

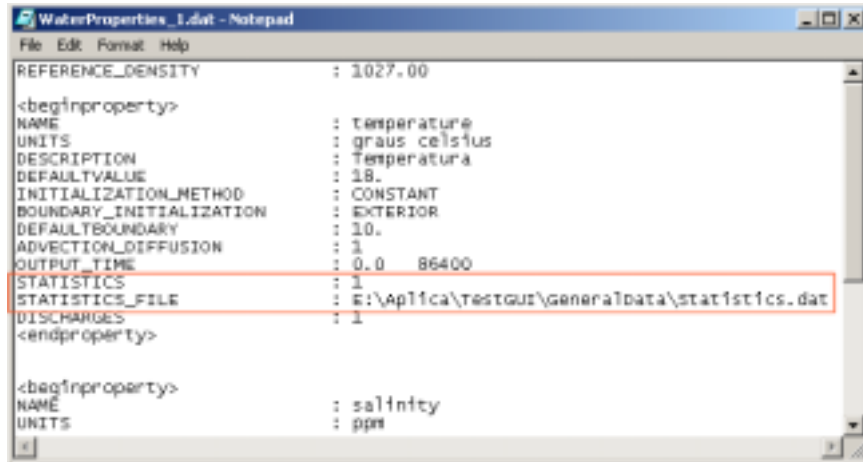
Module Statistics

Introduction

The Module Statistics can calculate the average, minimum, maximum and classifications of any 3D field. Average, minimum and maximum can be calculated daily, monthly and globally (begin of the run until the end of the run). The classification is just calculated for the whole run time. Actually the Module Statistic can be called from the eulerian and the lagrangian module. Each property can have or not statistic associated. Be aware that the statistics calculations are time consuming, once in each iteration the whole matrix must be checked several times.

Data Files

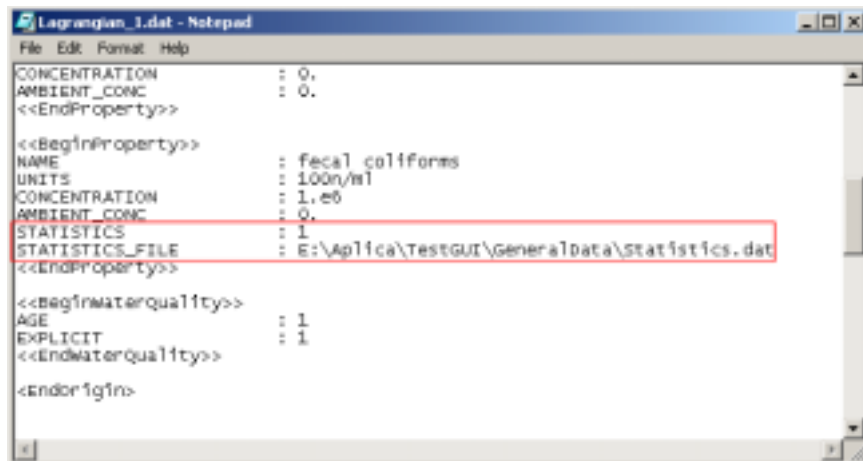
Figure 1 and Figure 2 show how to activate the statistic module from the eulerian and from the lagrangian module, respectively.



```
WaterProperties_1.dat - Notepad
File Edit Format Help
REFERENCE_DENSITY      : 1027.00
<beginproperty>
NAME                  : temperature
UNITS                 : graus celsius
DESCRIPTION           : Temperatura
DEFAULTVALUE         : 18.
INITIALIZATION_METHOD : CONSTANT
BOUNDARY_INITIALIZATION : EXTERIOR
DEFAULTBOUNDARY       : 10.
ADVECTION_DIFFUSION   : 1
OUTPUT_TIME           : 0.0 86400
STATISTICS             : 1
STATISTICS_FILE        : E:\Aplica\TestGUI\GeneralData\statistics.dat
DISCHARGES             : 1
<endproperty>

<beginproperty>
NAME                  : salinity
UNITS                 : ppm
```

Figure 1: Example of calling statistics from the eulerian model



```
Lagrangian_1.dat - Notepad
File Edit Format Help
CONCENTRATION         : 0.
AMBIENT_CONC          : 0.
<<EndProperty>>

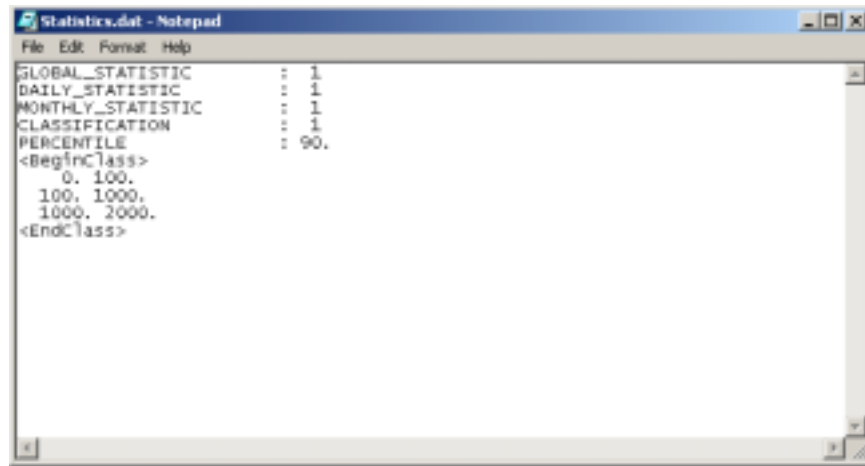
<<BeginProperty>>
NAME                  : fecal coliforms
UNITS                 : 100n/ml
CONCENTRATION         : 1.e0
AMBIENT_CONC          : 0.
STATISTICS             : 1
STATISTICS_FILE        : E:\Aplica\TestGUI\GeneralData\statistics.dat
<<EndProperty>>

<<beginwaterquality>>
AGE                   : 1
EXPLICIT              : 1
<<Endwaterquality>>

<endorigin>
```

Figure 2: Example of calling statistics from the lagrangian model

Figure 3 shows an example of a data definition file for the statistics module, enabling the calculation of the global, daily and monthly statistic. A classification into three classes is also specified.



```
GLOBAL_STATISTIC : 1
DAILY_STATISTIC : 1
MONTHLY_STATISTIC : 1
CLASSIFICATION : 1
PERCENTILE : 90.
<BeginClass>
0. 100.
100. 1000.
1000. 2000.
<EndClass>
```

Figure 3: Example of statistic data file

Calculation

In the actual implementation the module statistics receives a three dimensional matrix from the eulerian or the lagrangian module. If the matrix comes from the eulerian module it contains the values of the concentration of the property in each grid point. If the matrix comes from the lagrangian module it is previously filled by one of two methods: maximum method or minimum method. The description of how these methods work is located in the lagrangian module user guide.

In each iteration the matrix is checked for new minimum, maximum values and the average is updated. This is done, is desired, for the global statistics, the daily statistic and/or the monthly statistics. If the user pretends to use a classification of the matrix, each grid point is classified for its actual value. At the end of the run, for each class one matrix with the percentage of classification which a given grid point passed inside the class is written to the HDF file. One further matrix, which contains the final classification of each grid point, attending to the given percentile, is written. In this matrix, each grid point contains a value between one and the number of classes. If a point doesn't fit in any classification

Result Files

The results of the statistic calculation are stored inside of the HDF result file of the calling module. Figure 4 shows an example of the statistic results stored in the lagrangian HDF result file.

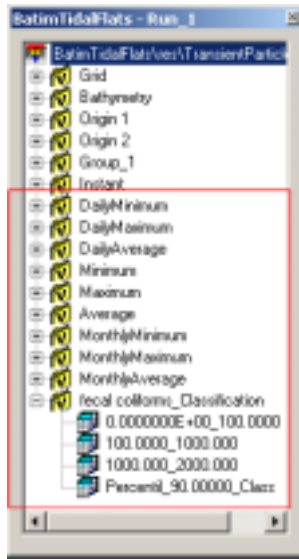


Figure 4: Example of statistics results in an HDF file