for a realistic simulation of the conditions close to intersections, where emission points exist, which are polluted simultaneously by several roads at certain wind directions. In these cases, it is not correct to determine the 98-percentile value (concentrations which are not exceeded in 98 % of the time) by calculating the influence of each individual road and combining everything at a later stage.
Also the influence of a sound protection measures of a defined length can be considered in this way. This influence inferred in papers by Romberg et al. (1986) for the Bundesanstalt für Straßenwesen. The influence of the sound protection wall is interpreted as an initial dilution, where a value σ_{zo} is added as an additive term to the vertical dispersion parameter σ_z. The dispersion model is able to consider an individual value of σ_{zo} for each line source. The dispersion parameters σ_y, and σ_z of the guideline VDI 3782 Sheet 1 correspond to those of TA air (1986).
To correctly determine the 98-percentile value, it is important, to consider the traffic density dependent on the time of day. It also depends on the correct determination of the traffic and emission peaks. The model therefore allows the input of 5 different emission levels and their occurrence frequency.
With respect to the meteorology, PROKAS can calculate with 36 different wind direction classes, 9 different wind speed classes, and 6 different dispersion classes. The dispersion classes take into account that the dilution of exhaust gases for a given wind direction and a given wind speed also depends on the stability of the atmosphere. For instance, the dilution is lower for an "inversion" situation than for sunny, "normal" weather conditions. Altogether 36 x 9 x 6 = 1.944 weather conditions with the corresponding frequencies are considered.
Therefore for each investigation point, the calculated result consists of 1.944 weather conditions x 5 emission levels = 9.720 different concentration values along with the corresponding frequencies. This data shows how often the 9.720 concentration values occur per year. A frequency distribution is retrieved from this data. This distribution allows

for the 98-percentile value to be determined. This is the 98-percentile value of the additional pollution concentration which we were looking for. The immission parameters for the total pollution concentration are determined from the parameters of the background pollution concentration and the additional pollution concentration (due to the traffic emissions on the particular roads) according to the procedure given in the TA Luft (1986) Annex D.
The geometry of the road grid and the investigation points are digitalized or taken over from traffic pattern models, sound calculation programs, or databases. To control the correct input, the software produces a scaled graph with the road grid and the position of the investigation points, as well as a list with the distances (as calculated by the software) of the points to the line sources, and, in addition, the source strengths, the number of point sources and the length of each line source.
The results of the immission calculations (average yearly values and 98-percentile values of NO_2, and the average yearly values of two inert pollutants, e.g. benzene, soot, or PM10) are saved in a file for each investigation point in the form of a table. They can be graphically displayed either in the form of numerical values at the corresponding investigation points, or by colored symbols, with the color set according to the concentration.

Calculation of immisions in densely developed roads with PROKAS_B

Immissions cannot be calculated by PROKAS_V in the case of partially or completely closed developments (for instance a street canyons). The supplementary building module PROKAS_B is used instead. It is based on model calculations with the microscale dispersion model MISKAM of all typical types of development. The nondimensional exhaust gas concentration c* was determined for 20 different types of development and 36 flow directions in 1.5 m height and 1 m distance to the next building, respectively.
The different development types are street canyons with one- or two-sided development with a varying relation of the building height to the street canyon width and a varying percentage of gaps in the development. Gap density refers to the percentage of non-developed areas along the road with (one- or both-sided) developments. The width of the street canyons is defined as the double of the distance from the middle of the road to the development closest to the road. Tab. 3.1 describes the classification of the various types of developments. Road crossings are not considered due to insights from measurements and model simulations. According to these studies, 10 % to 30 % lesser concentrations can be observed at crossings than at the neighboring street canyons.
The exhaust gas concentrations c are calculated via the nondimensional concentrations

$$c = \frac{c^* \cdot Q}{B \cdot u'}$$

whereby:
c = exhaust-gas concentration [µg/m³]
c* = nondimensional exhaust-gas concentration [-]
Q = emitted pollution source strength [µg/(m s)]
B = width of street canyons [m] alternatively the double distance from the middle of the road to the development
u' = wind speed in respect to traffic induced turbulences [m/s]

The contribution to the concentrations of PROKAS_V for the background pollution concentration and of PROKAS_B are combined for all individual situations, i.e. correlated by time.

Types of road developments considered by PROKAS_B

Type		Development	Building height/ street canyon width	Percentage of gaps [%]
One Lane	Two lanes			
0*		loose	-	61 - 100
101	**301**	one-sided	1:3	0 - 20
102	**302**	"	1:3	21 - 60
103	**303**	"	1:2	0 - 20
104	**304**	"	1:2	21 - 60
105	**305**	"	1:1.5	0 - 20
106	**306**	"	1:1.5	21 - 60
107	**307**	"	1:1	0 - 20
108	**308**	"	1:1	21 - 60
109	**309**	"	1.5:1	0 - 20
110	**310**	"	1.5:1	21 - 60
201	**401**	both-sided	1:3	0 - 20
202	**402**	"	1:3	21 - 60
203	**403**	"	1:2	0 - 20
204	**404**	"	1:2	21 - 60
205	**405**	"	1:1.5	0 - 20
206	**406**	"	1:1.5	21 - 60
207	**407**	"	1:1	0 - 20
208	**408**	"	1:1	21 - 60
209	**409**	"	1.5:1	0 - 20
210	**410**	"	1.5:1	21 - 60

The types 101 and higher are only available, if the building module **PROKAS_B** is installed. If the development-module is not available, 0 has to be set as “development type”.
Types 101 till 210 describe a central source (one lane) position like in **Fig. 1**.
Types 301 to 410 represent a street with two lanes like in **Fig. 2** shown.

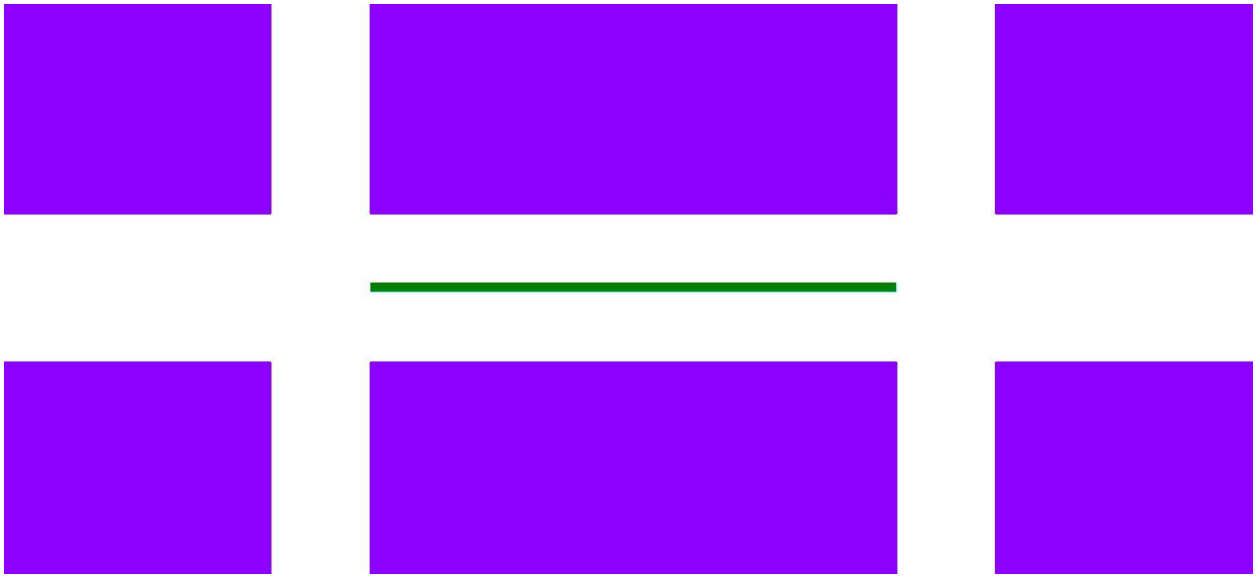


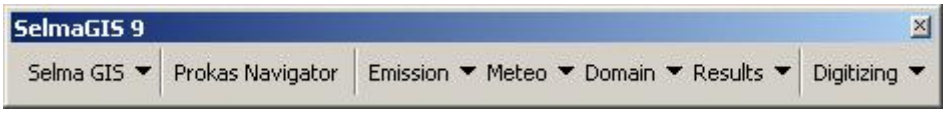
Fig. 1: Central source position for the example case of type 201.
Buildings are depicted in violet; the street source is depicted in green.

Fig. 2: Central source position for the example case of type 201.
Buildings are depicted in violet; the street source is depicted in green.

Controls and Commands

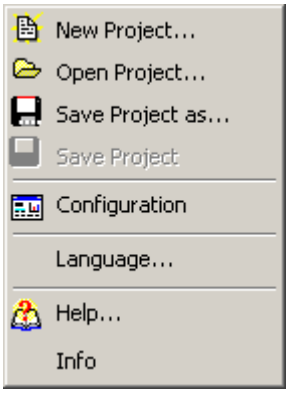
All functions and Dialogs of SELMA^{GIS} can be accessed with Command buttons in the SELMA^{GIS} Toolbar. You get the toolbar by selecting "SELMA^{GIS} 9" in the context menu which is opened by clicking the right mouse button in the menu area of ArcMap.

SELMA^{GIS} Toolbar

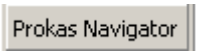


- SELMAGIS Menu for managing SELMAGIS project
- PROKAS Menu for prepare/execute PROKAS dispersion model
- Emission Menu for Calculating road traffic emissions
- Meteo Menu with import Feature
- Domain Menu for preparing terrain grid
- Results Menu for read results of Dispersion models
- Digitising Menu with digitising tools based on ESRI shapes

SELMA^{GIS}



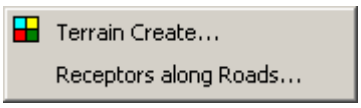
PROKAS



Emission Factory

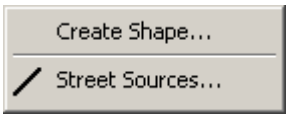
Meteorology Factory

Domain



Results

Digitising



Input fields for shape files or ASCII support drag&drop files coming from the file manager (e.g. Explorer) or from ArcMap's table of content (TOC). Double click on the white area or click on the directory icon opens an open/save dialog or select directory dialog. Click on the world icon add the shape file to the TOC of ArcMap as a feature layer.

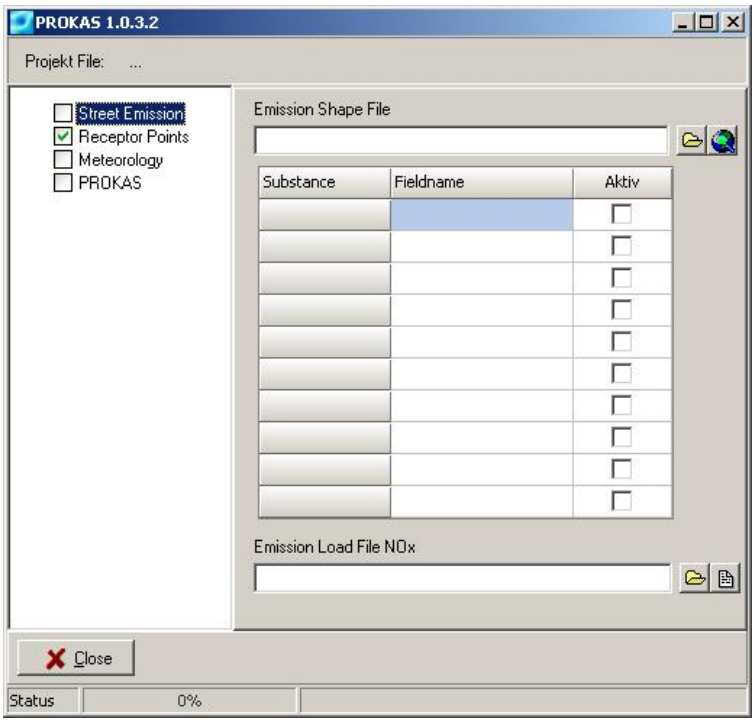
PROKAS Navigation

For each group of PROKAS input data PROKAS dialog provides one panel. Navigation is possible by clicking on list items in the Navigation bar left hand.

Street Emission

Emission Shape File:

The emission shape file is defined by file name by clicking on the open button or double click on the edit field.



Substance:

All substances, which are found in the emission shape file, are displayed in the column substance.

Fieldname:

In column fieldname a column from emission shape file has to be chosen, which contains the emissions of substance and will be transferred to the output concentration shape file for the calculation of immission.

Active:

The checkbox Active specifies, whether immission will be calculated for a certain substance or not.

Emission Load File NOx:

„EGN-file“ with a summarized, sorted emission curve for a street segment, which will be created in addition to a emission shape file from the emission factory. This EGN-file is just needed for the programs PROKAS, PROKAS_B or SELMA_PROKAS.

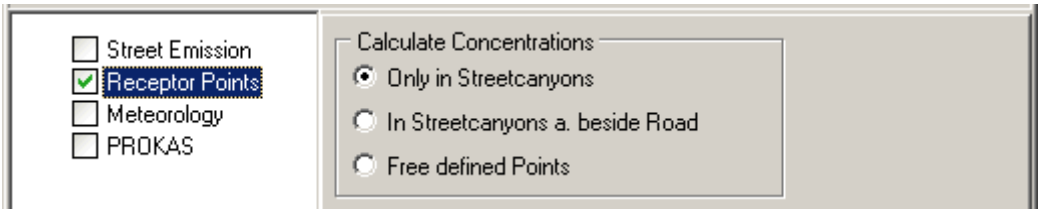
Important note:

- Check boxes must be activated for each substance which should be considered.
- For Street emissions generate emission with PROKAS_E before.

Receptor Points

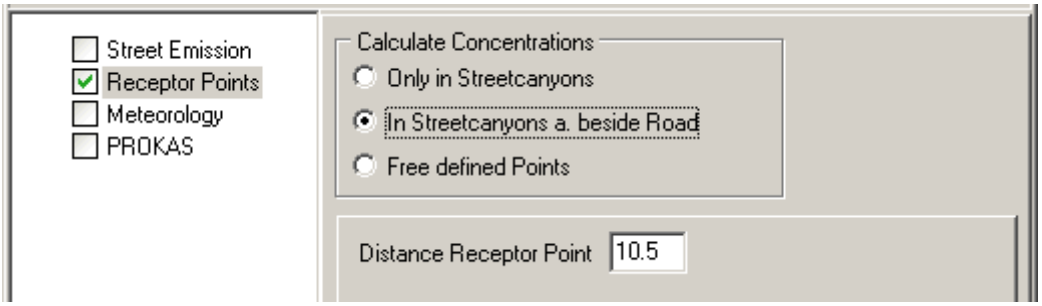
The PROKAS Receptor Points dialog provides a selection for calculating methods.

Only in Streetcanyons:



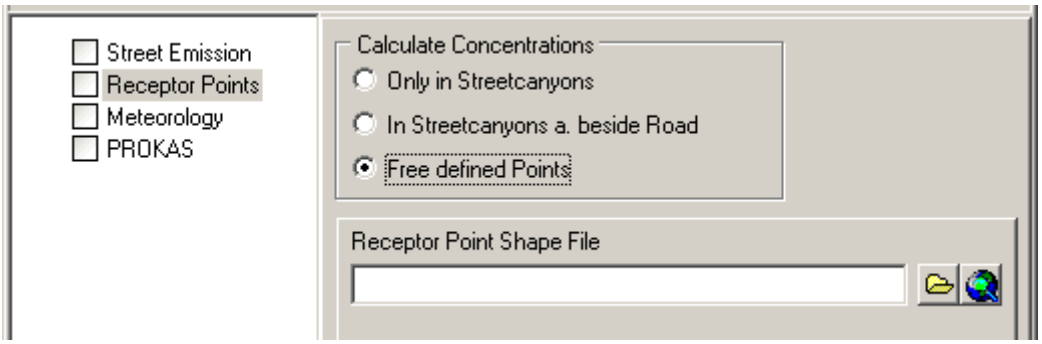
PROKAS calculates concentrations in side of street canyons. Streetcanyon

In Streetcanyons along beside Road:



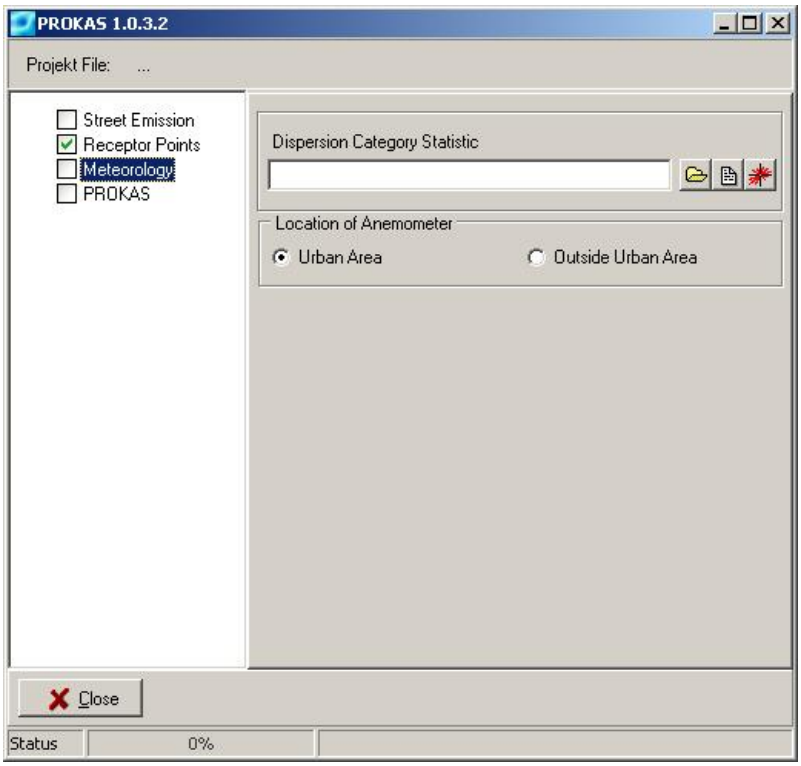
Concentrations will be computed in street canyons and at the border of the road. The border must be defined with the distance between the middle of the street a receptor point. The receptor points will be generated automatically. The minimum of the distance receptor points is 10.5 m. PROKAS do not accept receptor points with a distance less than 10 m.

Free defined Points:



It is possible do generate receptor points in a point shape file. Irregular points can be defined or generate a grid point shape file in the Dialog Domain/Terrain Grid…

Meteorology



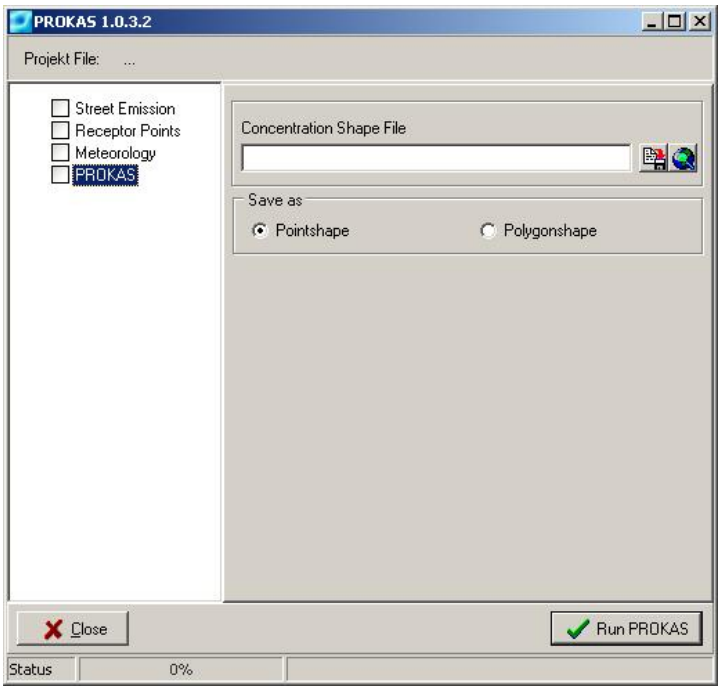
Dispersion Category Statistic:

Defines the file name of the dispersion class statistics as WND-File

***Location of Anemometer*:**

Defines the local positioning area of the anemometer to define the according wind profile.

Start PROKAS



Concentration Shape File:

The concentration shape filename can be defined by clicking on the open button or double click on the edit field.

Run PROKAS:

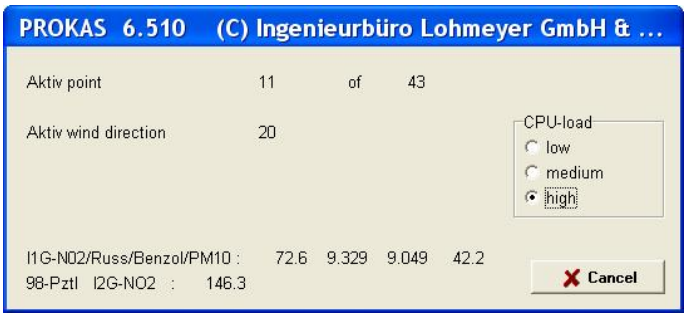
Generates PROKAS input files and starts the dispersion model PROKAS.

If Receptor Points are defined as grid in a Point shape file the option Save as will appear. It is possible to choose to save results as Polygon shape or Point shape file. The Polygon shape file will be generated by quadratic Polygons. Its centre is the defined Point in the receptor point shape file and the width/height of the quadrat accords to the distance between the first two points of the receptor point shape file.

Clicking on PROKAS Calculation button activates the dispersion computation. Later on, the status window of PROKAS computation kern appears.

As information, on the monitor is displayed which point of all and which dispersion class and wind direction is calculated at the moment. The calculated values for the last point appear in the bottom part of the window. On the right side of the window, you can choose the desired CPU load. On the one hand, it influences the computation time, on the other – the speed at which other Windows applications are used, while PROKAS is computing in the background. If the CPU load is set on a low level, which is the standard default setting, other Windows applications run without significant time limits. If the CPU load is set on HIGH, the dispersion modelling runs faster. The other Windows applications however are becoming slower.

Clicking on the „*Cancel*“ window makes it possible to terminate the computation at any time. At doing this, the last calculated point is saved in the Pollutant Concentration shape.



The results are added into the current View.

If the value -99 appears as a concentration value for a particular point, it means that PROKAS could calculate no value for this point. If the street segment has “0” as a Canyon Type value, pollutant receptor points

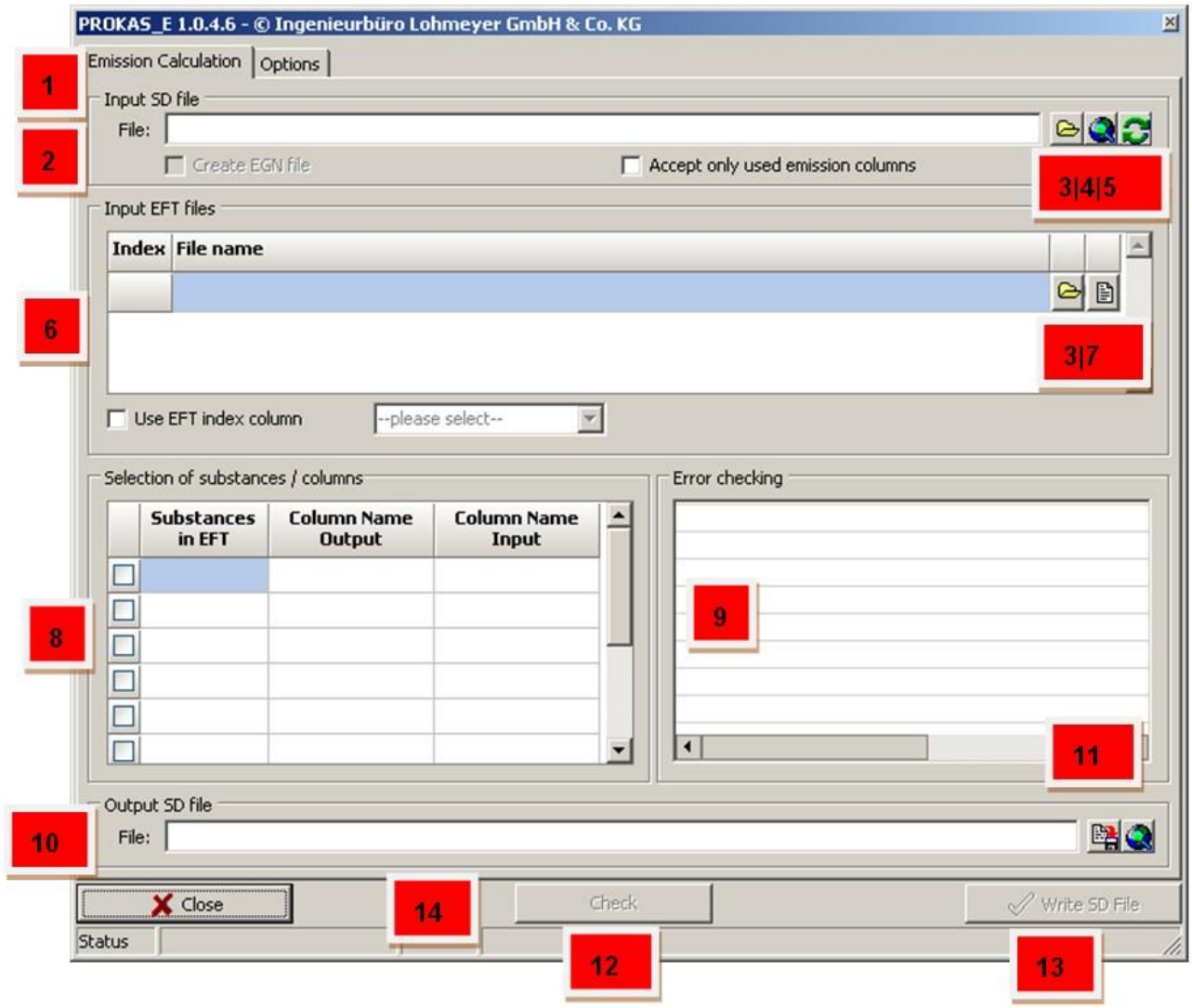
located in a distance of up to 10 m from the street segment cannot be computed by PROKAS.

PROKAS_E

Program Control takes place entirely with the user interface.

A SD-File, i.e. a file with line geometry and according attributes of road parameters (number of street segment, DTV for VEC and HDV, traffic situation, if applicable stop&go shares, tunnel information and road condition) for every street segment is required. For base year dependent emission factors and vehicle fleet compositions an EFT-file is needed. If applicable a VTG-File with user defined details for diurnal and weekly variations can be used.

Calculation Street Emission



Input SD-File [2]

A SD-File, i.e. a file with line geometry and according attributes of road parameters (number of street segment, DTV for VEC and HDV, traffic situation, if applicable stop&go shares, tunnel information and road condition) for every street segment has to be entered.

Possible input options:

- Click on the button „**Open**“ (record card symbol) [3]
- Drag&drop or entry of path- and file name

Formats:

- SHP (ESRI-Shape file)
- SD3 (ASCII-file)

In case there is a connection between ArcGIS and Prokas_E, it's possible to display the SD-file in ArcGIS by clicking the button „**ArcGIS**“ [4] in PROKAS_E

I you push the button “**Update**“ [5] the specified SD-file will be load afresh.

The following options can be selected loading a SD-file:

Create EGN - file:

Creation of an emission time series using a user-defined a diurnal cycle/week cycle of the traffic.

This field is only active when the VTG-file is loaded. For the calculation of emissions with working day traffic values, a diurnal cycle/week cycle of the traffic and the selection of a significant street segment are required.

Accept only used emission columns:

In the Output-Shape-file [13] only used emission columns are written. The allocation of columns has to be specified in **Selection substances/columns** [8].

Input EFT-File [6]

Input of the EFT-file with base year dependent emission factors and vehicle fleet composition.

Input possibilities:

- double click or button „Open“ for dialog box [3]input of path- and file name

- EFT3 (ASCII-File)Emission factors according to vehicle type categories in conjunction with Euro-Norm and type of drive and traffic composition of the vehicle type categories PKW, LNF and so on.
- EFTk (ASCII-File) Emission factors according to vehicle type group (vehicles (VEH) and heavy duty vehicles (HDV))

The button „Show“ allows to display the file in a standard editor.

Use EFT index-column:

The EFT-Index column allows to use more than one EFT-file e.g. for environmental zones. An index is attributed to every EFT-file in a list. For each street segment the attribute environmental zone index (default column name iUZ) has to be included as an Integer column according to the index in the EFT-file list of the SD-file.

The respective emission factor set, which is extracted from the EFT-file, will be assigned to the street segment according to the index.

*Selection of substances/columns [8]*Substances in EFT

All substances, which are found in the **EFT - file**, are displayed in the column substances in eft. The checkbox specifies, whether emissions will be calculated for a certain substance or not.

Column Name Output:

In „**column name output**“ predefined names for the selected substances can be specified in a list for the output-shape-file (SD-File).

The specification of „**column name output**“ causes a renaming of the column name in output-shape-file (only for input-SD-file in shape-format)

Column Name Input:

In „**column name input**“ a column has to be chosen, which will be transferred to the output-shape-file (SD-File) for the calculation of emissions.

Error checking [9]

Program information is displayed as following symbols:

= No Error

= Process started / finished

= Caution!

= Error

Output SD-File [10]

Storage directory and name for the output emission file has to be entered. As default the storage location and name of the Input file with the extension „_emi“ are suggested.

Input possibilities:

- double click or button „Save“ for input dialog
- drag&drop or manual input of path- and file name

In case PROKAS_E was opened in **ArcGIS** it’s possible to open and display the output file in ArcGIS.

Check [12]

The function „**Check**“ has to be executed **before writing SD File**.

The input data will be checked for errors. In the view box the result will be displayed.

Possible errors are:

column "IDTV" not found in SD-File

column "PLV" not found in SD-File

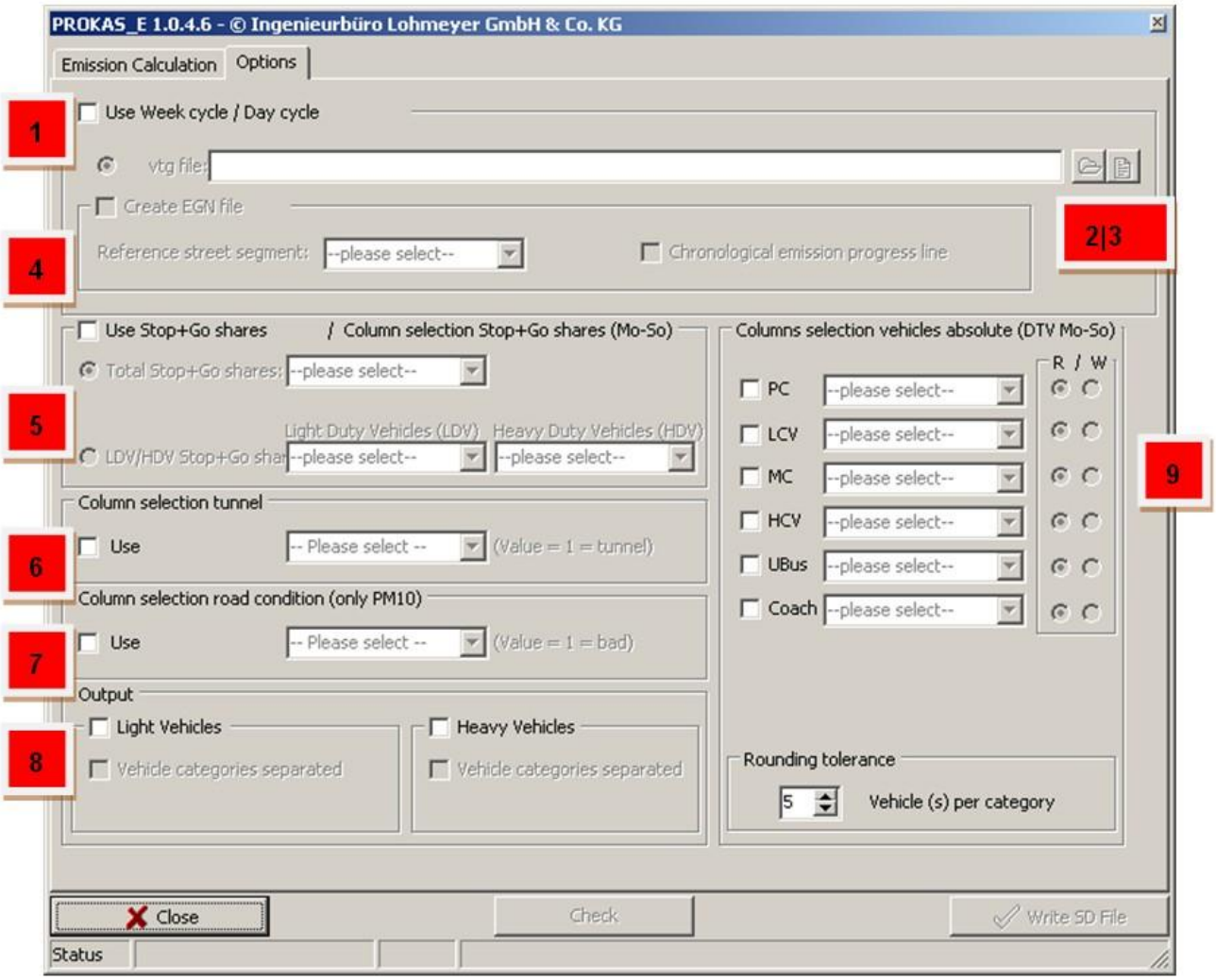
column "traffic situation" not found in SD-File

traffic situation AB100 not found in eft-file Nr.: 0

Write SD-File [13]

By using the button „**Write SD File**“ [13] emissions for every street segment will be calculated and written to the Output SD-File

Options



Use Week cycle/Day cycle [1]

It's required to use a week cycle/day cycle, if DTV values are working day traffic statistic.

VTG-File:

A VTG-File can be imported by using the button „Open" [2]The VTG-File can be displayed in a standard editor with the button „**Text**" [3]

By executing a dispersion calculation with the programs PROKAS, PROKAS_B or SELMA-PROKAS it's required to specify an emission density (EGN-file). The usage of a VTG-file including day and week cycles is necessary.

Create EGN-File:

Activating the check box „create EGN-file" [4] leads to a summarized, sorted emission curve for a street segment, which will be created in

addition to a Output-Shape-File. This EGN-file is just needed for the programs PROKAS, PROKAS_B or SELMA_PROKAS.

Reference street segment:

A representative segment of the Input SD-file needs to be selected for the investigation area. The street segments in the SD-file can be identified by the attribute „**STR_NAME**“.

Chronological emission progress line:

By activating the checkbox **chronological emission progress line** [4]a CGN-file (ASCII-file) will be created in addition to the output-shape-file and EGN-file. Therein a chronological emission progress line for working days (Mo-Fr), Saturday (Sa) and Sunday (So) will be saved.

Column selection Stop+Go shares [5]

To activate this section the checkbox „use Stop+Go shares“ [5] in the tab „Emission calculation“ needs to be hooked.

Stop+Go shares are specified as share and factors respectively (not in percentage). The emissions of a street segment in the relevant traffic situation are composed of an according emission factor multiplied by (1 - Stop+Go share) plus Stop+Go share multiplied by emission factor of the same traffic situation.

Use stop&go shares:

Import stop&go shares

Total Stop+Go shares:

Specifies the column name (Default = STANT) of the Input-SD-file, which contains the total stop+go shares for each street segment. In case the column has the name „STANT“, it will be preselected automatically.

LV- / HV-Stop+Go shares:

Activating the checkbox **LV- / HV-Stop+Go shares** enables the option to specify stop+go shares for light and heavy vehicles separately. The boxes **light vehicles** (Default = LV_STANT) and **heavy vehicles** (Default = SV_STANT) define the according column name of the Input-SD-file for the emission calculation of each street segment.

Column selection tunnel [6]

The particulate matter emission factors for abrasion and resuspension in street tunnels distinguish from open roadways. Therefor the emission calculation for PM10 and PM2.5 in tunnel segments uses modified E-

factors (exhaust emission remain uneffected). Tunnel segments in a Input-SD-file can be identified with the option **use tunnel**.

The column with information of the tunnel (Default = TUNNEL**)** must contain Integer values. The value=1 indicates a tunnel segment. All other values indicate no tunnel.

Column selection road condition (only PM10) [7]

For street segments in bad condition PM10 abrasion and resuspension factors can be doubled (exhaust emission remain uneffected). These street segments are specified in the Input-SD-file in the column selection (Default = ZUSTAND). The value=1 indicates bad road conditions. All other values indicate normal conditions.

Column selection vehicles absolute [9]

Generally information about the traffic composition is obtained by an EFT3-file. However it's possible to define DTV values separately for each street segment and vehicle type category with „**column selection vehicles absolute**". Thereby average traffic counts for one or more vehicle type categories can be predefined in the Input-SD-file. Furthermore Option „**R**" for read must be activated.

The columns traffic counts and heavy vehicles share are still required, in case one vehicle type category is not defined separately. The traffic data of the according vehicle type category are calculated from differences.

For example:

Specifications:

- $DTV_{Mo\text{-}So}$ (IDTV) = 10 000,
- HDV-share (PLV) = 10 %
- PC = 8 500 vehicles

Calculation:

- LV (9 000 vehicles) from DTV and HV
- LV – PC = LCV und MC (500 vehicles)
- 500 vehicles are allocated proportionately to LCV and MC depending on traffic composition

Furthermore to check it's possible to write the absolute number of individual vehicle types in the Output-Shape-file by activating the checkbox „**W**" (Write). Thereby a column must exist in the Input-SD-file to write the traffic counts of the vehicle type.

Rounding tolerance:

Using absolute vehicle counts and / or VTG-Files can lead to deviation due to rounding. The sum of vehicles of all vehicle categories can differ from the DTV-value (column IDTV). The option **Rounding tolerance** enables the possibility to specify a tolerance value per category. Between 0 and 10 vehicles can be chosen. In case this condition is not fullfilled, a warning message occurs in the .

Output [8]

Light vehicles and / or Heavy vehicles:

Usually emissions are calculated as a density for all vehicle type categories for each street segment. The option **Light vehicles and / or Heavy vehicles** can be used to calculate emissions for vehicle type categories separately (e.g. EPM10_LV, EPM10_HV).

If the checkbox „**vehicle categories separated**“ is hooked, emissions are calculated even more detailed among vehicle categories for each pollutant (e.g. EPM10_PKW, EPM10_LNF). Considered light vehicle categories (LV) are PKW, LNF and KR. Considered heavy vehicle categories (HV) are SNF, LBUS and RBUS.

File formats

Detailed description of file formats used by PROKAS_E.

Input-SD-File

The Input-SD-File can be either a *.shp-file, a *.sd3-file or a *.dtv-file.

These files contain in each case the definition of street segments with street width, traffic intensity, HDV share, traffic situation, source height of emissions of street segments.

For each street segment a row has to be created.

An Input-SD-file has to hold the following structure.

Variable(s)	Type	meaning	required	
			Shape	ASCII (column)
KENNNR	Integer	Identification number	optional	mandatory (1)
X1	Float	Start coordinate of the straight street segment [m]	optional	mandatory (2)
Y1	Float	Start coordinate of the straight street segment [m]	optional	mandatory (3)
X2	Float	End coordinate of the straight street segment [m]	optional	mandatory (4)
Y2	Float	End coordinate of the straight street segment [m]	optional	mandatory (5)
FBREITE	Float	Lane width [m]	optional	mandatory (6)
FBHOEHE	Float	Lane height [m]	optional	mandatory (7)

Variable(s)	Type	meaning	required	
			Shape	ASCII (column)
ENOX	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	mandatory (8)
ENOX_LV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENOX_SV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENOX_PKW	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENOX_LNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENOX_KR	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENOX_SNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENOX_LBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENOX_RBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBZL	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	mandatory (9)
EBZL_LV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBZL_SV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBZL_PKW	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBZL_LNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBZL_KR	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBZL_SNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBZL_RBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBZL_LBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ERUSS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	mandatory (10)
ERUSS_LV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ERUSS_SV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ERUSS_PKW	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ERUSS_LNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ERUSS_KR	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ERUSS_SNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ERUSS_LBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ERUSS_RBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM10	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	mandatory (11)
EPM10_LV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM10_SV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM10_PKW	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM10_LNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional

Variable(s)	Type	meaning	required	
			Shape	ASCII (column)
EPM10_KR	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM10_SNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM10_LBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM10_RBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM25	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM25_LV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM25_SV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM25_PKW	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM25_LNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM25_KR	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM25_SNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM25_LBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPM25_RBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENO2	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENO2_LV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENO2_SV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENO2_PKW	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENO2_LNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENO2_KR	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENO2_SNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENO2_LBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENO2_RBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBaP	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBaP_LV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBaP_SV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBaP_PKW	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBaP_LNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBaP_KR	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBaP_SNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBaP_LBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EBaP_RBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENH3	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional

Variable(s)	Type	meaning	required	
			Shape	ASCII (column)
ENH3_LV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENH3_SV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENH3_PKW	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENH3_LNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENH3_KR	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENH3_SNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENH3_LBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ENH3_RBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO2	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO2_LV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO2_SV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO2_PKW	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO2_LNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO2_KR	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO2_SNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO2_LBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO2_RBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO_LV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO_SV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO_PKW	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO_LNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO_KR	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO_SNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO_LBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ECO_RBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPN	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPN_LV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPN_SV	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPN_PKW	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPN_LNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPN_KR	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional

Variable(s)	Type	meaning	required	
			Shape	ASCII (column)
EPN_SNF	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPN_LBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
EPN_RBUS	Float	mean emission density [mg/(m*s)] accordant to variable id	optional	optional
ESTOFF5	Float	mean emission density for further pollutants [mg/(m*s)]	optional	mandatory (12)
ESTOFF6	Float	mean emission density for further pollutants [mg/(m*s)]	optional	mandatory (13)
ESTOFF7	Float	mean emission density for further pollutants [mg/(m*s)]	optional	mandatory (14)
ESTOFF8	Float	mean emission density for further pollutants [mg/(m*s)]	optional	mandatory (15)
ESTOFF9	Float	mean emission density for further pollutants [mg/(m*s)]	optional	mandatory (16)
ESTOFF10	Float	mean emission density for further pollutants [mg/(m*s)]	optional	mandatory (17)
IDTV	Integer	mean daily traffic volume	mandatory	mandatory (18)
PLV	Float	HDV-share of the vehicle fleet	mandatory	mandatory (19)
FAHRMUSTER	String	Traffic situation	mandatory	mandatory (20)
Q_STRBR	Float	• roads without ribbon development: source height [m] • roads with both-sided ribbon development: distance between opposing buildings [m] • roads with one-sided ribbon development : doubled distance from the middle of the street to the ribbon development [m]	optional	mandatory (21)
SCHLT	Integer	Schluchttyp	optional	mandatory (22)
SIG	Float	Rate of the initial dilution pollutant concentration, default: 1.5 m	optional	mandatory (23)
Str_Name	String	distinct street name	optional	mandatory (24)
Str_Katego	String	informationen of the street category	optional	mandatory (25)
PKW	Integer	absolute number of passenger cars	optional	optional
LNF	Integer	absolute number of light commercial vehicles	optional	mandatory (26)
KR	Integer	absolute number of motorcycles	optional	optional
SNF	Integer	absolute number of HGV (mix: trucks, trailers, ..)	optional	optional
LBUS	Integer	absolute number of urban buses	optional	optional
RBUS	Integer	absolute number of tour coaches	optional	optional
STANT	Float	Stop&Go share	optional	optional
LV_STANT	Float	Stop&Go share LDV	optional	optional
SV_STANT	Float	Stop&Go share HDV	optional	optional
FS	Integer	lane number	optional	optional

Variable(s)	Type	meaning	required	
			Shape	ASCII (column)
IUZ	Integer	environmental zone index (Auswahl EFT3-Datei)	optional	optional
TUNNEL	Integer	tunnel index (1=Tunnel)	optional	optional
ZUSTAND	Integer	road condition index (1=schlecht)	optional	optional

Input-SHP-file

Actually a SHP-file consists of a file compound of *.shp, *.shx, *.dbf and others. Each of these files contains different information of the shape-file, e.g. geometry, attributes. The following description targets on the file compound.

In the SHP-file an object-ID is specified automatically by ArcGIS in the column „FID“. The geometry of street segments is saved in the column „shape“. Apart from that the columns has to be created analogue to the table in 1.4.. Input-shp-files shall be used for dispersion calculation with PROKAS, PROKAS_B and SELMA-PROKAS.

In the following an example Input-SD-file is shown:

Attribute von bsp

FID	Shape *	KENNNR	FBREITE	FBHOEHE	IDTV	PLV	FAHRMUSTER	Q_STRBR	SCHLT	SIG	Str_Name	Str_Katego	LNFZ	LBUS	FS	LN	WO	LNEIG	FM_ABB	LOS	STANT
0	Polylinie	1	16	0	18757	0.05	IO-HVS50_2	0	0	1.5	musterstr_1		0	0	0	0	0	_2	IO-HVS50	f	0
1	Polylinie	2	16	0	18757	0.05	IO-HVS50d_2	0	0	1.5	musterstr_2		0	0	0	0	0	_2	IO-HVS50	d	0
2	Polylinie	3	16	0	15353	0.08	IO-HVS50d_2	0	0	1.5	musterstr_3		0	0	0	0	0	_2	IO-HVS50	d	0
3	Polylinie	4	16	0	15353	0.08	IO-HVS50_2	0	0	1.5	musterstr_4		0	0	0	0	0	_2	IO-HVS50	f	0
4	Polylinie	5	16	0	15353	0.08	IO-HVS50_2	0	0	1.5	musterstr_5		0	0	0	0	0	_2	IO-HVS50	f	0
5	Polylinie	6	16	0	15353	0.08	IO-HVS50_2	0	0	1.5	musterstr_6		0	0	0	0	0	_2	IO-HVS50	f	0
6	Polylinie	7	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_7		0	0	0	0	0	_2	AO-Fern70	f	0
7	Polylinie	8	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_8		0	0	0	0	0	_2	AO-Fern70	f	0
8	Polylinie	9	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_9		0	0	0	0	0	_2	AO-Fern70	f	0
9	Polylinie	10	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_10		0	0	0	0	0	_2	AO-Fern70	f	0
10	Polylinie	11	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_11		0	0	0	0	0	_2	AO-Fern70	f	0
11	Polylinie	12	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_12		0	0	0	0	0	_2	AO-Fern70	f	0
12	Polylinie	13	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_13		0	0	0	0	0	_2	AO-Fern70	f	0
13	Polylinie	14	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_14		0	0	0	0	0	_2	AO-Fern70	f	0
14	Polylinie	15	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_15		0	0	0	0	0	_2	AO-Fern70	f	0
15	Polylinie	16	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_16		0	0	0	0	0	_2	AO-Fern70	f	0
16	Polylinie	17	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_17		0	0	0	0	0	_2	AO-Fern70	f	0
17	Polylinie	18	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_18		0	0	0	0	0	_2	AO-Fern70	f	0
18	Polylinie	19	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_19		0	0	0	0	0	_2	AO-Fern70	f	0
19	Polylinie	20	20	0	15353	0.08	AO-Fern70d_2	0	0	1.5	musterstr_20		0	0	0	0	0	_2	AO-Fern70	d	0
20	Polylinie	21	22	0	20227	0.05	IO-HVS50d	0	0	1.5	musterstr_21		0	0	0	0	0		IO-HVS50	d	0
21	Polylinie	22	22	0	20227	0.05	IO-HVS50d	0	0	1.5	musterstr_22		0	0	0	0	0		IO-HVS50	d	0

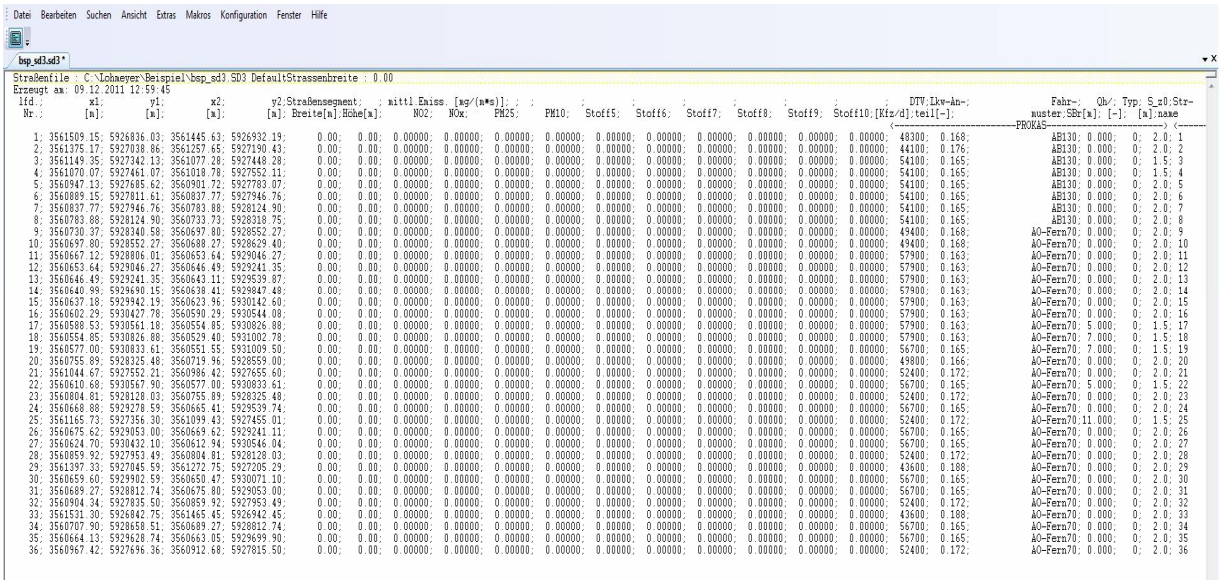
Datensatz: 1 Anzeigen: Alle Ausgewählte Datensätze (0 aus 209 Ausgewählte) Optionen

Various options of PROKAS_E can be used by adding further columns. Correspondent properties for each column gathered from table with the information about the structure of an SD-file.

For example it‘s necessary to add 2 columns, if stop&go share for LV and HV shall be specified separately.

Input-SD3-File

All informations for considered street segments are saved in an Input-SD-file. For SD-files in the ASCII-format there are restrictions on the functionality of PROKAS_E.



Datei Bearbeiten Suchen Ansicht Extras Makros Konfiguration Fenster Hilfe

bsp_sd3.sd3 *

Straßenfile : C:\Lohmeyer\Beispiel\bsp_sd3.SD3 Default:Strassenbreite : 0.00
Erzeugt am: 09.12.2011 12:59:45

lfd.-Nr.:	x1: [m];	y1: [m];	x2: [m];	y2:Str&Ensegment: [m];	mittl.Emiss. [mg/(m*s)]: Breite[m]:Höhe[m];	NO2;	NOx;	PM25;	PM10;	Stoff5;	Stoff6;	Stoff7;	Stoff8;	Stoff9;	Stoff10:[Kfz/d]:teil[-]:	DTV:Lkw-An-:	Fahr-muster:SBr[m];	Qh/: [-];	Typ: [m];	S_z0:Str-.name
																	<--------	PROKAS	-------->	<------
1;	3561509.15;	5926836.03;	3561445.63;	5926932.19;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	48300;	0.168;	AB130;	0.000;	0;	2.0; 1
2;	3561375.17;	5927038.86;	3561257.65;	5927190.43;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	44100;	0.176;	AB130;	0.000;	0;	2.0; 2
3;	3561149.35;	5927342.13;	3561077.28;	5927448.28;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	54100;	0.165;	AB130;	0.000;	0;	1.5; 3
4;	3561070.07;	5927461.07;	3561018.78;	5927552.11;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	54100;	0.165;	AB130;	0.000;	0;	1.5; 4
5;	3560947.13;	5927685.62;	3560901.72;	5927783.07;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	54100;	0.165;	AB130;	0.000;	0;	2.0; 5
6;	3560889.15;	5927811.61;	3560837.77;	5927946.76;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	54100;	0.165;	AB130;	0.000;	0;	2.0; 6
7;	3560837.77;	5927946.76;	3560783.88;	5928124.90;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	54100;	0.165;	AB130;	0.000;	0;	2.0; 7
8;	3560783.88;	5928124.90;	3560733.73;	5928318.75;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	54100;	0.165;	AB130;	0.000;	0;	2.0; 8
9;	3560730.37;	5928340.58;	3560697.80;	5928552.27;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	49400;	0.168;	AO-Fern70;	0.000;	0;	2.0; 9
10;	3560697.80;	5928552.27;	3560688.27;	5928629.40;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	49400;	0.168;	AO-Fern70;	0.000;	0;	2.0; 10
11;	3560667.12;	5928806.01;	3560653.64;	5929046.27;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	57900;	0.163;	AO-Fern70;	0.000;	0;	2.0; 11
12;	3560653.64;	5929046.27;	3560646.49;	5929241.35;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	57900;	0.163;	AO-Fern70;	0.000;	0;	2.0; 12
13;	3560646.49;	5929241.35;	3560643.11;	5929539.87;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	57900;	0.163;	AO-Fern70;	0.000;	0;	2.0; 13
14;	3560640.99;	5929690.15;	3560638.41;	5929847.48;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	57900;	0.163;	AO-Fern70;	0.000;	0;	2.0; 14
15;	3560637.18;	5929942.19;	3560623.96;	5930142.60;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	57900;	0.163;	AO-Fern70;	0.000;	0;	2.0; 15
16;	3560602.29;	5930427.78;	3560590.29;	5930544.08;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	57900;	0.163;	AO-Fern70;	0.000;	0;	2.0; 16
17;	3560580.53;	5930561.18;	3560554.85;	5930826.88;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	57900;	0.163;	AO-Fern70;	5.000;	0;	1.5; 17
18;	3560554.85;	5930826.88;	3560529.40;	5931002.78;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	57900;	0.163;	AO-Fern70;	7.000;	0;	1.5; 18
19;	3560577.00;	5930833.61;	3560551.55;	5931009.50;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	56700;	0.165;	AO-Fern70;	7.000;	0;	1.5; 19
20;	3560755.89;	5928325.48;	3560719.96;	5928559.00;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	49800;	0.166;	AO-Fern70;	0.000;	0;	2.0; 20
21;	3561044.67;	5927552.21;	3560986.42;	5927655.60;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	52400;	0.172;	AO-Fern70;	0.000;	0;	2.0; 21
22;	3560610.68;	5930567.90;	3560577.00;	5930833.61;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	56700;	0.165;	AO-Fern70;	5.000;	0;	1.5; 22
23;	3560804.81;	5928128.03;	3560755.89;	5928325.48;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	52400;	0.172;	AO-Fern70;	0.000;	0;	2.0; 23
24;	3560868.88;	5929278.59;	3560665.41;	5929539.74;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	56700;	0.165;	AO-Fern70;	0.000;	0;	2.0; 24
25;	3561165.73;	5927356.30;	3561099.43;	5927455.01;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	52400;	0.172;	AO-Fern70;	11.000;	0;	1.5; 25
26;	3560675.62;	5929053.00;	3560669.62;	5929241.11;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	56700;	0.165;	AO-Fern70;	0.000;	0;	2.0; 26
27;	3560624.70;	5930432.10;	3560612.94;	5930546.04;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	56700;	0.165;	AO-Fern70;	0.000;	0;	2.0; 27
28;	3560859.92;	5927953.49;	3560804.81;	5928128.03;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	52400;	0.172;	AO-Fern70;	0.000;	0;	2.0; 28
29;	3561397.33;	5927045.59;	3561272.75;	5927205.29;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	43600;	0.188;	AO-Fern70;	0.000;	0;	2.0; 29
30;	3560659.60;	5929902.59;	3560650.47;	5930071.10;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	56700;	0.165;	AO-Fern70;	0.000;	0;	2.0; 30
31;	3560689.27;	5928812.74;	3560675.80;	5929053.00;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	56700;	0.165;	AO-Fern70;	0.000;	0;	2.0; 31
32;	3560904.34;	5927835.50;	3560859.92;	5927953.49;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	52400;	0.172;	AO-Fern70;	0.000;	0;	2.0; 32
33;	3561531.30;	5926842.75;	3561465.45;	5926942.45;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	43600;	0.188;	AO-Fern70;	0.000;	0;	2.0; 33
34;	3560707.90;	5928658.51;	3560689.27;	5928812.74;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	56700;	0.165;	AO-Fern70;	0.000;	0;	2.0; 34
35;	3560664.13;	5929628.74;	3560663.05;	5929699.90;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	56700;	0.165;	AO-Fern70;	0.000;	0;	2.0; 35
36;	3560967.42;	5927696.36;	3560912.68;	5927815.50;	0.00; 0.00;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	0.00000;	52400;	0.172;	AO-Fern70;	0.000;	0;	2.0; 36

Notice for the ASCII-format: In case a row starts with a non-Integer value, the row is treated as a comment.

Input-EFT-File

In the head of the Input EFT3-file the following is specified::

- the version of the handbook HBEFA
- date of creation of the EFT-file
- version of HbefaToEft
- title of the file
- Year of the emission factors
- cold start Yes/No
- petrol/diesel separated? No

Therefor the creation of E-factors is reproducible.

The cold start addition is only applied for traffic situations in town, which are characterized with „IO“ or „IOS“. Furthermore the driving performance rate for standard light vehicles and standard heavy vehicles are displayed separately in percentage [%].

In the EFT-file for all traffic situations for the following pollutants NOx

- NO_2
- PM10
- PM2.5
- BaP
- NH3
- CO_2(total)
- CO
- Benzol
- PN(particle number)

emission factors in [g/km*vehicles for the vehicle categories:

- PKW (PC)
- LNF (LCV)
- KR (MC)
- SNF (HGV)
- LBus (urban bus)
- RBus (tour coach)

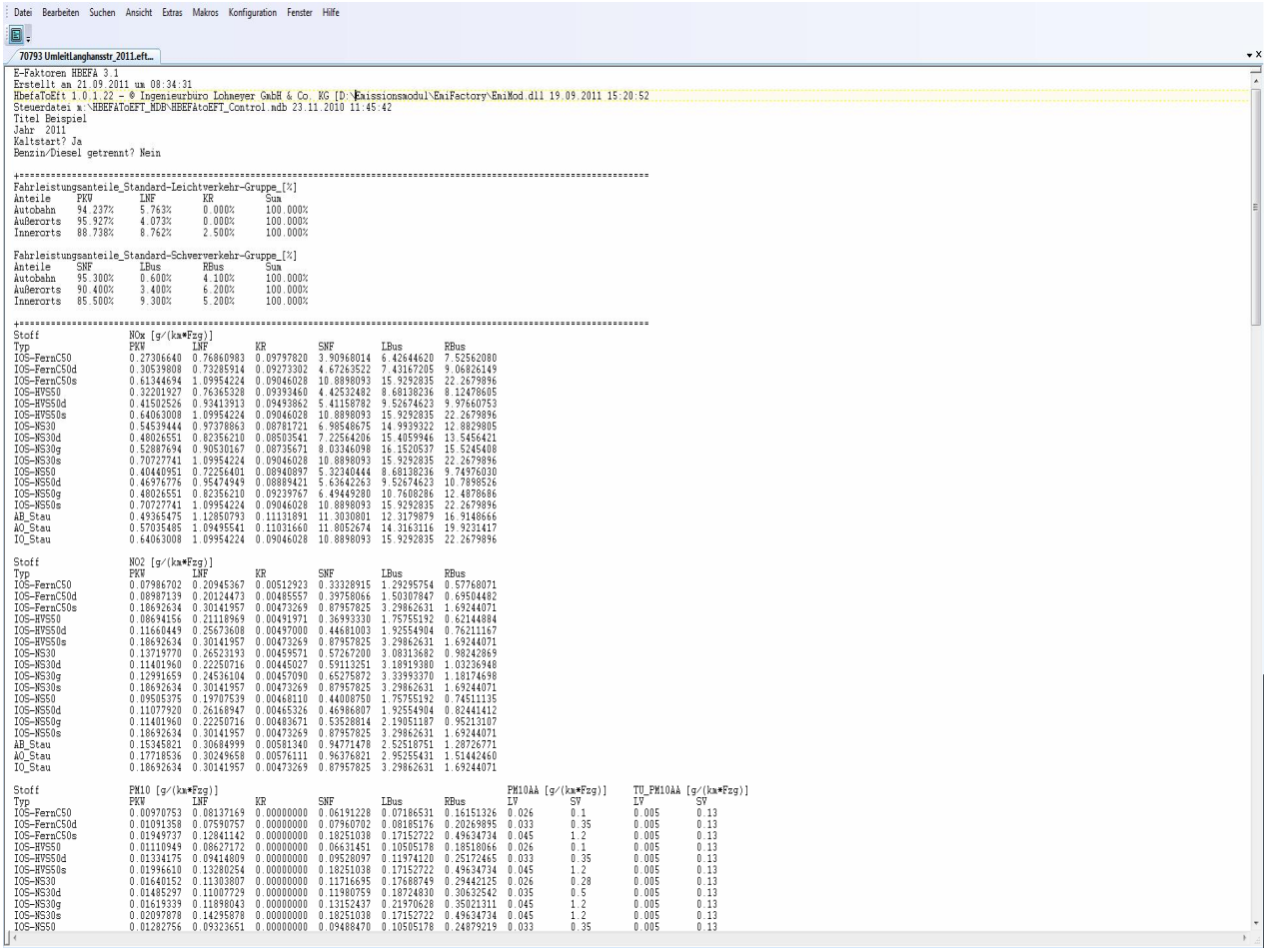
are specified.

Furthermore longitudinal slope and level of service (LOS) is specified for every traffic situation. For the level of service 4 different groups are differentiated:

- freeflow
- heavy
- saturated
- stop + go

Longitudinal slope is differentiated in groups of 0%, 2%, 4% and 6%. Whereas there is a difference between „+“, „-„ and „+/-„ (specified as „_“). An exact description of traffic situations is attached hereto.

For the emission factors for PM10 and PM2.5 the emissions for abrasion and resuspension as well as rasion and resuspension emissions for tunnels are specified separately.



Datei Bearbeiten Suchen Ansicht Extras Makros Konfiguration Fenster Hilfe

70793 UmleitLanghansstr_2011.eft...

```
E-Faktoren HBEFA 3.1
Erstellt am 21.09.2011 um 08:34:31
HbefaToEft 1.0.1.22 - © Ingenieurbüro Lohmeyer GmbH & Co. KG [D:\Emissionsmodul\EmiFactory\EmiMod.dll 19.09.2011 15:20:52
Steuerdatei m:\HBEFAToEFT_MDB\HBEFAtoEFT_Control.mdb 23.11.2010 11:45:42
Titel Beispiel
Jahr 2011
Kaltstart? Ja
Benzin/Diesel getrennt? Nein

+-----------------------------------------------------------------------------------------------------------------------

Fahrleistungsanteile_Standard-Leichtverkehr-Gruppe_[%]
Anteile     PKW       LNF       KR        Sum
Autobahn    94.237%   5.763%    0.000%    100.000%
Außerorts   95.927%   4.073%    0.000%    100.000%
Innerorts   88.738%   8.762%    2.500%    100.000%

Fahrleistungsanteile_Standard-Schwerverkehr-Gruppe_[%]
Anteile     SNF       LBus      RBus      Sum
Autobahn    95.300%   0.600%    4.100%    100.000%
Außerorts   90.400%   3.400%    6.200%    100.000%
Innerorts   85.500%   9.300%    5.200%    100.000%

+-----------------------------------------------------------------------------------------------------------------------

Stoff                NOx [g/(km*Fzg)]
Typ                  PKW          LNF          KR           SNF          LBus         RBus
IOS-FernC50          0.27306640   0.76860983   0.09797820   3.90968014   6.42644620   7.52562080
IOS-FernC50d         0.30539808   0.73285914   0.09273302   4.67263522   7.43167205   9.06826149
IOS-FernC50s         0.61344694   1.09954224   0.09046028   10.8898093   15.9292835   22.2679896
IOS-HVS50            0.32201927   0.76365328   0.09393460   4.42532482   8.68138236   8.12478605
IOS-HVS50d           0.41502526   0.93413913   0.09493862   5.41158782   9.52674623   9.97660753
IOS-HVS50s           0.64063008   1.09954224   0.09046028   10.8898093   15.9292835   22.2679896
IOS-NS30             0.54539444   0.97378863   0.08781721   6.98548675   14.9939322   12.8829805
IOS-NS30d            0.48026551   0.82356210   0.08503541   7.22564206   15.4059946   13.5456421
IOS-NS30g            0.52887694   0.90530167   0.08735671   8.03346098   16.1520537   15.5245408
IOS-NS30s            0.70727741   1.09954224   0.09046028   10.8898093   15.9292835   22.2679896
IOS-NS50             0.40440951   0.72256401   0.08940897   5.32340444   8.68138236   9.74976030
IOS-NS50d            0.46976776   0.95474949   0.08889421   5.63642263   9.52674623   10.7898526
IOS-NS50g            0.48026551   0.82356210   0.09239767   6.49449280   10.7608286   12.4878686
IOS-NS50s            0.70727741   1.09954224   0.09046028   10.8898093   15.9292835   22.2679896
AB_Stau              0.49365475   1.12850793   0.11131891   11.3030801   12.3179879   16.9148666
AO_Stau              0.57035485   1.09495541   0.11031660   11.8052674   14.3163116   19.9231417
IO_Stau              0.64063008   1.09954224   0.09046028   10.8898093   15.9292835   22.2679896

Stoff                NO2 [g/(km*Fzg)]
Typ                  PKW          LNF          KR           SNF          LBus         RBus
IOS-FernC50          0.07986702   0.20945367   0.00512923   0.33328915   1.29295754   0.57768071
IOS-FernC50d         0.08987139   0.20124473   0.00485557   0.39758066   1.50307847   0.69504482
IOS-FernC50s         0.18692634   0.30141957   0.00473269   0.87957825   3.29862631   1.69244071
IOS-HVS50            0.08694156   0.21118969   0.00491971   0.36993330   1.75755192   0.62144884
IOS-HVS50d           0.11660449   0.25673608   0.00497000   0.44681003   1.92554904   0.76211167
IOS-HVS50s           0.18692634   0.30141957   0.00473269   0.87957825   3.29862631   1.69244071
IOS-NS30             0.13719770   0.26523193   0.00459571   0.57267200   3.08313682   0.98242869
IOS-NS30d            0.11401960   0.22250716   0.00445027   0.59113251   3.18919380   1.03236948
IOS-NS30g            0.12991659   0.24536104   0.00457090   0.65275872   3.33993370   1.18174698
IOS-NS30s            0.18692634   0.30141957   0.00473269   0.87957825   3.29862631   1.69244071
IOS-NS50             0.09505375   0.19707539   0.00468110   0.44008750   1.75755192   0.74511135
IOS-NS50d            0.11077920   0.26168947   0.00465326   0.46986807   1.92554904   0.82441412
IOS-NS50g            0.11401960   0.22250716   0.00483671   0.53528814   2.19051187   0.95213107
IOS-NS50s            0.18692634   0.30141957   0.00473269   0.87957825   3.29862631   1.69244071
AB_Stau              0.15345821   0.30684999   0.00581340   0.94771478   2.52518751   1.28726771
AO_Stau              0.17718536   0.30249658   0.00576111   0.96376821   2.95255431   1.51442460
IO_Stau              0.18692634   0.30141957   0.00473269   0.87957825   3.29862631   1.69244071

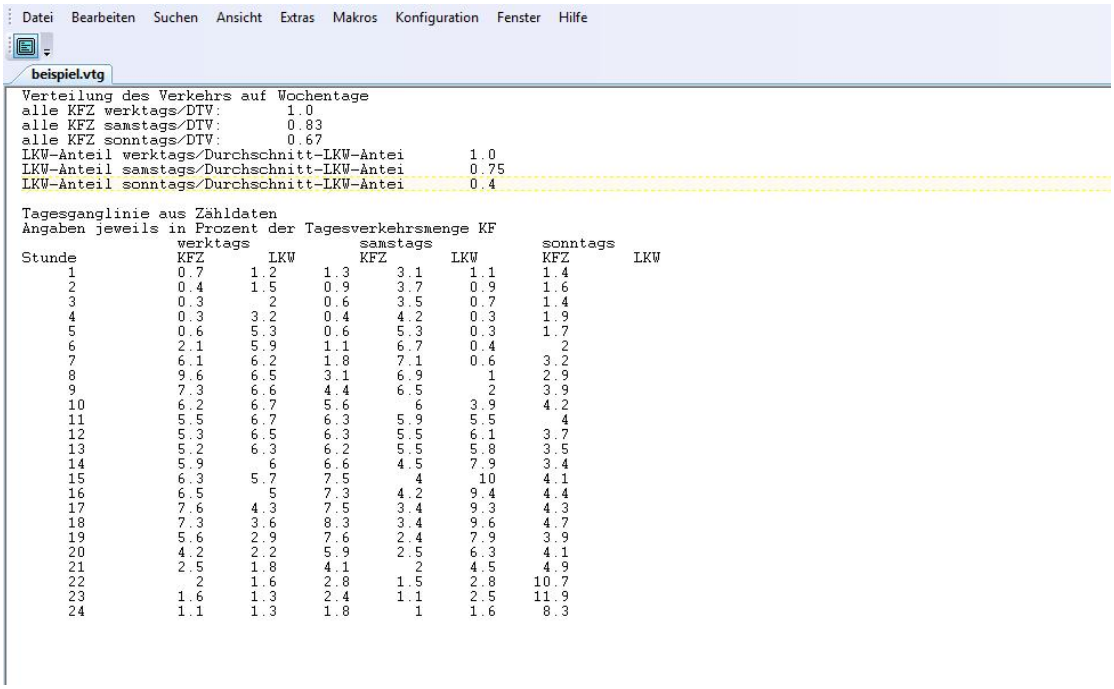
Stoff                PM10 [g/(km*Fzg)]                                                  PM10AA [g/(km*Fzg)]    TU_PM10AA [g/(km*Fzg)]
Typ                  PKW          LNF          KR           SNF          LBus         RBus         LV       SV       LV       SV
IOS-FernC50          0.00970753   0.08137169   0.00000000   0.06191228   0.07186531   0.16151326   0.026    0.1      0.005    0.13
IOS-FernC50d         0.01091358   0.07590757   0.00000000   0.07960702   0.08185176   0.20269895   0.033    0.35     0.005    0.13
IOS-FernC50s         0.01949737   0.12841142   0.00000000   0.18251038   0.17152722   0.49634734   0.045    1.2      0.005    0.13
IOS-HVS50            0.01110949   0.08627172   0.00000000   0.06631451   0.10505178   0.18518066   0.026    0.1      0.005    0.13
IOS-HVS50d           0.01334175   0.09414809   0.00000000   0.09528097   0.11971120   0.25172465   0.033    0.35     0.005    0.13
IOS-HVS50s           0.01996610   0.13280254   0.00000000   0.18251038   0.17152722   0.49634734   0.045    1.2      0.005    0.13
IOS-NS30             0.01640152   0.11303807   0.00000000   0.11716695   0.17688749   0.29442125   0.026    0.28     0.005    0.13
IOS-NS30d            0.01485297   0.11007729   0.00000000   0.11980759   0.18724830   0.30632542   0.035    0.5      0.005    0.13
IOS-NS30g            0.01619339   0.11898043   0.00000000   0.13152437   0.21970628   0.35021311   0.045    1.2      0.005    0.13
IOS-NS30s            0.02097878   0.14295878   0.00000000   0.18251038   0.17152722   0.49634734   0.045    1.2      0.005    0.13
IOS-NS50             0.01282756   0.09323651   0.00000000   0.09488470   0.10505178   0.24879219   0.033    0.35     0.005    0.13
```

The division of the vehicle fleet composition for traffic on highways, out of town and in town for different Euro fleeds are included in the EFT-file.

Furthermore the cold start addition for different traffic situations for the in town traffic are specified. For NO_x the cold start addition is only applied for PKW.

VTG-File

The VTG-file can be opened in the tab option, when using week cycle/ day cycle is hooked.



Datei Bearbeiten Suchen Ansicht Extras Makros Konfiguration Fenster Hilfe

beispiel.vtg

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Verteilung des Verkehrs auf Wochentage
alle KFZ werktags/DTV:        1.0
alle KFZ samstags/DTV:        0.83
alle KFZ sonntags/DTV:        0.67
LKW-Anteil werktags/Durchschnitt-LKW-Antei       1.0
LKW-Anteil samstags/Durchschnitt-LKW-Antei       0.75
LKW-Anteil sonntags/Durchschnitt-LKW-Antei       0.4

Tagesganglinie aus Zähldaten
Angaben jeweils in Prozent der Tagesverkehrsmenge KF
                werktags          samstags          sonntags
Stunde          KFZ      LKW      KFZ      LKW      KFZ      LKW
     1          0.7      1.2      1.3      3.1      1.1      1.4
     2          0.4      1.5      0.9      3.7      0.9      1.6
     3          0.3        2      0.6      3.5      0.7      1.4
     4          0.3      3.2      0.4      4.2      0.3      1.9
     5          0.6      5.3      0.6      5.3      0.3      1.7
     6          2.1      5.9      1.1      6.7      0.4        2
     7          6.1      6.2      1.8      7.1      0.6      3.2
     8          9.6      6.5      3.1      6.9        1      2.9
     9          7.3      6.6      4.4      6.5        2      3.9
    10          6.2      6.7      5.6        6      3.9      4.2
    11          5.5      6.7      6.3      5.9      5.5        4
    12          5.3      6.5      6.3      5.5      6.1      3.7
    13          5.2      6.3      6.2      5.5      5.8      3.5
    14          5.9        6      6.6      4.5      7.9      3.4
    15          6.3      5.7      7.5        4       10      4.1
    16          6.5        5      7.3      4.2      9.4      4.4
    17          7.6      4.3      7.5      3.4      9.3      4.3
    18          7.3      3.6      8.3      3.4      9.6      4.7
    19          5.6      2.9      7.6      2.4      7.9      3.9
    20          4.2      2.2      5.9      2.5      6.3      4.1
    21          2.5      1.8      4.1        2      4.5      4.9
    22            2      1.6      2.8      1.5      2.8     10.7
    23          1.6      1.3      2.4      1.1      2.5     11.9
    24          1.1      1.3      1.8        1      1.6      8.3
```

This file is only needed, if traffic data is available for single working days or if the dispersion calculation will be executed with PROKAS, PROKAS_B or SELMA-PROKAS. These programs require a x.EGN-File.

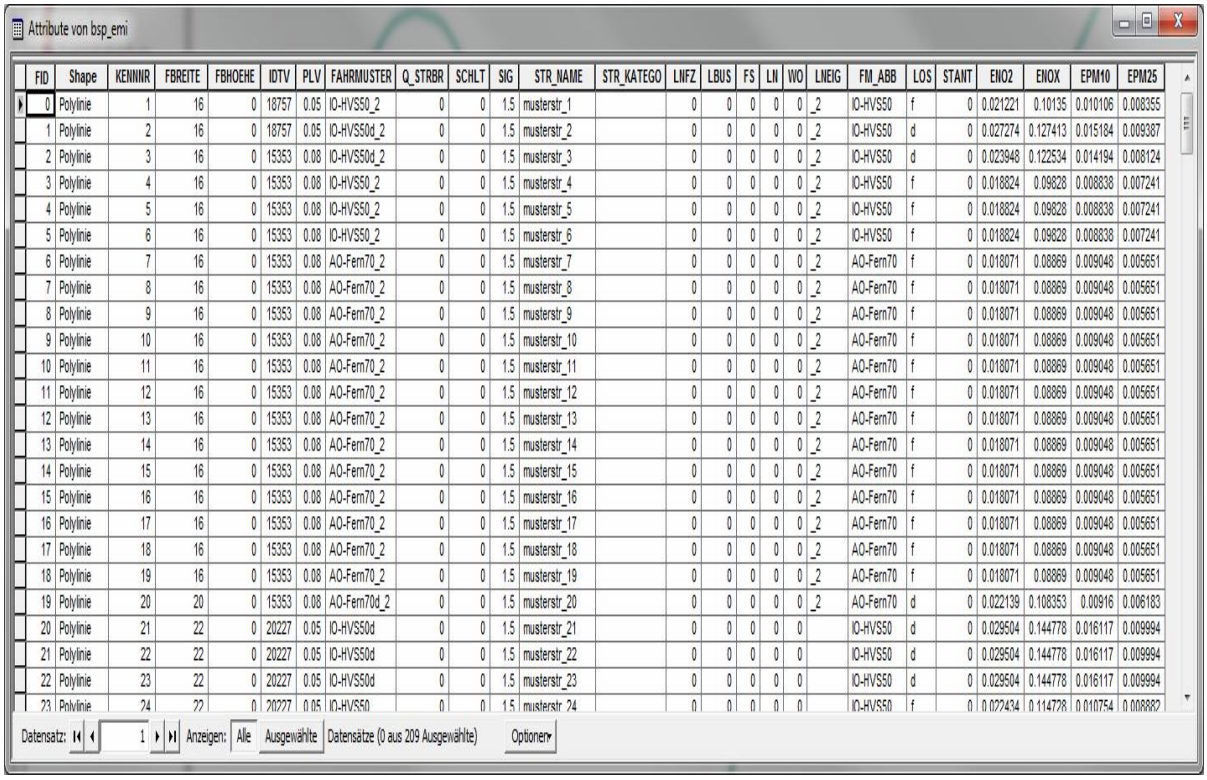
The distribution of the week cycle for all vehicles and trucks is specified in the VTG-file. In the 9th row a comment about the origin of the data can be entered.

Furthermore the day cycle has to be specified separately for all vehicles and trucks at working days (mo-fr) and at saturday and sunday.

In case a mean traffic composition is existent, the sum of the DTV mean value (mon - sun) and the sum of the DTV mean value (mon -sun) and HDV mean value (mon – sun) has to be 7.

Output-shp-file

Every SHP-file consists of a file composition of *.shp, *.shx, *.dbf and others. Each of these files contains different information about the shape-file e.g. geometry, attributes. The following description of the shape-file targets the file composition.


Attribute von bsp_emi

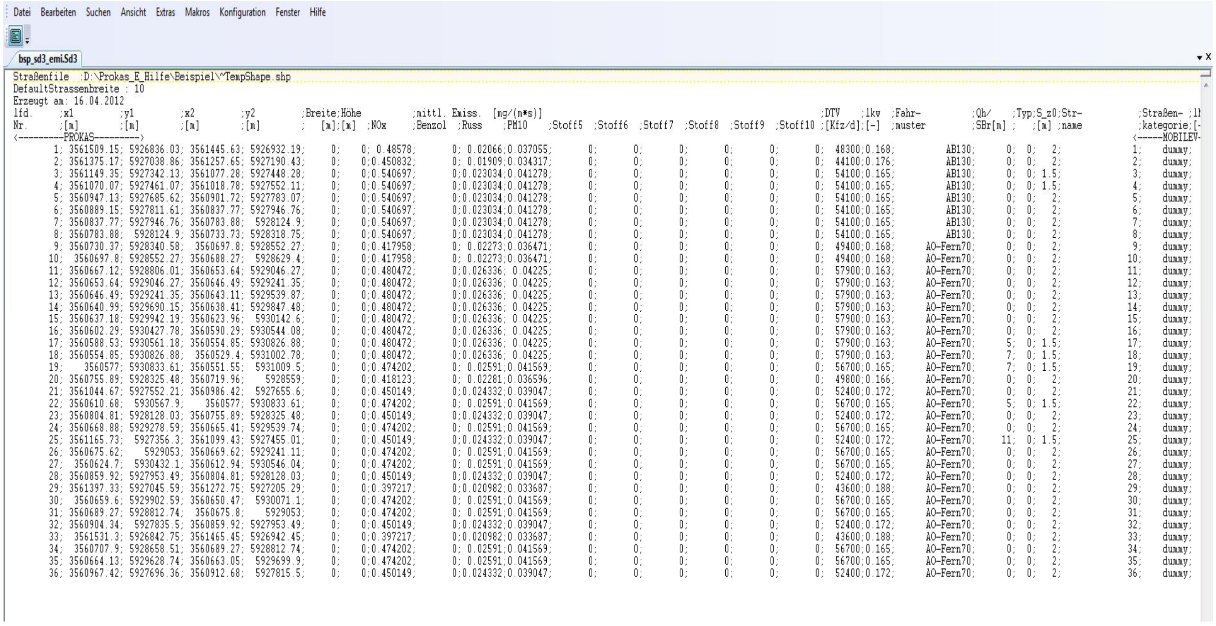
FID	Shape	KENNNR	FBREITE	FBHOEHE	IDTV	PLV	FAHRMUSTER	Q_STRBR	SCHLT	SIG	STR_NAME	STR_KATEGO	LNFZ	LBUS	FS	LN	WO	LNEIG	FM_ABB	LOS	STANT	ENO2	ENOX	EPM10	EPM25
0	Polylinie	1	16	0	18757	0.05	IO-HVS50_2	0	0	1.5	musterstr_1		0	0	0	0	0	_2	IO-HVS50	f	0	0.021221	0.10135	0.010106	0.008355
1	Polylinie	2	16	0	18757	0.05	IO-HVS50d_2	0	0	1.5	musterstr_2		0	0	0	0	0	_2	IO-HVS50	d	0	0.027274	0.127413	0.015184	0.009387
2	Polylinie	3	16	0	15353	0.08	IO-HVS50d_2	0	0	1.5	musterstr_3		0	0	0	0	0	_2	IO-HVS50	d	0	0.023948	0.122534	0.014194	0.008124
3	Polylinie	4	16	0	15353	0.08	IO-HVS50_2	0	0	1.5	musterstr_4		0	0	0	0	0	_2	IO-HVS50	f	0	0.018824	0.09828	0.008838	0.007241
4	Polylinie	5	16	0	15353	0.08	IO-HVS50_2	0	0	1.5	musterstr_5		0	0	0	0	0	_2	IO-HVS50	f	0	0.018824	0.09828	0.008838	0.007241
5	Polylinie	6	16	0	15353	0.08	IO-HVS50_2	0	0	1.5	musterstr_6		0	0	0	0	0	_2	IO-HVS50	f	0	0.018824	0.09828	0.008838	0.007241
6	Polylinie	7	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_7		0	0	0	0	0	_2	AO-Fern70	f	0	0.018071	0.08869	0.009048	0.005651
7	Polylinie	8	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_8		0	0	0	0	0	_2	AO-Fern70	f	0	0.018071	0.08869	0.009048	0.005651
8	Polylinie	9	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_9		0	0	0	0	0	_2	AO-Fern70	f	0	0.018071	0.08869	0.009048	0.005651
9	Polylinie	10	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_10		0	0	0	0	0	_2	AO-Fern70	f	0	0.018071	0.08869	0.009048	0.005651
10	Polylinie	11	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_11		0	0	0	0	0	_2	AO-Fern70	f	0	0.018071	0.08869	0.009048	0.005651
11	Polylinie	12	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_12		0	0	0	0	0	_2	AO-Fern70	f	0	0.018071	0.08869	0.009048	0.005651
12	Polylinie	13	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_13		0	0	0	0	0	_2	AO-Fern70	f	0	0.018071	0.08869	0.009048	0.005651
13	Polylinie	14	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_14		0	0	0	0	0	_2	AO-Fern70	f	0	0.018071	0.08869	0.009048	0.005651
14	Polylinie	15	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_15		0	0	0	0	0	_2	AO-Fern70	f	0	0.018071	0.08869	0.009048	0.005651
15	Polylinie	16	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_16		0	0	0	0	0	_2	AO-Fern70	f	0	0.018071	0.08869	0.009048	0.005651
16	Polylinie	17	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_17		0	0	0	0	0	_2	AO-Fern70	f	0	0.018071	0.08869	0.009048	0.005651
17	Polylinie	18	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_18		0	0	0	0	0	_2	AO-Fern70	f	0	0.018071	0.08869	0.009048	0.005651
18	Polylinie	19	16	0	15353	0.08	AO-Fern70_2	0	0	1.5	musterstr_19		0	0	0	0	0	_2	AO-Fern70	f	0	0.018071	0.08869	0.009048	0.005651
19	Polylinie	20	20	0	15353	0.08	AO-Fern70d_2	0	0	1.5	musterstr_20		0	0	0	0	0	_2	AO-Fern70	d	0	0.022139	0.108353	0.00916	0.006183
20	Polylinie	21	22	0	20227	0.05	IO-HVS50d	0	0	1.5	musterstr_21		0	0	0	0	0		IO-HVS50	d	0	0.029504	0.144778	0.016117	0.009994
21	Polylinie	22	22	0	20227	0.05	IO-HVS50d	0	0	1.5	musterstr_22		0	0	0	0	0		IO-HVS50	d	0	0.029504	0.144778	0.016117	0.009994
22	Polylinie	23	22	0	20227	0.05	IO-HVS50d	0	0	1.5	musterstr_23		0	0	0	0	0		IO-HVS50	d	0	0.029504	0.144778	0.016117	0.009994
23	Polylinie	24	22	0	20227	0.05	IO-HVS50	0	0	1.5	musterstr_24		0	0	0	0	0		IO-HVS50	f	0	0.022434	0.114728	0.010754	0.008882

Datensatz: 1 Anzeigen: Alle Ausgewählte Datensätze (0 aus 209 Ausgewählte) Optionen

The emissions are output in the column ENO2, ENOX, EPM10, EPM25 (according to the chosen substances). If output of emission for different vehicle type categories as well as output of absolute vehicle counts is chosen, the information is displayed according to the settings of PROKAS_E in the file. Also an*_emi.dbf is created and can be opened with Microsoft Office Excel.

Output-SD3-File

In the header of the SD3-File folder directory, creation date and the default street width of 10m are displayed. Mean emission densities are displayed in the columns NOx, Benzol, Russ und PM10 accordingly to the definition in „selection of substances/columns“ in PROKAS_E emission calculation. The amount of output information also depends on the settings in „output“ like emissions for different vehicle categories and output of absolute vehicle counts.



```
Straßenfile  :D:\Prokas_E_Hilfe\Beispiel\~TempShape.shp
DefaultStrassenbreite : 10
Erzeugt am: 16.04.2012
lfd.  ;x1         ;y1         ;x2         ;y2         ;Breite;Höhe      ;mittl. Emiss.  [mg/(m*s)]                                                                         ;DTV    ;lkw  ;Fahr-       ;Qh/    ;Typ;S_z0;Str-       ;Straßen-  ;lk
Nr.   ;[m]        ;[m]        ;[m]        ;[m]        ;   [m];[m]  ;NOx     ;Benzol ;Russ   ;PM10     ;Stoff5 ;Stoff6 ;Stoff7 ;Stoff8 ;Stoff9 ;Stoff10 ;[Kfz/d];[-]  ;muster      ;SBr[m] ;   ;[m] ;name       ;kategorie;[-
<---------PROKAS--------->                                                                                                                                                                                   <-----MOBILEV-
 1; 3561509.15; 5926836.03; 3561445.63; 5926932.19;  0;  0; 0.48578;  0; 0.02066;0.037055;  0;  0;  0;  0;  0;  0; 48300;0.168;     AB130;  0;  0;   2;   1;  dummy;
 2; 3561375.17; 5927038.86; 3561257.65; 5927190.43;  0;  0;0.450832;  0; 0.01909;0.034317;  0;  0;  0;  0;  0;  0; 44100;0.176;     AB130;  0;  0;   2;   2;  dummy;
 3; 3561149.35; 5927342.13; 3561077.28; 5927448.28;  0;  0;0.540697;  0;0.023034;0.041278;  0;  0;  0;  0;  0;  0; 54100;0.165;     AB130;  0;  0; 1.5;   3;  dummy;
 4; 3561070.07; 5927461.07; 3561018.78; 5927552.11;  0;  0;0.540697;  0;0.023034;0.041278;  0;  0;  0;  0;  0;  0; 54100;0.165;     AB130;  0;  0; 1.5;   4;  dummy;
 5; 3560947.13; 5927685.62; 3560901.72; 5927783.07;  0;  0;0.540697;  0;0.023034;0.041278;  0;  0;  0;  0;  0;  0; 54100;0.165;     AB130;  0;  0;   2;   5;  dummy;
 6; 3560889.15; 5927811.61; 3560837.77; 5927946.76;  0;  0;0.540697;  0;0.023034;0.041278;  0;  0;  0;  0;  0;  0; 54100;0.165;     AB130;  0;  0;   2;   6;  dummy;
 7; 3560837.77; 5927946.76; 3560783.88;  5928124.9;  0;  0;0.540697;  0;0.023034;0.041278;  0;  0;  0;  0;  0;  0; 54100;0.165;     AB130;  0;  0;   2;   7;  dummy;
 8; 3560783.88;  5928124.9; 3560733.73; 5928318.75;  0;  0;0.540697;  0;0.023034;0.041278;  0;  0;  0;  0;  0;  0; 54100;0.165;     AB130;  0;  0;   2;   8;  dummy;
 9; 3560730.37; 5928340.58;  3560697.8; 5928552.27;  0;  0;0.417958;  0; 0.02273;0.036471;  0;  0;  0;  0;  0;  0; 49400;0.168; AO-Fern70;  0;  0;   2;   9;  dummy;
10;  3560697.8; 5928552.27; 3560688.27;  5928629.4;  0;  0;0.417958;  0; 0.02273;0.036471;  0;  0;  0;  0;  0;  0; 49400;0.168; AO-Fern70;  0;  0;   2;  10;  dummy;
11; 3560667.12; 5928806.01; 3560653.64; 5929046.27;  0;  0;0.480472;  0;0.026336; 0.04225;  0;  0;  0;  0;  0;  0; 57900;0.163; AO-Fern70;  0;  0;   2;  11;  dummy;
12; 3560653.64; 5929046.27; 3560646.49; 5929241.35;  0;  0;0.480472;  0;0.026336; 0.04225;  0;  0;  0;  0;  0;  0; 57900;0.163; AO-Fern70;  0;  0;   2;  12;  dummy;
13; 3560646.49; 5929241.35; 3560643.11; 5929539.87;  0;  0;0.480472;  0;0.026336; 0.04225;  0;  0;  0;  0;  0;  0; 57900;0.163; AO-Fern70;  0;  0;   2;  13;  dummy;
14; 3560640.99; 5929690.15; 3560638.41; 5929847.48;  0;  0;0.480472;  0;0.026336; 0.04225;  0;  0;  0;  0;  0;  0; 57900;0.163; AO-Fern70;  0;  0;   2;  14;  dummy;
15; 3560637.18; 5929942.19; 3560623.96;  5930142.6;  0;  0;0.480472;  0;0.026336; 0.04225;  0;  0;  0;  0;  0;  0; 57900;0.163; AO-Fern70;  0;  0;   2;  15;  dummy;
16; 3560602.29; 5930427.78; 3560590.29; 5930544.08;  0;  0;0.480472;  0;0.026336; 0.04225;  0;  0;  0;  0;  0;  0; 57900;0.163; AO-Fern70;  0;  0;   2;  16;  dummy;
17; 3560588.53; 5930561.18; 3560554.85; 5930826.88;  0;  0;0.480472;  0;0.026336; 0.04225;  0;  0;  0;  0;  0;  0; 57900;0.163; AO-Fern70;  5;  0; 1.5;  17;  dummy;
18; 3560554.85; 5930826.88;  3560529.4; 5931002.78;  0;  0;0.480472;  0;0.026336; 0.04225;  0;  0;  0;  0;  0;  0; 57900;0.163; AO-Fern70;  7;  0; 1.5;  18;  dummy;
19;    3560577; 5930833.61; 3560551.55;  5931009.5;  0;  0;0.474202;  0; 0.02591;0.041569;  0;  0;  0;  0;  0;  0; 56700;0.165; AO-Fern70;  7;  0; 1.5;  19;  dummy;
20; 3560755.89; 5928325.48; 3560719.96;    5928559;  0;  0;0.418123;  0; 0.02281;0.036596;  0;  0;  0;  0;  0;  0; 49800;0.166; AO-Fern70;  0;  0;   2;  20;  dummy;
21; 3561044.67; 5927552.21; 3560986.42;  5927655.6;  0;  0;0.450149;  0;0.024332;0.039047;  0;  0;  0;  0;  0;  0; 52400;0.172; AO-Fern70;  0;  0;   2;  21;  dummy;
22; 3560610.68;  5930567.9;    3560577; 5930833.61;  0;  0;0.474202;  0; 0.02591;0.041569;  0;  0;  0;  0;  0;  0; 56700;0.165; AO-Fern70;  5;  0; 1.5;  22;  dummy;
23; 3560804.81; 5928128.03; 3560755.89; 5928325.48;  0;  0;0.450149;  0;0.024332;0.039047;  0;  0;  0;  0;  0;  0; 52400;0.172; AO-Fern70;  0;  0;   2;  23;  dummy;
24; 3560668.88; 5929278.59; 3560665.41; 5929539.74;  0;  0;0.474202;  0; 0.02591;0.041569;  0;  0;  0;  0;  0;  0; 56700;0.165; AO-Fern70;  0;  0;   2;  24;  dummy;
25; 3561165.73;  5927356.3; 3561099.43; 5927455.01;  0;  0;0.450149;  0;0.024332;0.039047;  0;  0;  0;  0;  0;  0; 52400;0.172; AO-Fern70; 11;  0; 1.5;  25;  dummy;
26; 3560675.62;    5929053; 3560669.62; 5929241.11;  0;  0;0.474202;  0; 0.02591;0.041569;  0;  0;  0;  0;  0;  0; 56700;0.165; AO-Fern70;  0;  0;   2;  26;  dummy;
27;  3560624.7;  5930432.1; 3560612.94; 5930546.04;  0;  0;0.474202;  0; 0.02591;0.041569;  0;  0;  0;  0;  0;  0; 56700;0.165; AO-Fern70;  0;  0;   2;  27;  dummy;
28; 3560859.92; 5927953.49; 3560804.81; 5928128.03;  0;  0;0.450149;  0;0.024332;0.039047;  0;  0;  0;  0;  0;  0; 52400;0.172; AO-Fern70;  0;  0;   2;  28;  dummy;
29; 3561397.33; 5927045.59; 3561272.75; 5927205.29;  0;  0;0.397217;  0;0.020982;0.033687;  0;  0;  0;  0;  0;  0; 43600;0.188; AO-Fern70;  0;  0;   2;  29;  dummy;
30;  3560659.6; 5929902.59; 3560650.47;  5930071.1;  0;  0;0.474202;  0; 0.02591;0.041569;  0;  0;  0;  0;  0;  0; 56700;0.165; AO-Fern70;  0;  0;   2;  30;  dummy;
31; 3560689.27; 5928812.74;  3560675.8;    5929053;  0;  0;0.474202;  0; 0.02591;0.041569;  0;  0;  0;  0;  0;  0; 56700;0.165; AO-Fern70;  0;  0;   2;  31;  dummy;
32; 3560904.34;  5927835.5; 3560859.92; 5927953.49;  0;  0;0.450149;  0;0.024332;0.039047;  0;  0;  0;  0;  0;  0; 52400;0.172; AO-Fern70;  0;  0;   2;  32;  dummy;
33;  3561531.3; 5926842.75; 3561465.45; 5926942.45;  0;  0;0.397217;  0;0.020982;0.033687;  0;  0;  0;  0;  0;  0; 43600;0.188; AO-Fern70;  0;  0;   2;  33;  dummy;
34;  3560707.9; 5928658.51; 3560689.27; 5928812.74;  0;  0;0.474202;  0; 0.02591;0.041569;  0;  0;  0;  0;  0;  0; 56700;0.165; AO-Fern70;  0;  0;   2;  34;  dummy;
35; 3560664.13; 5929628.74; 3560663.05;  5929699.9;  0;  0;0.474202;  0; 0.02591;0.041569;  0;  0;  0;  0;  0;  0; 56700;0.165; AO-Fern70;  0;  0;   2;  35;  dummy;
36; 3560967.42; 5927696.36; 3560912.68;  5927815.5;  0;  0;0.450149;  0;0.024332;0.039047;  0;  0;  0;  0;  0;  0; 52400;0.172; AO-Fern70;  0;  0;   2;  36;  dummy;
```

Output-xlm-File

In *_emi.shp.xml-File all relevant settings and parameter are saved in the ESRI-Metadata-format additionally. The used files (Input-SD-file, EFT-file(s) und VTG-file) as well as the allocation of each contaminant are displayed. Furthermore the date of the creation is saved.

Output Report.xls-File

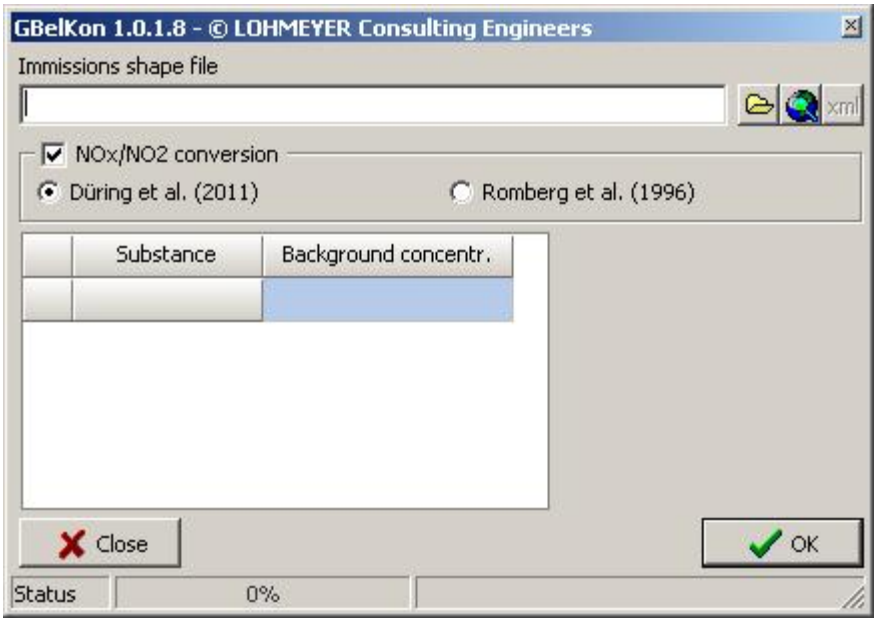
A *emi_report.xls file is created in addition to the SD-file. This file serves as a control and log-file and can be used as a master for a report table. It contains a summary of the emission calculation e.g. the used traffic situation with a description and summarized emission factors.

The *emi_report.xls contains the following worksheets:

- „PROKAS_E_report“, with all relevant files, settings and entries of the error checking list
- „Emission factors“, report table with used emission factors separately for substances and traffic situations for light and heavy vehicles in mg/km.
- „TS_description“, report table with descriptions of the used traffic situation according to HBEFA 3.1

Results

Total Concentrations



Immissions shape file:
Select a shape file with the additional load of emissions. If the field names are included the substrings "j00z" (Austal) or "_zb" (Prokas) then they are added to the “substance” column.
In der Spalte Hintergrundbelastung kann dann die Hintergrundbelastung für den jeweiligen Stoff eingetragen oder eine Spalte der eingeladenen Shape-Datei gewählt werden, welche die Hintergrundbelastungen enthält.
NOx/NO_2 conversion:
Conversion can´t be performed if the selected shape file not contains additional load for NO_2 and / or NOx. For the conversion from Düring et al. (2011), the background concentrations of NOx, NO_2 and ozone are needed. For the conversion from Romberg et al. (1996) only NO_2.
Tau:
The parameter tau is calculated from meteorological values (e.g. wind speed and turbulence) and the road geometry. Between the two specifications 100 seconds (street canyon) or 40 seconds (free dispersion) can be selected by default.

Düring, I., Bächlin, W., Ketzel, M., Baum, A., Friedrich, U., Wurzler, S. (2011): A new simplified NO/NO_2 conversion model under consideration of direct NO_2-emissions. Meteorologische Zeitschrift, Vol. 20 067-073 (February 2011).

Romberg, E., Bösinger, R., Lohmeyer, A., Ruhnke, R. und Röth R. (1996): NO-NO_2-Um-wandlung für die Anwendung bei Immissionsprognosen für Kfz-Abgase. In: Staub-Rein-haltung der Luft, Vol. 56, Nr. 6, p. 215-218.

PROKAS Result Shape

Format: ESRI Shape

Attributable:

field name	explanation	unit	field type digits/Scale
[substance]_i1_zb	Substance annual mean without background concentration	[µg/m³]	decimal 10/1
[substance]_i1_gb	Substance annual mean including background concentration	[µg/m³]	decimal 10/1

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