Deltares

Memo

To
To whom it may concern

Date	Our reference	Number of pages
2023-10-12	001	13

Contact person	**Direct line**	**E-mail**
Jan Mooiman	—	jan.mooiman@deltares nl

Subject
Manual to plot Climate and Forecast 1.7 standard compliant Time Series files

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enabling delta life

1 Release Notes

Release	Description
4.03.00	- Support of station names as they are defined as `string`.
4.02.03	- When rereading the file, the time listbox is updated.
4.02.02	- List box selection is set to last item if selection is empty.
4.02.01	- Better detection of time step size (example 1.5 sec).
4.02.00	- Tick mark labels adjusted if timespan is less then 1 second.
	- Upgrade to QT 6.5.0
4.01.00	- Highlighted line contains dots at time-points.
4.00.00	- Upgrade to QT 6.4.1
	- Group box titles in bold.
	- Compliant for 4k screen
3.08.00	- 5 % white space around graph in plot window.
3.07.03	- Crash on reread file repaired.
3.07.02	- Check on already read file on full path, instead of filename only.
3.07.01	- Export to CSV file repaired.
	- Hiding progress bar after rereading a file.
3.07.00	- Integer variable values are now plotted, ex. pump_actual_stage.
	- Context menu option added. In the file listbox to reread a file.
3.06.01	- Some reorganization how to dected the time variable, now checking on standard_name = 'time'.
3.06.00	- Upgrade to QT 5.15.2.
3.05.00	- Use of QCustomPlot 2.1.0.
	- Reading of netCDF variable 'float' enabled.
3.04.00	- Pre-selection of time-series implemented.
3.03.00	- Partial selection of time series repaired.
	- Main window increased in vertical direction.
3.02.00	- Location names are now trimmed, leading and trailing spaces are removed.
3.01.00	- All presented times are given in UTC (Temps universel coordonné, Coordinated Universal Time).
3.00.00	- Pre-selection of parameters and locations implemented.
	- Multi select of input files allowed.
2.12.00	- Support netCDF (CF-1.5, Deltares 0.1) file of the NHI (Nederlands Hydrologisch Instrumentarium).
	- Strip leading and trailing spaces from parameter name.
2.11.00	- Memory bug repaired with respect to a reading global attribute which has a value longer then 256 characters.

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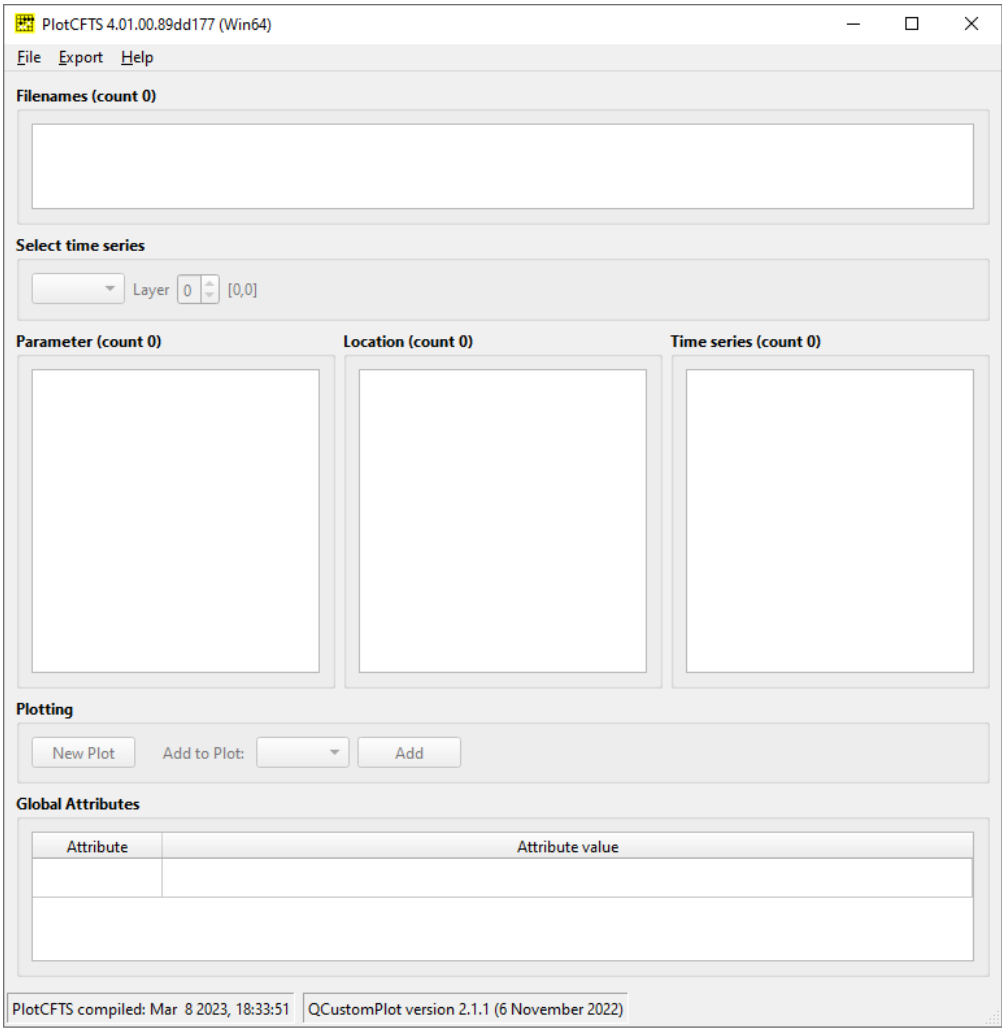| Release	Description continued from previous page
2.10.00	- If a part of the time series is selected, the CSV export is now correct. The time and value did not correspond.
2.09.00	- Some parameters where listed without having the time-dimension. Now a parameter need the time-dimension, to be present in Parameter listbox.
2.08.00	- Export to CSV file, commas (,) in names replaced by semi-coumn (;).
	- Fusion style theme used, advised by QT application.
2.07.00	- Show main window before loading the file given via the command line arguments.
	- Time unit, now assigned once, so independent on the length of the time-series (a performance issue).
2.06.00	- Disable reading a file with no time variable.
2.05.00	- Export of $<*.csv>$ file is now to start-up directory.
2.04.00	- Location of selected graph added to the top of the context menu.
	- Double click on a selected graph shows the location, time and value of the point where the cursor is when the double click is performed.
2.03.00	- Plot window is approximately a quarter of the main screen.
	- Main window size computed as percentage of the main screen.
	- Update spinners and tooltips if no files are in the file listbox.
2.02.02	- Close option added to file menu, close will close the files and exit will exiting the program.
2.02.01	- Set the tooltip to the filename which is selected in the file listbox.
2.02.00	- Upgrade to QT 5.12.1.
2.01.??	- No information available.

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2   Main window

Figure 1: *Opening window of the program PlotCFTS (**Plot C**limate and **F**orecast **T**ime **S**eries)*

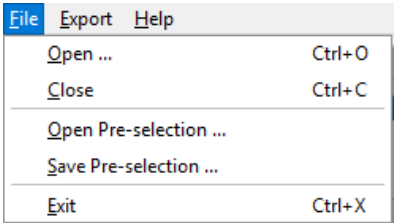## 3   Menu bar

3.1   File

Figure 2: *Menu →File*

3.1.1   Open file

An open file selection window will be shown where all netCDF files with extension $<$.nc$>$ are listed, even if they do not meet the Climate and Forecast 1.7 standard. If the selected file(s) does meet the Climate and Forecast standard 1.7 the file will be read and the main window will updated with the current information. And if there exist (on the same directory) a file with

the filename in the form <*basename*_presel.json> then this file will be also read to show the pre-selected parameters and locations.
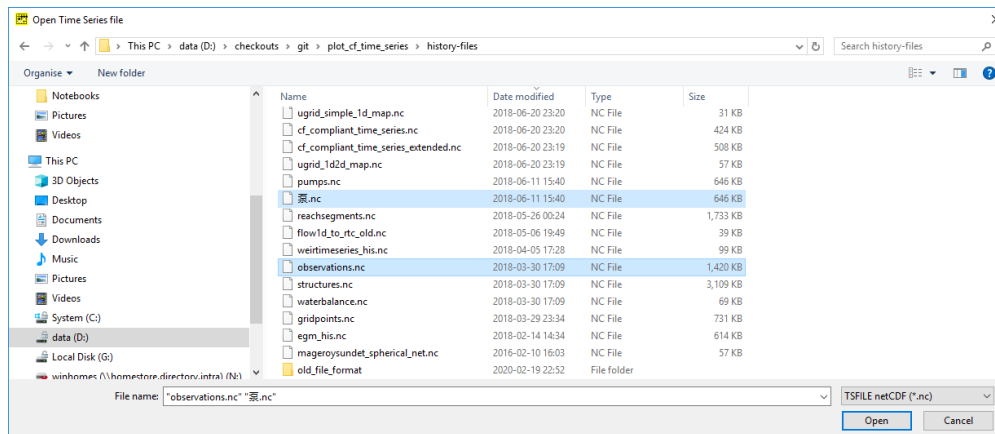

Figure 3: *Open window, to open several files which fulfil to the Climate and Forecast 1.7 standard compliant Time Series file format.*

If the file does not meet the Climate and Forecast 1.7 standard or cannot be read due to unsupported characters a message will presented (see Figure 4)
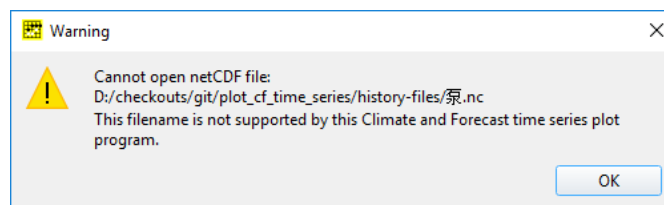

Figure 4: *Message window when a file does not met the Climate and Forecast 1.7 standard or the path contains unsupported characters.*

3.1.2 Close
Close all plot windows and opened files.

3.1.3 Open Pre-selection
Open file(s) with pre-defined selections as saved by the menu option *File →Save Pre-selection....* Selecting several files at once is possible, as saving was dependent of the choice from the combobox in groupbox *Select time series*.

3.1.4 Save Pre-selection
Save the selected parameters and locations of the main program window to an external file (JSON-format). This file can be read by a next session of the program PlotCFTS. If there is a need for more pre-selections of other choices in the combobox, see group *Select time series*, they need to be saved separately. Concatenation of files is not supported, but can be done manually. Reading of multi files is supported by the *File →Open Pre-selection...* option.

3.1.5 Exit
To exit the application PlotCFTS.

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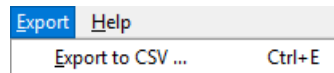001

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3.2 Export

Figure 5: *Menu → Export*

3.2.1 Export to CSV

Export the data selected in the main program window to a comma separated value file. The default file name has as basename the current date/time combination (ex. <2018-08-08_230049>) and as extension <csv>.
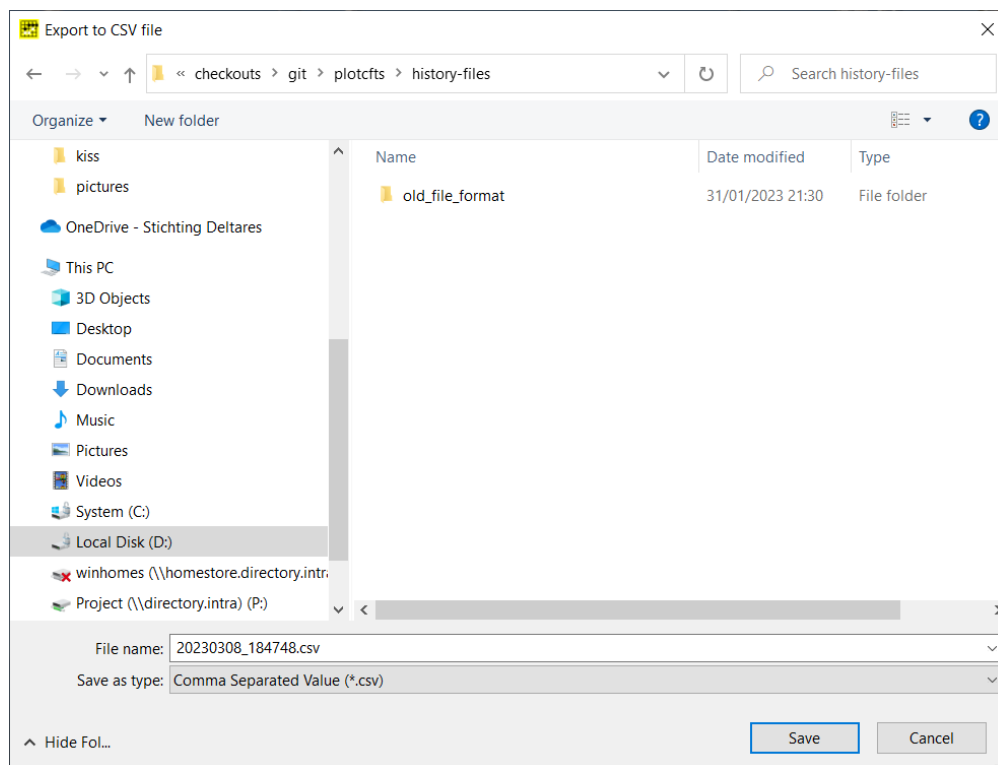

Figure 6: *Export window to export the data as indicated in the main window of the program PlotCFTS.*
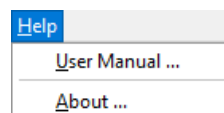
3.3 Help

Figure 7: *Menu → Help*

3.3.1 User Manual

Shows the user manual

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Figure 8: *Header of the PlotCFTS user manual*

3.3.2 About
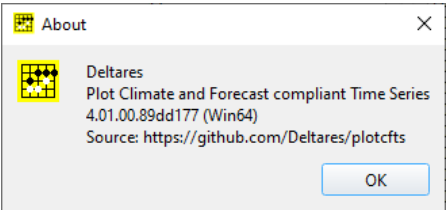
Shows the about box.

Figure 9: *About box*

4 Filename group

4.1 Tooltip

When the cursor is on the filename the tooltip will show the full path of the file, see Figure 10
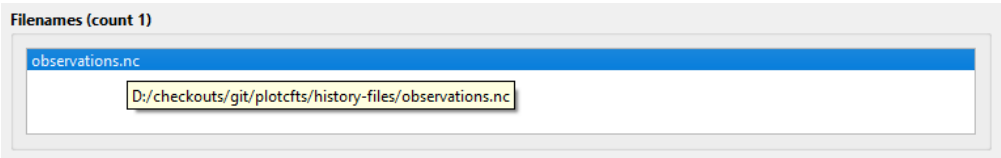

Figure 10: *List box for filenames, with tooltip.*

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4.2   Contex menu

When the cursor is on the filename the context menu (when pressing right mouse button) contains three options, see Figure 11.
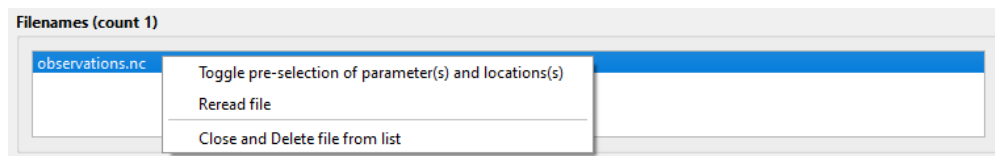

Figure 11: *List box for filenames, with context menu.*

The options are
1   *Toggle pre-selectionof parameter(s) and location(s)*
    Toggle between showing the pre-selection or not. Sometimes the list boxes could be empty, this will occure if there are no pre-selections are made.
2   *Reread file*
    File will be reread, new data is read from that file.
3   *Close and Delete file from list*
    Close and delete the file from the listbox.
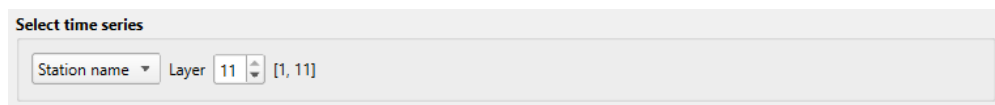
5   Select time series

Figure 12: *Combobox within group →Select time series*

6   Parameter, Location, Time series selection

The groups *Parameter, Location* and *Time series* are shown in Figure 14:
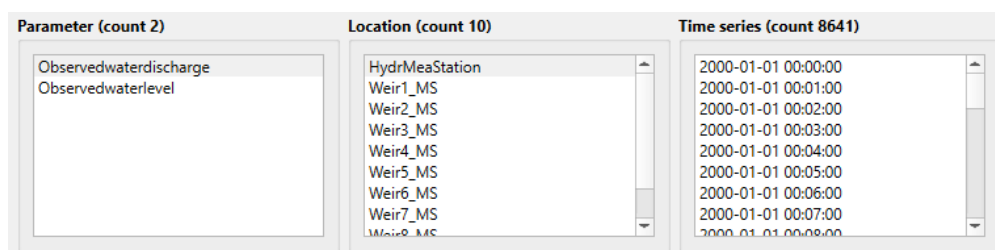

Figure 13: *List boxes for the Parameter, Location and Time Series.*

With these groups you are able to select a parameter(s) and a location(s) and the desired part of the time series. If no part of the time-series is selected the whole time series will be used for plotting the graph.
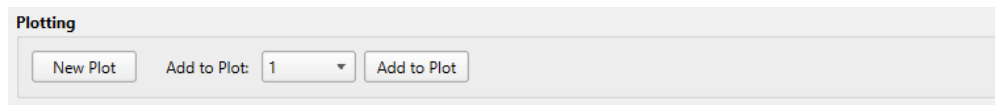
7 Plotting

The group *Plotting* is shown in Figure 14:

Figure 14: *Group Plotting.*
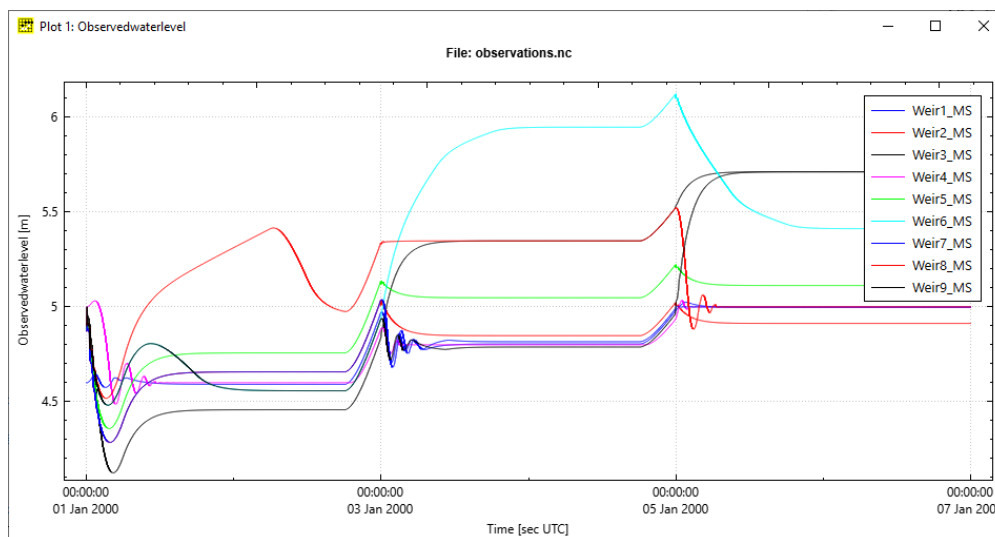
7.1 Button *New Plot*

Figure 15: *Initial plot after pressing button* New Plot

See section 10 for an explanation of available options to scale and rename some items of the plot area.

7.2 Combobox next to button *Add*

With this combobox you are able to select a plot by its number in which an additional graph can be plotted.

7.3 Button *Add*

When pressing this button the graph of the selected Parameter–Location will be added to the selected plot,idicated by the plot number.

8 Global Attributes

Showing the main global attributes as defined in the Climate and Forecast compliant Time Series file file (netCDF format, see Figure 16).

Figure 16: *Global attributes*

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9 Status bar

The status bar present the compilation date and time, the version number of the used QCustomPlot library and the progress bar when reading a file (see Figure 17).

| PlotCFTS compiled: Mar 8 2023, 18:33:51 | QCustomPlot version 2.1.1 (6 November 2022) |

Figure 17: Status bar

10 Plot area

10.1 Zooming

(a) Point multiplication

(b) x-axis zooming, scaled by the scroll wheel
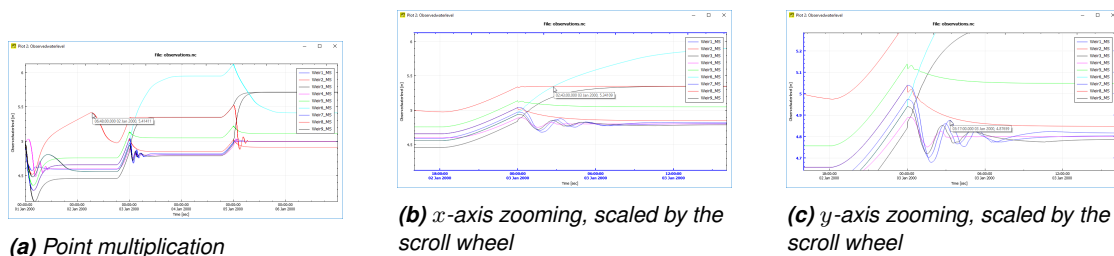
(c) y-axis zooming, scaled by the scroll wheel

Figure 18: Several types of zooming: point multiplication, x-axis and y-axis. The zooming factor is scaled by the scroll wheel

10.2 Legend area

10.2.1 Renaming a graph name

When double clicking on the legend item, the name of the graph can be changed, see Figure 19.
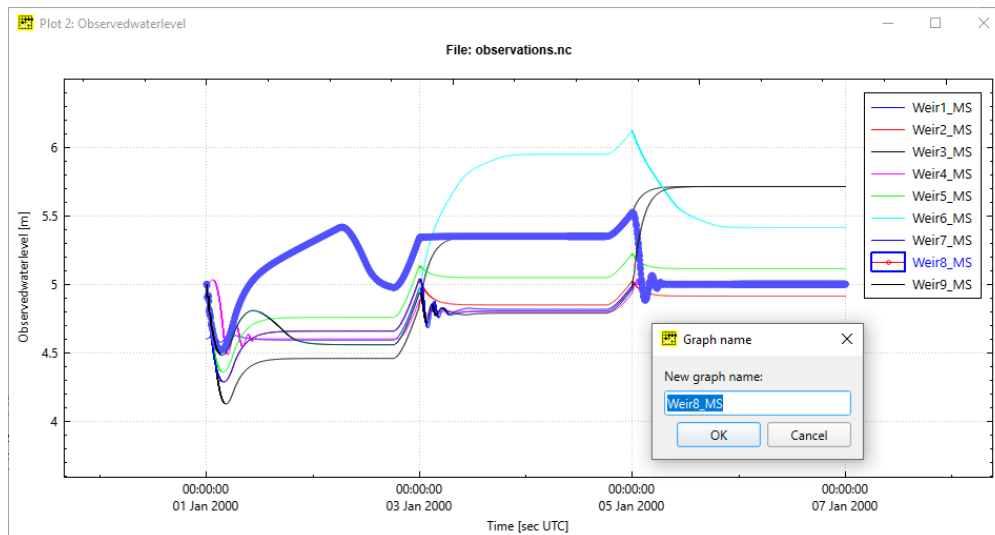
Figure 19: Graph selected and edit window for graph name.

10.2.2 Using the context menu

When pressing the right mouse button in the legend area, the legend area can be moved to five pre-selected locations, these locations are:

1 Move to top left
2 Move to top center
3 Move to top right
4 Move to bottom right
5 Move to bottom left

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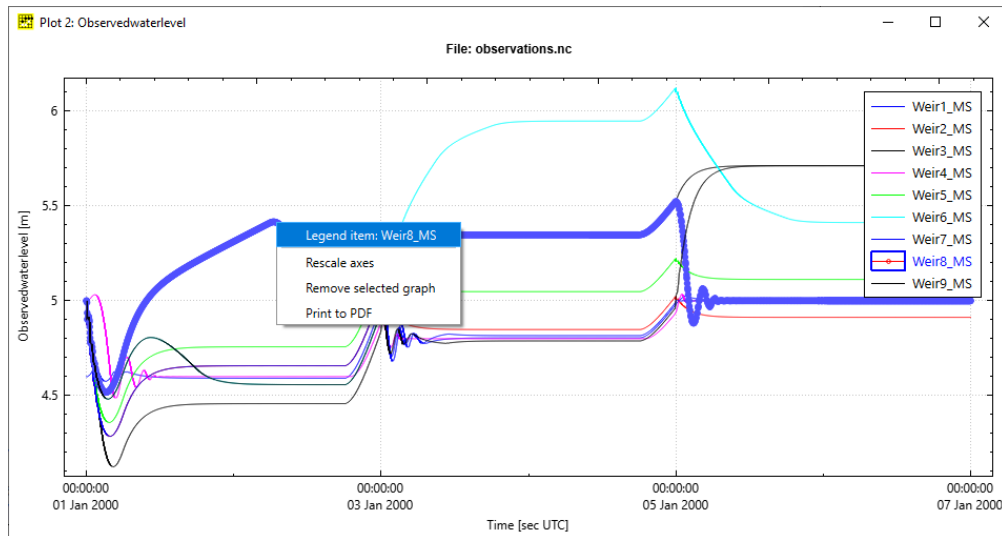11 of 13

10.3   Select a graph

Figure 20: *Selected graph with context menu indicating the location in legend.*

Context menu
The context menu may have four items:

1 **Legend item:** ∗
   This item cannot be selected. If a graph is selected the name of the location as presented in the legend is shown. This context menu entry is useful when the plot area contains a lot of graphs and the number of legend entries is larger then the legend area.

2 **Rescale axes**
   Selecting this item the axes will be rescaled to the bounding box of the graphs.

3 **Remove selected graph**
   Selecting this item will remove the selected graph from the plot area and legend.

4 **Print to PDF**
   Selecting this item the plot will be saved to a pdf-file.

Double click on a selected graph
When a double click is given on een selected graph a message window will shown the location, time and value of the nearest point in time on the graph where the double click is performed.
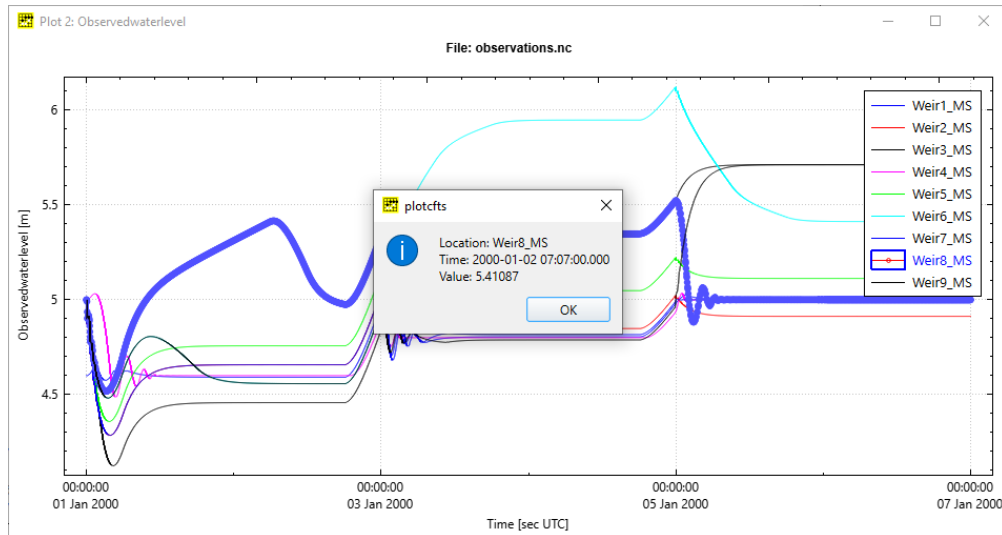
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Figure 21: *Selected graph by double click displays an information window containing the location, time and value of the cursor location*

10.4 Editing labels

To be able to change the name of a lable, double click on the following lables:
1 x-axis lable,
2 y-axis lable,
3 Plot title,
4 Legend title.

10.5 Multiple y-axis

When multiple axis are needed each y-axis label gets a prefix, this label will also be visible as prefix in the legend.
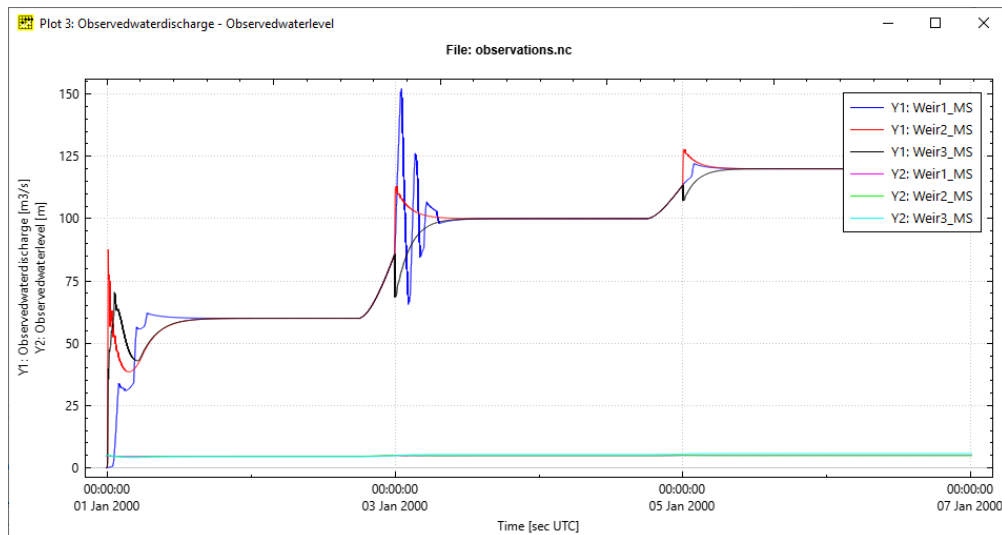

Figure 22: *Multiple y-axis, legend and y-axis labels has a prefix.*

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10.6 Support ISO 10646 charaters set (UTF-8)

The plot program support the ISO 10646 character set as seen in Figure 23, the location list box contains Norwegian and Chinese characters.
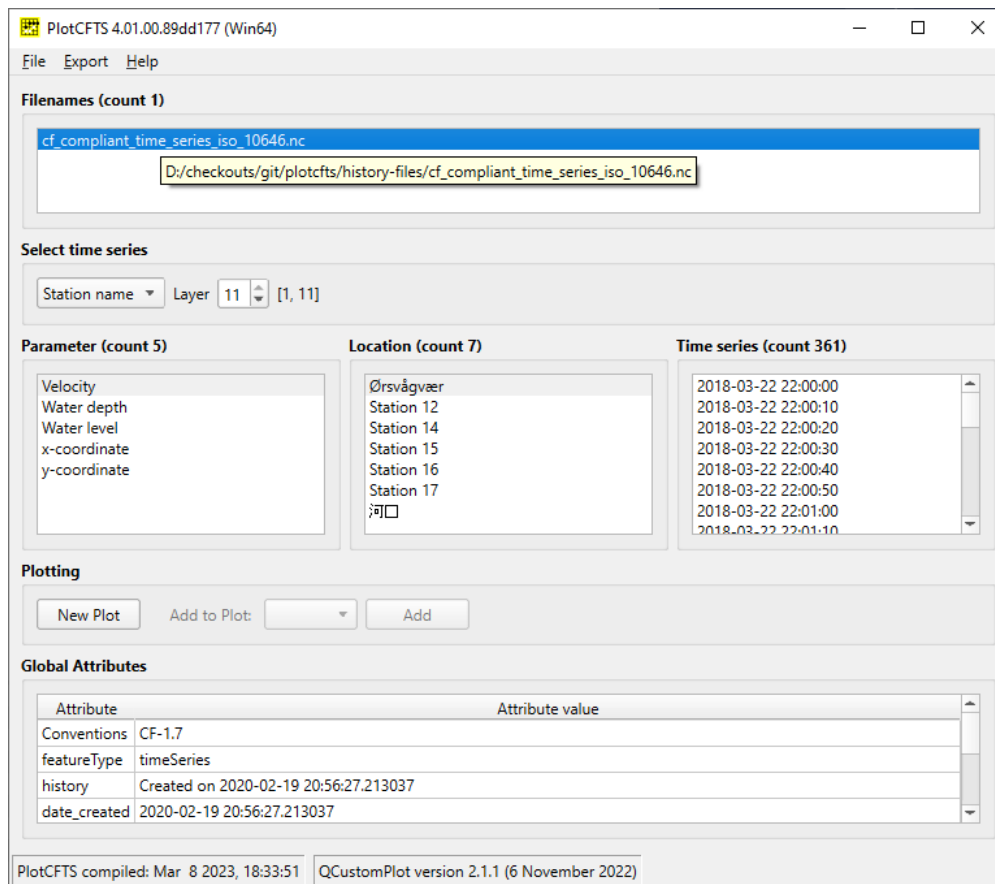

Figure 23: Location *list box contains Norwegian and Chinese characters.*

11 Commandline option

The program can be started with the desired file as commandline option:

--ncfile   Behind this argument the name of the netCDF file need to be specified, including the file extension <.nc>.

Example:

```
$ plotcfts --ncfile <filename>
```

12 Version control information

The source code is available on GitHub:

Repository : https://github.com/Deltares/PlotCFTS

Branch   **:** master

Hash   **:** dc3198a