

MIKE URBAN CS/MOUSE Tools

M11EXTRAwin and M11EXTRA

Extraction of data from MOUSE engine result files



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1 Introduction

The MOUSE engine binary result file format is proprietary and optimized for the use in the common computational engine. For more information about MIKE Powered by DHI, please visit: <http://www.mikepoweredbydhi.com/>

The computational results can be presented in MIKE URBAN or in the freeware result viewer MIKE VIEW. In both cases the presentation is done directly from the binary result files.

It is possible to extract and export selected results in the MIKE VIEW application. However this is a manually operated process, which is useful when working with a minor project or when working with a few result time series.

When working with larger projects there may be need for frequent extraction of specific results for further processing and use in other applications.

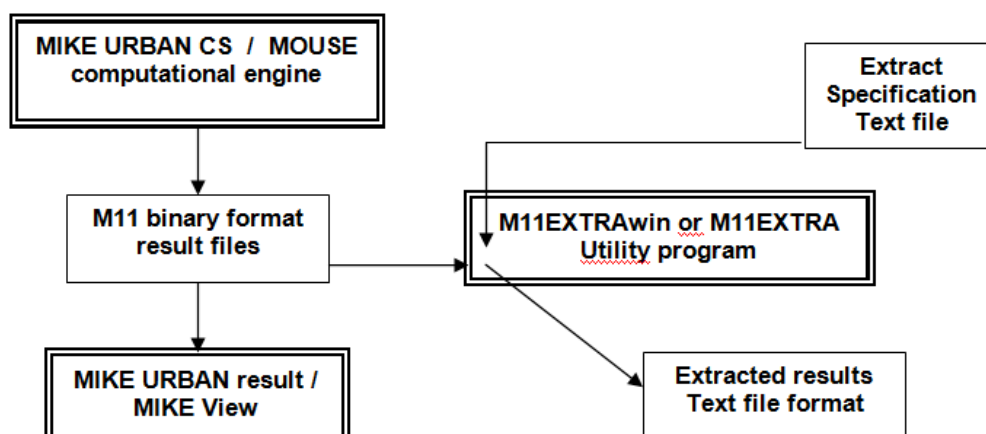


Figure 1.1 Function of M11EXTRA, schematic view

The M11EXTRA utility supports this type of result extraction with possibilities for automating the process in batch style of operation. Results can be selected for extraction on a script-like basis, and exported to text files in a variety of formats.

This document describes how the M11EXTRA is used. The name of the utility originates from the name used for the binary result file format "M11 File Format" and the EXTRAction functionality.

The M11EXTRA utility program is available in two versions. The original version was developed as a console application for execution from a Command Prompt (DOS Window). In addition the utility is now available as M11EXTRAwin with a Windows User Interface. Finally the M11EXTRAwin supports the COM technology for execution as an Automation server.

2 M11EXTRAwin – Windows Interface Version

2.1 Quick guide to M11EXTRAwin

Figure 2.1 shows the user interface of the M11EXTRAwin with short descriptions of the function. More detailed description is found in the following sections.

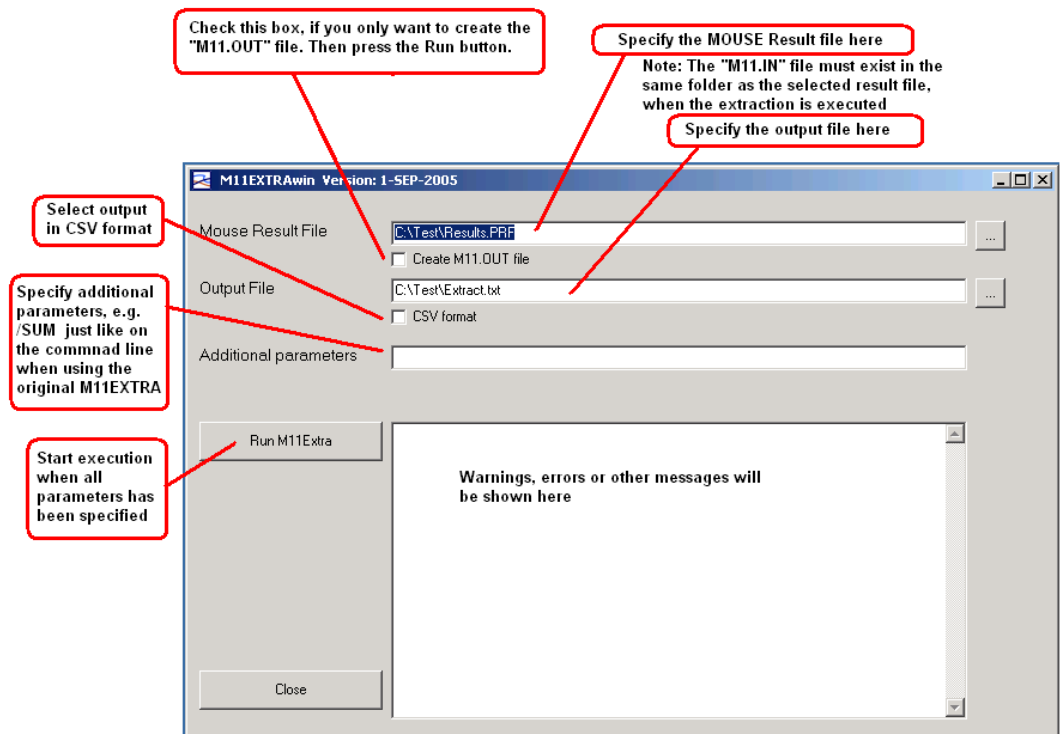


Figure 2.1 M11EXTRAwin – Quick guide

2.2 M11EXTRAwin – User Interface description

Before using the M11EXTRAwin, it is recommended to read the section describing the functionality of M11EXTRA Command Prompt version. The Windows user interface implements the same functionality as found in the command prompt version.

The user interface is shown in Figure 2.2. The upper part of the dialog has edit fields for entering the parameters controlling the operation of M11EXTRA. To the left is a button for executing the operation once the parameters has been set.

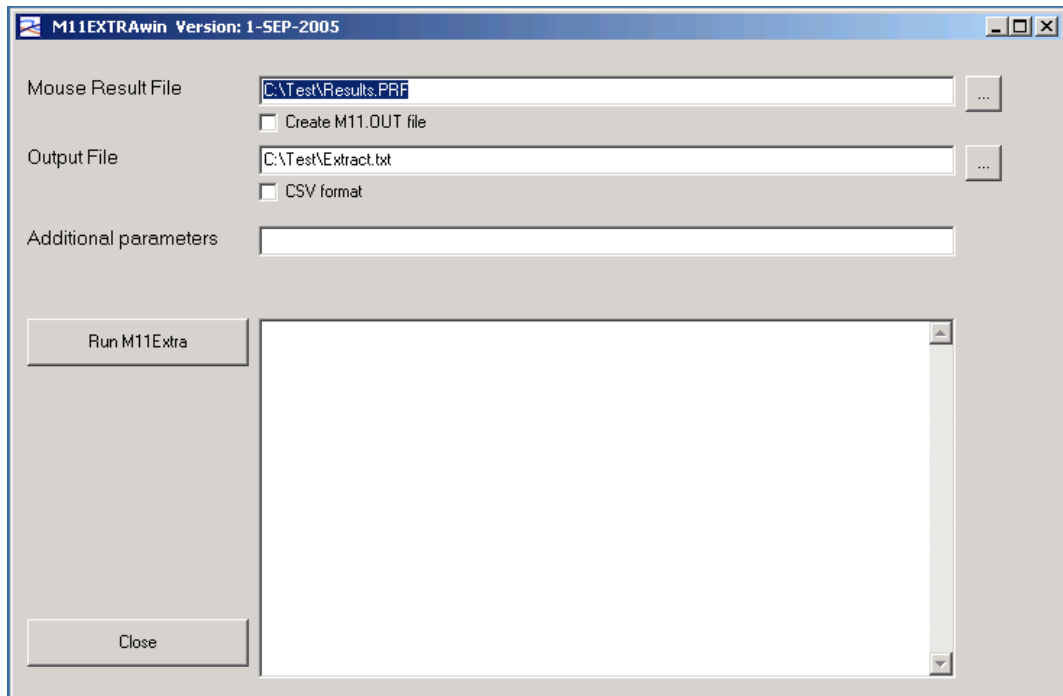


Figure 2.2 The user interface of M11EXTRAwin

The parameters consist of the filenames of the MOUSE Result File (input) and the output file. The buttons to the right may be used for browsing for files. Input and output may be in different locations. When the program starts up the previously used filenames will appear in the fields.

To generate the “M11.OUT” file you just set the check-box below the MOUSE Result File name. No other parameters are required in this case. Please refer to the description of the command prompt version to learn about using the “M11.OUT” and “M11.IN” files. Figure 2.3 shows the dialog with “Create M11.OUT file” selected, and Figure 2.4 shows the dialog after execution by pressing the Run button.

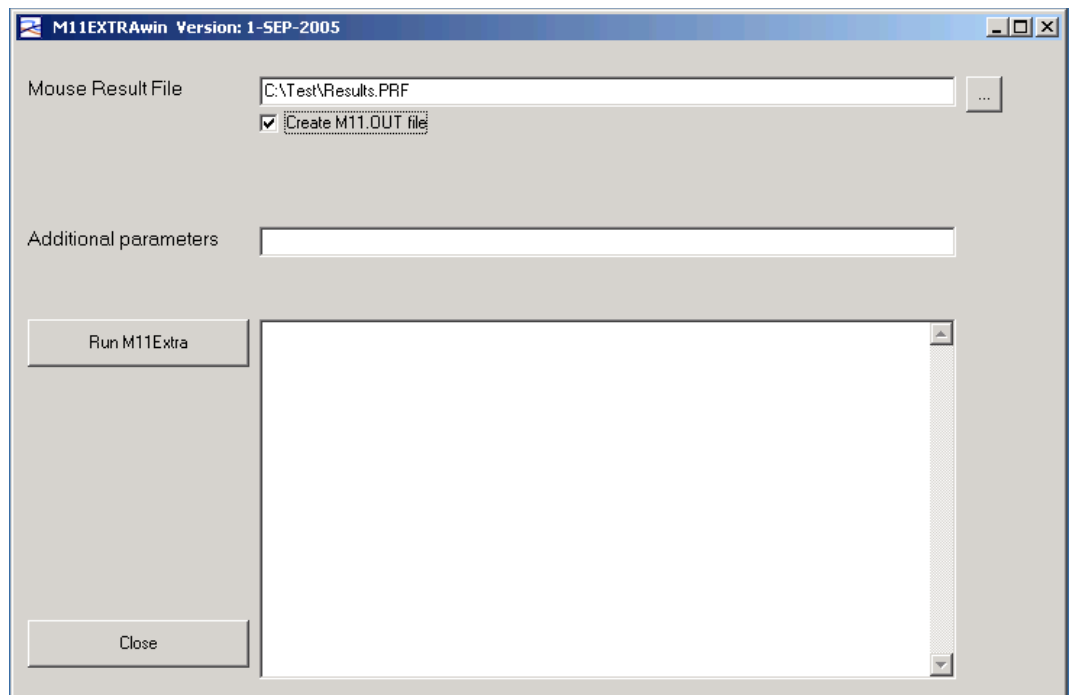


Figure 2.3 The Create M11.OUT file dialog selected

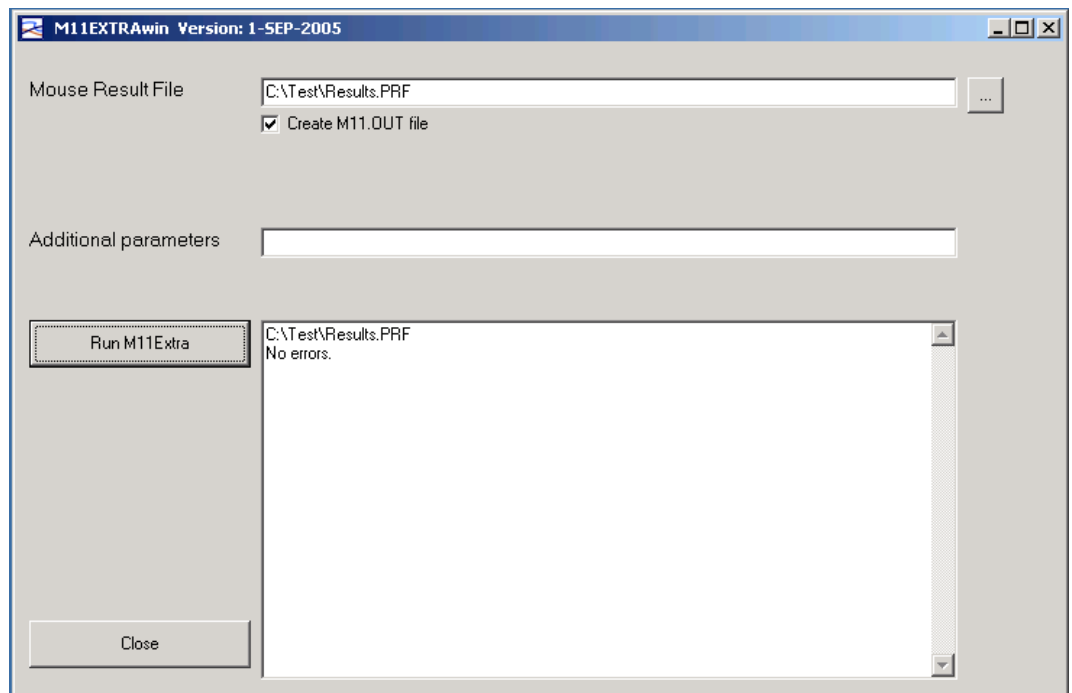


Figure 2.4 The Create M11.OUT file dialog after 'Run' execution

After preparing the “M11.IN” file, as explained in the description of the command prompt version the M11EXTRAwin is again executed to produce the final output file with extracted data.

In this operation the field “Additional parameters” can be used for entering any of the additional command line parameters available in the command prompt version. Figure 2.5 shows how a column with the sum of the values can be added to the output.

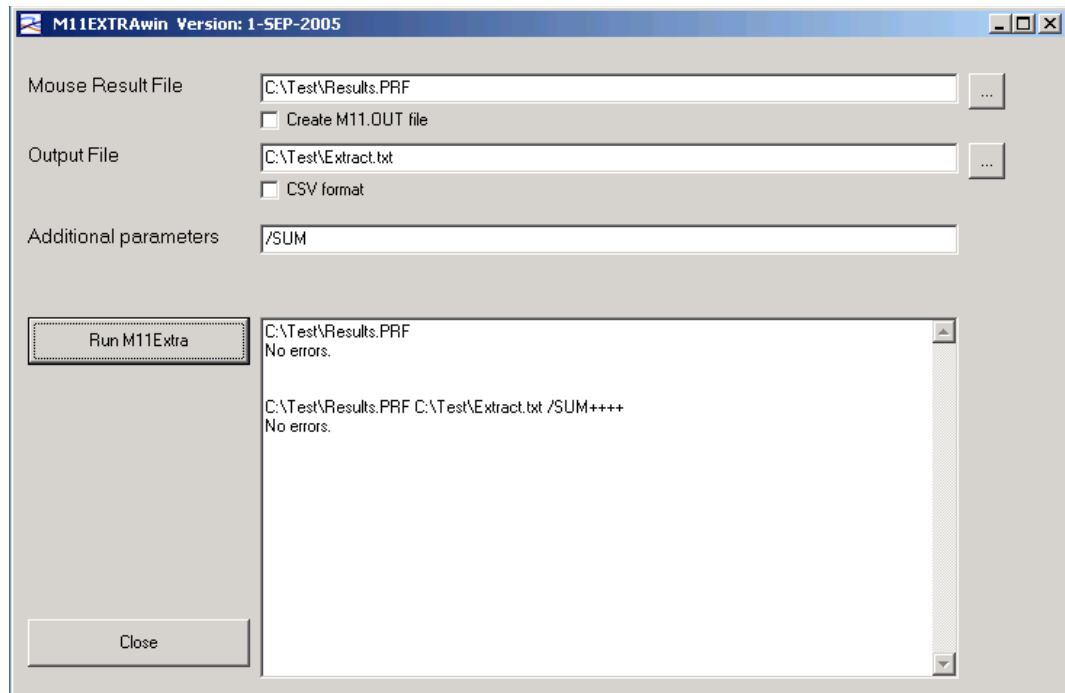


Figure 2.5 Add sum of values to output

2.3 M11EXTRAwin - Using the COM interface

The M11EXTRAwin has also a COM interface implemented. This allows other COM compliant applications to execute the functions available in M11EXTRAwin. This section describes how to use the COM interface.

The following methods and properties are available:

Method declarations:

Function RunM11Extra (Silent : Boolean) : Boolean

Properties declarations:

ParamLine : String
 CountWarningsAndErrors : Long
 CountWarnings : Long
 CountErrors : Long

ErrorMessage (Index : Long, Code : Long) : String
 WarningMessage (Index : Long, Code : Long) : String

The method "RunM11Extra" executes the function of M11ExtraWin according to the specification provided in the property "ParamLine". Currently the parameter "Silent" is not used. It is recommended to set Silent = True. The return value of the function is not set and should not be used.

The property “ParamLine” is used for specifying the action to be executed by M11ExtraWin.

The properties “CountWarningsAndErrors”, “CountWarning” and “CountErrors” can be inspected after the execution of “RunM11Extra”. The value will indicate if the operation was successful, or if an error occurred, or a warning was issued.

The properties “ErrorMessage” and “WarningMessage” can be used to return a text string describing the error or warning, and a code number identifying the error or warning.

The M11ExtraWin is executed through the COM Interface by using the following sequence: 1/ Set the contents of the “ParamLine” property. 2/ Execute “RunM11Extra”. 3/ Inspect the properties indicating the number of errors and warnings. 4/ Handle errors and warnings if any.

The content of the “ParamLine” property is exactly the same as use on the command line when executing the M11EXTRA Command Prompt version. Please refer to the section describing this version.

The following code example show how the M11EXTRAwin is executed as a COM Automation server from a BASIC subroutine. This routine can e.g. be executed from a macro in the DIMS application from DHI Software.

Executing M11extraWin - simple example:

```
Sub COMbased_M11Extra
Dim M As Variant

    Set M = CreateObject ("M11ExtraWin.Automation")
    M.ParamLine = "C:\Test\Results.PRF C:\Test\Extract.TXT"
    M.RunM11Extra True
    Set M = Nothing
End Sub
```

The example above is the simplest solution for just executing the M11EXTRAwin. This example does not use any of the features for handling error situations.

The next example show how the error messages eventually produced by M11EXTRAwin can be retrieved and presented. In this example the error messages are presented in a message box. This is only a demonstration example. In real application it may be preferred to write the error information to a log-file.

Executing M11extraWin - example demonstrating error messages:

```
Sub COMbased_M11Extra
Dim NumberOfErrors As Integer
Dim M As Variant
Dim i As Integer
Dim S As String
Dim ErrCode As Long

Set M = CreateObject ("M11ExtraWin.Automation")
M.ParamLine = "C:\Test\Results.PRF C:\Test\Extract.TXT"
M.RunM11Extra True
NumberOfErrors = M.CountErrors
For i=1 To NumberOfErrors
    S = M.ErrorMessage(i, ErrCode)
    MsgBox S & "    Error no = " & Format(ErrCode,"####")
Next i
Set M = Nothing

MsgBox "Number of errors = " & Str(NumberOfErrors)
End Sub
```

Please note: Before using M11ExtraWin as a COM object it is required to register the application in the Windows System. This is simply done by just starting M11ExtraWin once, and closing the application. This will register the application.

3 M11EXTRA – Command Prompt version

The M11EXTRA utility program is intended for batch-like operation. The program must be started from a Windows Command Prompt (DOS Window) or the utility can be executed from BAT or CMD command script files.

After the introduction of M11EXTRAWIN the M11EXTRA is mainly delivered for backward compatibility. The functions available in the two variants work identically.

The operation of M11EXTRA has two steps. The first step is the preparation of the Extract Specification. Once the specification is created, then it can be reused for the same type of extraction, e.g. for repeated simulations with the same variant of the model.

The M11EXTRA is also used for creating the template for the extract specification. This template is produced as step 1. The following description is presenting an example where a MOUSE HD result file *.PRF is used. The M11EXTRA can be used on any of the result files produced by the computation engines, including both Runoff and HD, and result files from specialized modules, like MOUSE TRAP.

3.1 Step 1: Preparation of the Extract Specification

The first step produces a template file named 'M11.OUT' which lists the contents of the selected result file. To generate the template file simply start M11EXTRA with the name of the result file as the only parameter on the command line. Like:

```
M11EXTRA results.prf
```

Please note: The contents of the binary result files has changed between releases of MOUSE. The M11EXTRA utility has been maintained with backward compatibility covering most of the former revisions of the binary file format. To work with older files an additional command line parameter can be used to indicate the version, e.g. for HD result files from MOUSE 2000 use:

```
M11EXTRA results.prf /M2000
```

The M11.OUT file has three columns. Column one has '0' (zero) in all lines, except for the first line. Column two is the MOUSE internal type-number for the time series. The rest of the line is the identification of e.g. node names.

To select results for extraction you must switch the '0' in column one to '1' for each time series of interest. Then save the file with the name 'M11.IN'

Example of the contents found in 'M11.OUT' :

```

1      2 Time:      <>
0    103 Node_WL:  <B6408>
0    103 Node_WL:  <B6407>
0    103 Node_WL:  <B6406>
0    103 Node_WL:  <B6405>
0    103 Node_WL:  <B6404>
0    103 Node_WL:  <B6403>
0    103 Node_WL:  <B6402>
0    103 Node_WL:  <B6401>

...

```

Example of the contents found in 'M11.IN', with time and three water levels selected:

```

1      2 Time:      <>
0    103 Node_WL:  <B6408>
0    103 Node_WL:  <B6407>
1    103 Node_WL:  <B6406>
1    103 Node_WL:  <B6405>
1    103 Node_WL:  <B6404>
0    103 Node_WL:  <B6403>
0    103 Node_WL:  <B6402>
0    103 Node_WL:  <B6401>

...

```

3.2 Step 2: Executing the Extraction

The second step in this type of extraction is to run M11EXTRA again with two command line parameters. That is the file name of the MOUSE result file and the name of the text file to write the extracted results to. The 'M11.IN' file must be present in the same directory. The command line may then be as:

```
M11EXTRA results.prf file1.txt
```

The Step 2 can be repeated after each new simulation, using the same M11.IN specification file. This is useful when e.g. running simulations for several different rain events.

Important note: Repeating Step 2 with the same M11.IN file is only valid if the MOUSE model is not modified between the simulations. The selection done in the M11.OUT / M11.IN files is only controlled by the sequence of the lines, which reflects the sequence of data in the binary result file. The selection is not based on the ID's. Therefore if the model is modified, then the sequence of the results may also change, and the Step 1 above must again be executed.

With this type of extraction the contents of the output file 'file1.txt' will be as shown below:

```
*M11 CHAN
1      2 Time:      <>
1    103 Node_WL:  <B6406XS>
1    103 Node_WL:  <B6405XS>
1    103 Node_WL:  <B6404XS>
*M11 DATA
2004-08-03 23:50:00 46.2396 46.0197 45.7496
2004-08-03 23:51:00 46.2396 46.0197 45.7496
2004-08-03 23:52:00 46.2396 46.0197 45.7496
2004-08-03 23:53:00 46.2396 46.0197 45.7496
2004-08-03 23:54:00 46.2396 46.0197 45.7496
2004-08-03 23:55:00 46.2396 46.0197 45.7496
2004-08-03 23:56:00 46.2396 46.0197 45.7496
2004-08-03 23:57:00 46.2396 46.0197 45.7496
...
...
```

This output format is used by M11EXTRA as default. Alternative output formats are available. Please refer to the section describing optional command line parameters.

Description of the format of the extract file

The text file output from the m11extra program consists of two sections. The first section, called the channel section, describes the order and the type of the time series found in the second section, named the data section. The data section consists of a line for each time step in the time series. The number of values on each line for each time step is the same as the number of time series listed in the channel section.

The syntax is as follows:

```
*M11 CHAN
<selection_number> <rectype> <description>
...
```

The <selection_number> is not used in this context and is always set to 1. The <rectype> is a unique number used in MOUSE to identify the type of the time series. The <description> is intended to identify the time series. It will e.g. be composed of a short string describing the type of data and the unique ID from MOUSE and other information like node name(s), distance within pipe, etc.

Table 3.1 Overview of the different rectypes applied in the conversion program.

Rectype	Description
2	Time
100	Water level in pipes
103	Water level in nodes
110	Weir /Gate levels
200	Discharge in pipes
203	Flow in pump stations
204	Discharge under gates and over weirs
210	QRV flow
250	Accumulated volumes
300	Velocities in pipes

The syntax of the data section is given below for N time series (columns) with M values (rows) each :

```
*M11 DATA
[date-time 1] [time series 1] [time series 2] ... [time series N]
...
[date-time M] [time series 1] [time series 2] ... [time series N]
```

The date-time is given by applying the ISO format i.e. YYYY-MM-DD hh:mm:ss. The values are real values with 4 decimals precision.

Optional parameters and more features

A set of optional parameters are available for the execution of the extraction (step 2). The optional parameters are just added to the command line after the file names of the input and the output file:

```
M11EXTRA <PRF file> <text file> [Optional parameter]
```


The available parameters are listed in Table 3.2.

Table 3.2 Optional parameters and functions

Optional parameter	Function
/SUM	Adds a column with the sum of the selected time series. This can e.g. be used for summarizing all overflow time series from a MOUSE simulation.
/SUMONLY	Same as /SUM , but outputs only the sum column
/MAX	Writes only the maximum values found in the selected time series.
/MIN	Writes only the minimum values found in the selected time series.
/MINMAX	Writes minimum and maximum value.
/NOHEADER	Omits the header lines in the output file
/CSV	Produces Comma Separated Value file output. The output file format is described below in this document.
/MMPRHR	Output rain fall intensities as [mm/hour]
/TSTART:<filename>	Read extraction start time from file: <filename> The file should have one line with the start time in format: YYYY-DD-MM hh:mm:ss
/TEND:<filename>	Read extraction end time from file: <filename> The file should have one line with the start time in format: YYYY-DD-MM hh:mm:ss
/TSTARTOFFSETHR=h.hhh	Start extraction h.hhh hour after start of the result time series (e.g. 2.750)
/TENDOFFSETHR=h.hhh	End extraction h.hhh hour after start of the result time series (e.g. 2.750)
/TDURATIONHR=h.hhh	Duration of extraction interval. Can be used with /TSTART or /TSTARTOFFSETHR

Optional CSV output format

When the optional command line parameter /CSV is applied, then M11EXTRA writes the output file in a comma separated format. In this case the output will take the form as shown in the listing below:

```

                TIME,   B6406XS,   B6405XS,   B6404XS,
                ,      Node_WL,   Node_WL,   Node_WL,
                2,      103,      103,      103,
2004-08-03 23:50:00, 46.2396, 46.0197, 45.7496,
2004-08-03 23:51:00, 46.2396, 46.0197, 45.7496,
2004-08-03 23:52:00, 46.2396, 46.0197, 45.7496,
2004-08-03 23:53:00, 46.2396, 46.0197, 45.7496,
2004-08-03 23:54:00, 46.2396, 46.0197, 45.7496,
2004-08-03 23:55:00, 46.2396, 46.0197, 45.7496,
2004-08-03 23:56:00, 46.2396, 46.0197, 45.7496,
2004-08-03 23:57:00, 46.2396, 46.0197, 45.7496,
...
...

```

In the CSV output format the first four lines contains header-information for each of the columns in the file. The contents of the four lines are explained in Table 3.3.

Table 3.3 CSV output format header information

Header Information Line No.	Description
1	Unique ID (e.g. node name)
2	Additional description, only for some time series
3	Type of time series (short description)
4	Record type number (unique type identification)