

## What's New in GASTAR version 3.2

April 2009

1. The source location can now be specified in the interface Source tab and is reported in the \*.gof output file.
2. The release time and date can now be specified in the interface on the Source tab and are reported in the \*.gof output file.
3. Gridded concentration output is now available. The user specifies the following output grid parameters on the Contour tab, in the Additional Output section of the Output tab:
  - a. Minimum X and Y co-ordinates
  - b. Maximum X and Y co-ordinates
  - c. Number of points in the X and Y directions
  - d. Height above ground level

Here X is the alongwind distance from the source, and Y is the crosswind distance. The gridded concentration data are contained in a new output file, named \*.ggd. The format of this file is described in Appendix 1.

Note that gridded output is only available for 'Continuous' and 'Instantaneous' release types.

## Appendix 1      Format of GASTAR gridded data output file \*.ggd

Figure 1 shows the proposed file template. A full description is given below.

```
GASTAR gridded data output file
FILE_VERSION=(real)
FILE_STEM=(string)
PATH=(string)
WIND_DIRECTION=(real)
COORD_SYSTEM=(string)
SOURCE_LOCATION=(string)
RELEASE_DATE_AND_TIME=(string)
TIME_ZONE=(string)
POLLUTANT_NAME=(string)
CONCENTRATION_UNITS=(string)
AVERAGING_TIME_SECONDS=(real)
END_OF_HEADER_SECTION
integer NX
integer NY
integer NZ
integer NT
real T_1
real T_2
.
.
.
real T_NT
"Year", "Day", "Hour", "Time(s)", "X(m)", "Y(m)", "Z(m)",
"Conc|(units)|(pollutant name)|(blank)|(blank)|(averaging time)"
integer Year, integer Day, integer Hour, real T, real X, real Y, real
Z, real Concentration
(etc)
```

**Figure 1** Proposed \*.ggd file template

The file begins with a header section, containing the following data:

- |        |   |
|--------|---|
| Line 1 | A header line   |
| Line 2 | File version – current version number of output file, included for reference in case the format of the output file changes in the future.   |
| Line 3 | Input file stem, i.e. name of input *.gpl file  |
| Line 4 | Full pathname of directory in which *.gpl file is located   |
| Line 5 | Direction from which wind is blowing, in degrees clockwise from North, included so that the output (x,y) co-ordinates (which are always aligned so that the positive x-axis is downwind) can be translated to a fixed co-ordinate system for plotting, if required. |
| Line 6 | Identifier for co-ordinate system in which the source location is given.  |
| Line 7 | Source location, in the above co-ordinate system. This may contain a comma.   |
| Line 8 | Release date and time, in the format YYYY/MM/DD HH:MM, with a space between the date and time.  |
| Line 9 | Time zone in which release date and time is specified.  |

|         |   |
|---------|---|
| Line 10 | Pollutant name  |
| Line 11 | Units of concentration output. Currently this will always be mol/mol, but including it in the header section gives us the option to allow more flexibility in the future.                                     |
| Line 12 | Averaging time in seconds   |
| Line 13 | A line indicating that the end of the header section has been reached. Extra lines of information may subsequently be added to the header section, but this line will always indicate the end of the section. |
| Line 14 | Number of x-values in the output grid   |
| Line 15 | Number of y-values in the output grid   |
| Line 16 | Number of z-values in the output grid. Initially this will always be 1, but including it gives us the option to allow more flexibility in the future.   |
| Line 17 | Number of timesteps for which output is given. This is only really relevant for instantaneous releases (puffs); for continuous releases (plumes) the value will always be 1.                                  |

The times at which output is given (in seconds) are then listed on consecutive lines.

There is then a header row for the columns of output. Note that the header for the concentration column includes the units, pollutant name and averaging time, as well as a couple of dummy values – these are included so that the file format matches similar output from other CERC models.

Finally the data is given, in 8 columns (year, day, hour, time, x, y, z, concentration), in comma-separated format. The year, day and hour values are taken from the release start time entered by the user. The time column is only relevant for puffs – for plumes this column will contain a dummy value of –999. The x, y, and z co-ordinates are in metres. A “.” is used for the decimal separator. Note that there may also be spaces between the columns.

The first part of an example \*.ggd file is shown in Figure 2.

```

GASTAR gridded data output file
FILE_VERSION=1.0
FILE_STEM=A_3_2
PATH=G:\VB6\Gastar\JunkGPLs\modelCR1000\
WIND_DIRECTION=225.00
COORD_SYSTEM=2
SOURCE_LOCATION=TQ301799
RELEASE_DATE_AND_TIME=2009/02/14 10:45
TIME_ZONE=UTC
POLLUTANT_NAME=Chlorine
CONCENTRATION_UNITS=mol/mol
AVERAGING_TIME_SECONDS=60.0
END_OF_HEADER_SECTION
51
51
1
1
-999.0
"Year", "Day", "Hour", "Time(s)", "X(m)", "Y(m)", "Z(m)", "Conc|mol/mol|Chlorine| | |60.0s"
2009, 45, 10, -999.00, 0.00, -250.00, 0.00, 0.000000E+00
2009, 45, 10, -999.00, 20.00, -250.00, 0.00, 0.000000E+00
2009, 45, 10, -999.00, 40.00, -250.00, 0.00, 0.000000E+00
2009, 45, 10, -999.00, 60.00, -250.00, 0.00, 0.000000E+00
2009, 45, 10, -999.00, 80.00, -250.00, 0.00, 0.000000E+00
2009, 45, 10, -999.00, 100.00, -250.00, 0.00, 0.000000E+00
2009, 45, 10, -999.00, 120.00, -250.00, 0.00, 0.000000E+00
2009, 45, 10, -999.00, 140.00, -250.00, 0.00, 0.000000E+00

```

**Figure 2** Extract from an example \*.ggd file