

Mini32 software

Quick Guide

Jiří Kučera, September 2024

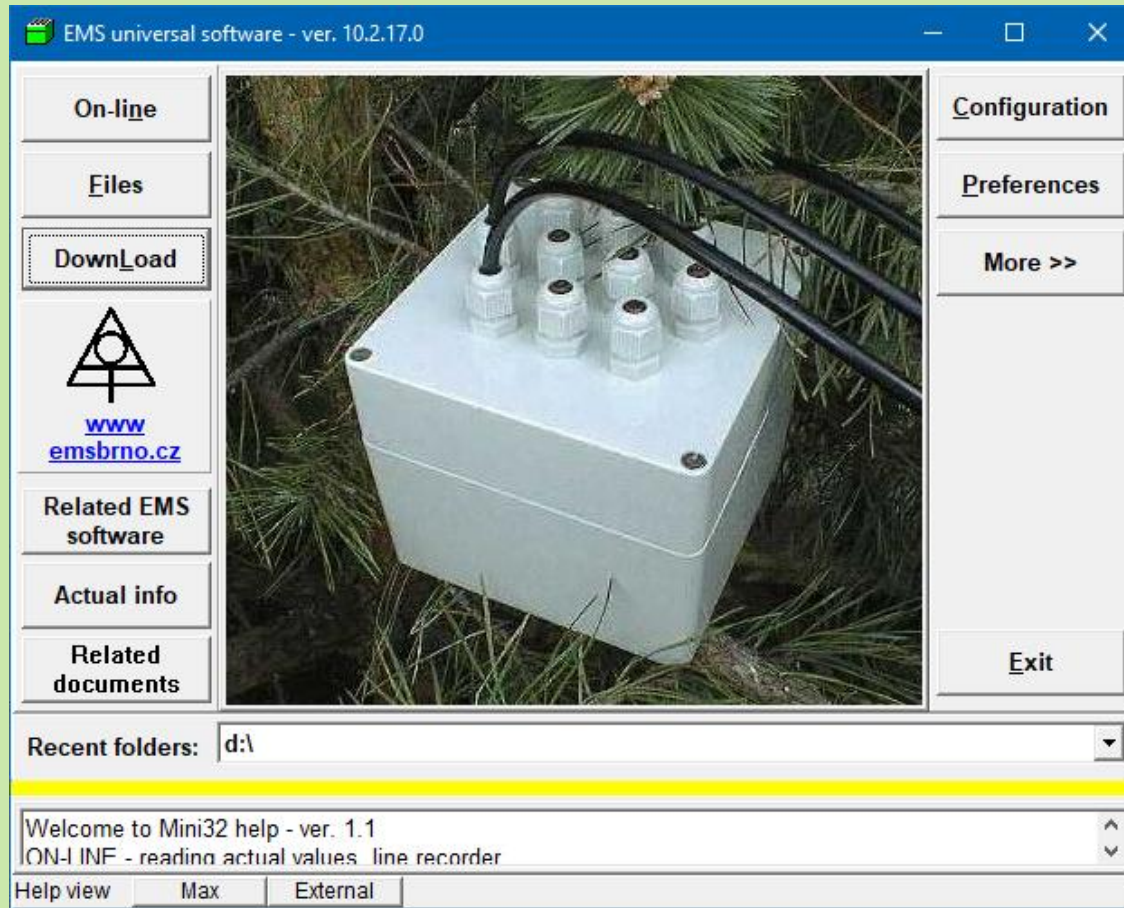
Software general description – main screen

Operation with data

- *On-line operation with actual values*
- *Operation with data files*
- *Download in more modes*

Way out of Mini32

- *Opens related software*
- *Opens actual info on web site*
- *Opens useful information documents*



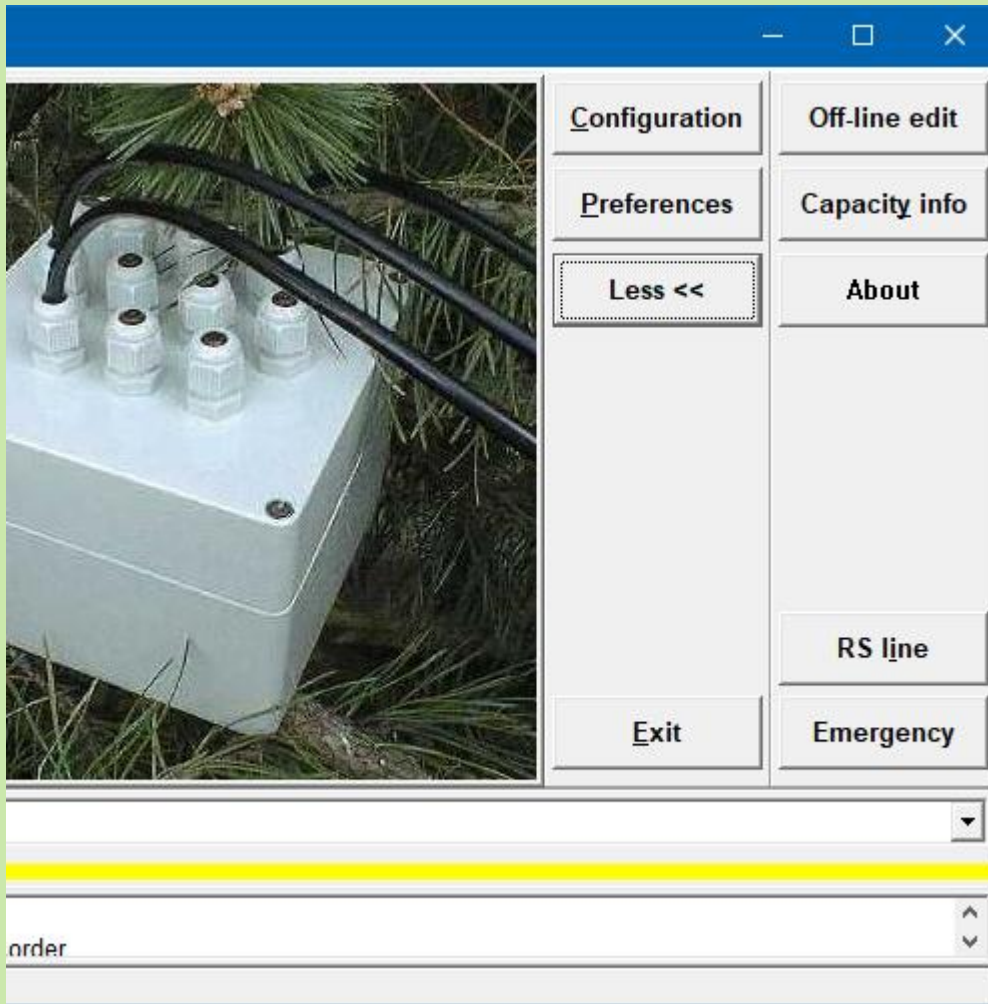
Configuration

- *Datalogger setting*
- *Program configuration*
- *Opens next options*

Online Help

- *The text can be read in two ways - by moving the yellow line up or in the separate window.*

Software general description – extended main screen



- *Preparing configuration according a template files for later upload to the datalogger*
- *Calculation memory and battery capacity of supported dataloggers*
- *List of supported systems*

- *Connection to RS multiplexer (obsolete)*
- *Firmware upload*

Program specific features

Pros

- Ready for processing of long-time data series
- Graphic view as main guide through data
- All operation accessible from the graphics screen are related only to displayed data set
- Context help on each page
- Number of useful trick is always larger than you suppose

Cons

- Unusual user interface (layout)
- Creating new files after most operations
- Limited ability to go back a step in processing

Operation with opened file.

Operation with opened file.

- file preview during browsing in file manager (HEX and DCV files)
 - data structure and configuration
 - file history including performed calculations
 - file notes
 - preview of the last chart just before closing the file
- drawing variables in two windows
- fast zoom and move along time
- convenient editing of variable values
- deletion of erroneous data in graphics
- fast conversion to a different time interval between records
- fast statistics of displayed values
- fast regression calculation
- calculation of non-linear multiregression according to user's equations
- dual data display (over time and as a scatter plot)
- deletion of values in the scatter plot view
- synchronous display of variables in an additional open file
- extensive pop-up menus in the graphic and many useful tricks for efficient work

Operation with opened file.

Hardware information and channel configuration of an opened file.

The screenshot shows the 'FILE OPERATIONS - GreyBox Mini32 v. 10.2.17.0' window. The 'Drawing' menu is active. The file name is 'MV_2024_09_29.dcv'. The hardware information section displays: Device type: GSM 78380, Device code: MV, Batt: 4.03 V, Time period: 2023-12-31 to 2024-09-29 14:00:00, Measuring interval: 1 m / warm-up 0 s, Storing interval: 10 m / warm-up 0 s, First record at: 2023-12-31, Battery remains: 97%, Memory capacity: 542 days, and Overwrite ENABLE.

#	Type	ON/off	Range	Gauge	Description (F2 to edit)
1.	Temperature	ON	---	Temperature [oC]	Soil Temp. [°C] #1
2.	Temperature	ON	---	Temperature [oC]	Soil Temp. [°C] #2
3.	Events	ON n/a	---	Weighted event	Precipitation [mm]
4.	Voltage	ON	---	Supply voltage [V]	Supply Voltage [V]
5.	Temperature	ON	---	Temperature [oC]	Internal Temp. [°C]
6.	Humidity	ON	---	Humidity [%]	Internal Humidity [%]
7.	Internal	ON	---	Available energy [%]	Available Energy [%]
8.	SDI-12 1/1	ON	---	Glob. rad. [W/m2] EMS11S	Global rad. [W/m2] 1/1
9.	SDI-12 2/1	ON	---	Temperature [°C] EMS33S	Air Temperature [°C] 2/1
10.	SDI-12 2/1	ON	---	Humidity [%] EMS33S	Air humidity [%] 2/1

File information - HEX or DCV files.
HEX files are downloaded from dataloggers and carries most of hardware information. It must be converted to DCV format suitable for data.

Help view: Max External

MV_2024_09_29.dcv Press F2 for channel edit; [p] to see the parameters of equations.

Operation with opened file

Items in "History" tab.

The image displays multiple overlapping windows of a software application, likely a data analysis tool. The windows show various tabs and data visualizations. Red circles highlight specific tabs: 'Configuration', 'History', 'File chaining tree', 'Last view', and 'Notes'.

File Details (repeated in multiple windows):

- File name: MV_2024_09_29_1 h.dcv
- Last saving at: 2024-09-29 14:00:06
- Device type: GreyBox GSM {134}
- Device code: MV
- Time period: 2023-12-31 to 2024-09-29
- Measuring interval: 1 m / warm-up 0 s
- Storing interval: 10 m / warm-up 0 s
- Batt: 4.0 V

Configuration Tab (Leftmost window):

#	Type	ON/OFF
1.	Temperature	ON
2.	Temperature	ON
3.	Events	ON
4.	Voltage	ON
5.	Temperature	ON
6.	Humidity	ON
7.	Internal	ON
8.	SDI-12 1/1	ON
9.	SDI-12 2/1	ON
10.	SDI-12 2/1	ON

History Tab (Middle window):

Mean values at 2024-09-29
Source file: MV_2024_09_29_1 h.dcv
Interval of averaging: 1 h
Number of missing values: 0
Destination file: MV_2024_09_29_1 h.dcv

Data Plots (Bottom windows):

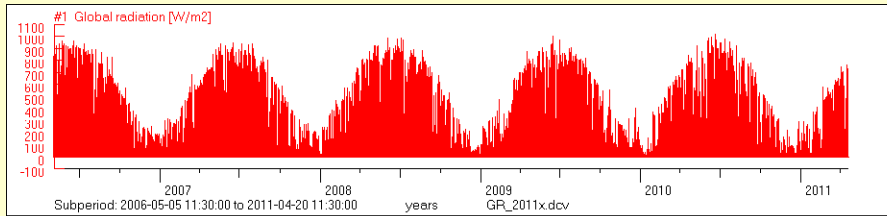
Two line graphs showing data over time. The top graph has a y-axis from 0 to 1000 and an x-axis from 2023-12-31 to 2024-09-29. The bottom graph has a y-axis from 0 to 100 and the same x-axis. Both graphs show fluctuating data points.

Notes Tab (Rightmost window):

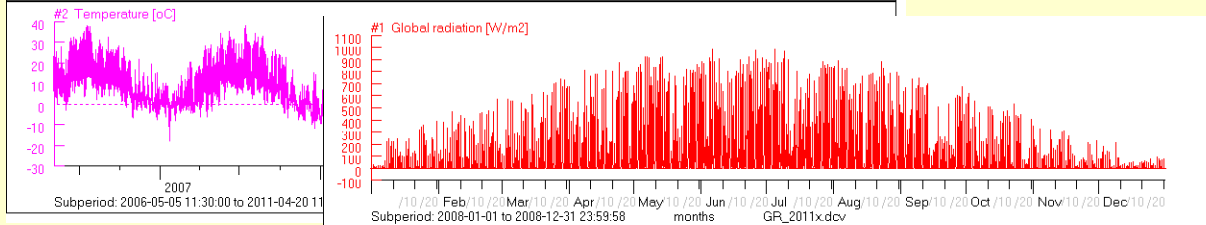
Calculated hourly values. This note will appear in Total commander, too.

Operation with opened file

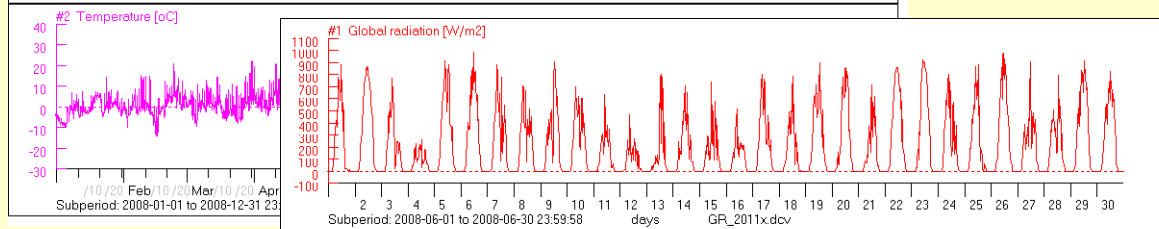
Drawing variables - zooming in five seconds



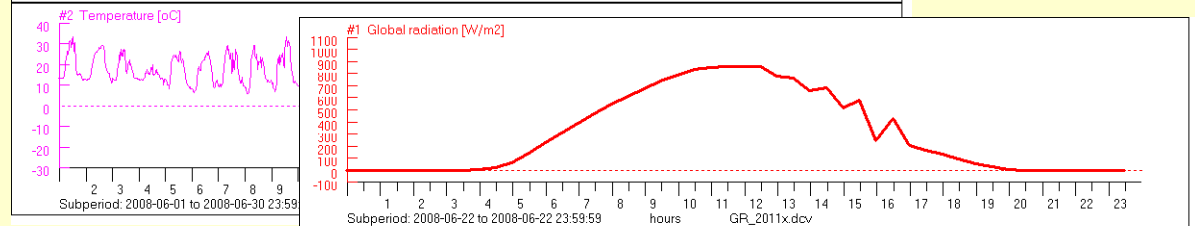
five years of 30 minute records



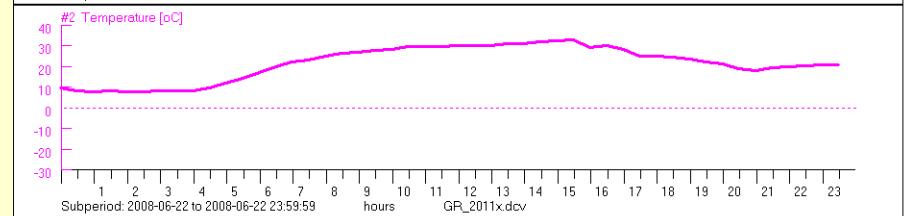
one year



one month

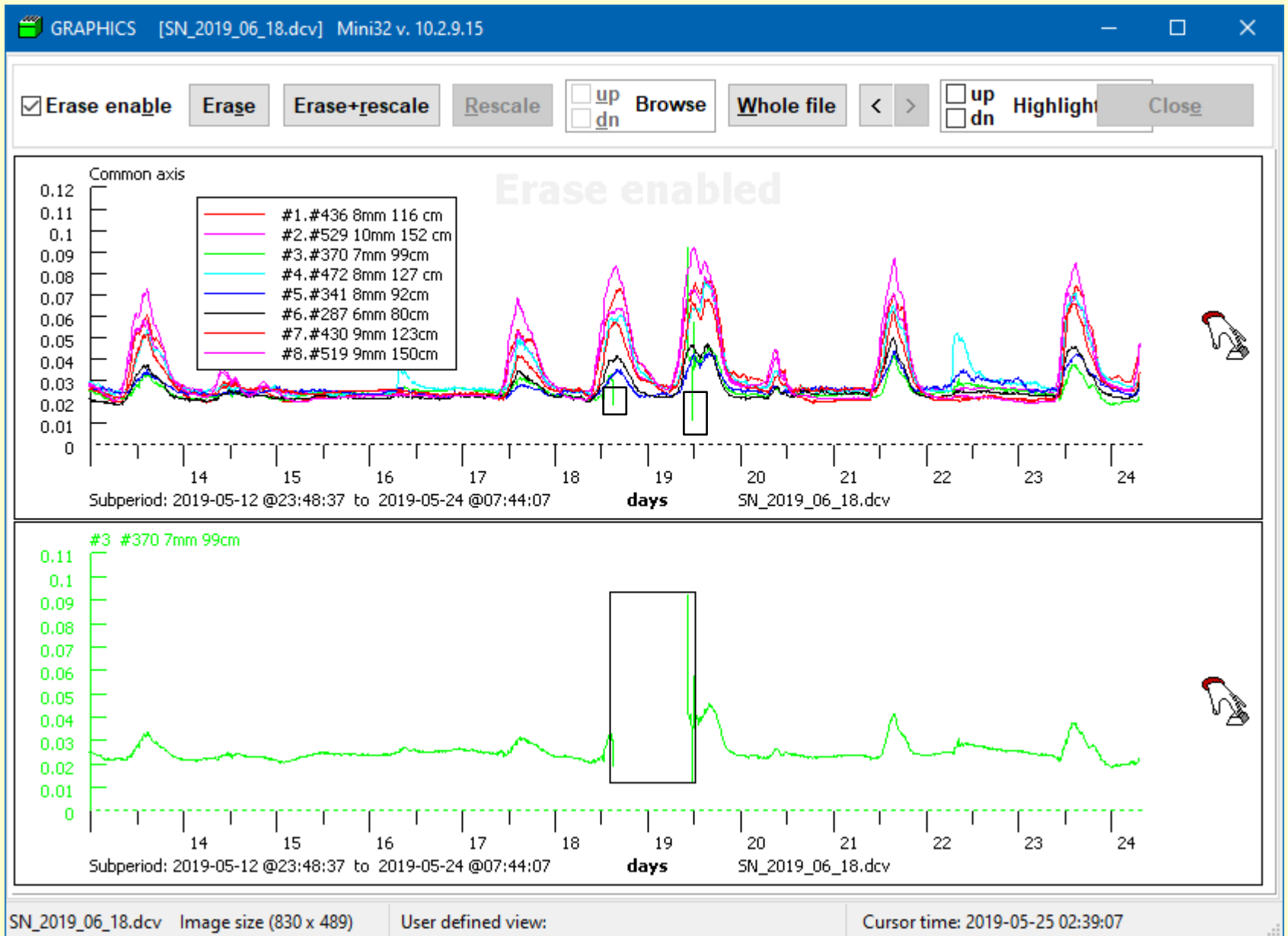


one day



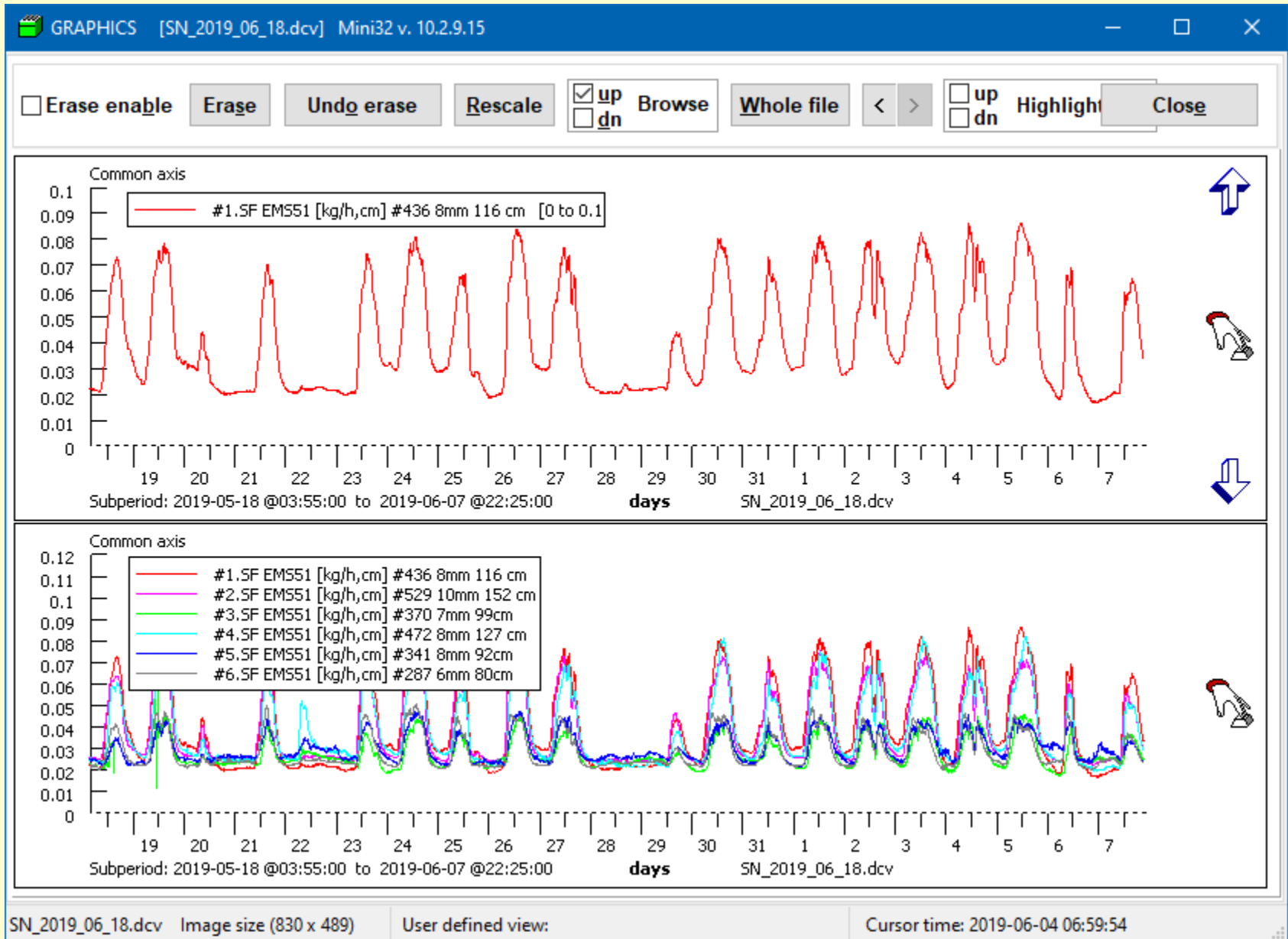
Operation with opened file.

Delete erroneous values framed in rectangles.



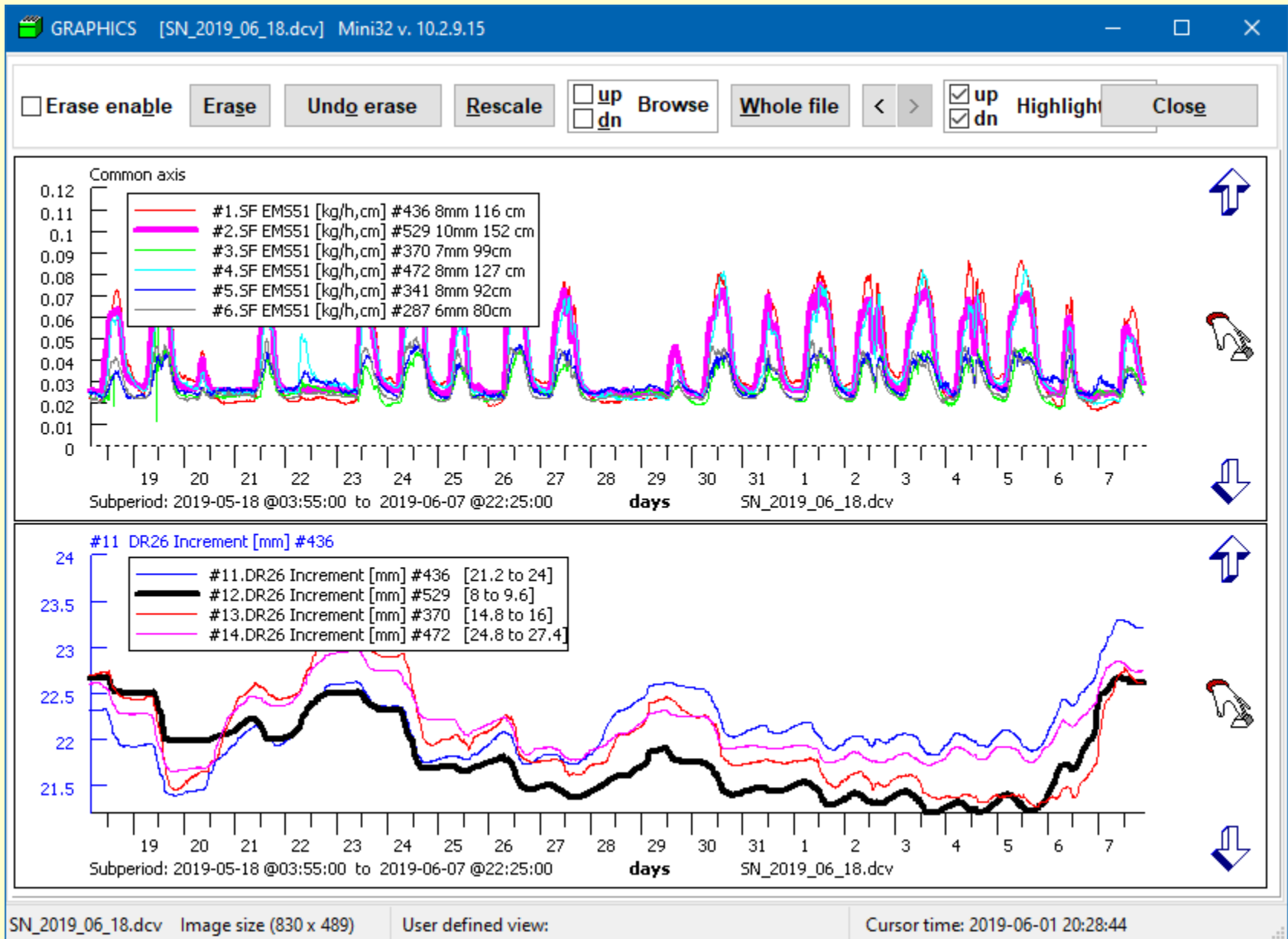
Operation with opened file.

Browsing through variables - in upper window.



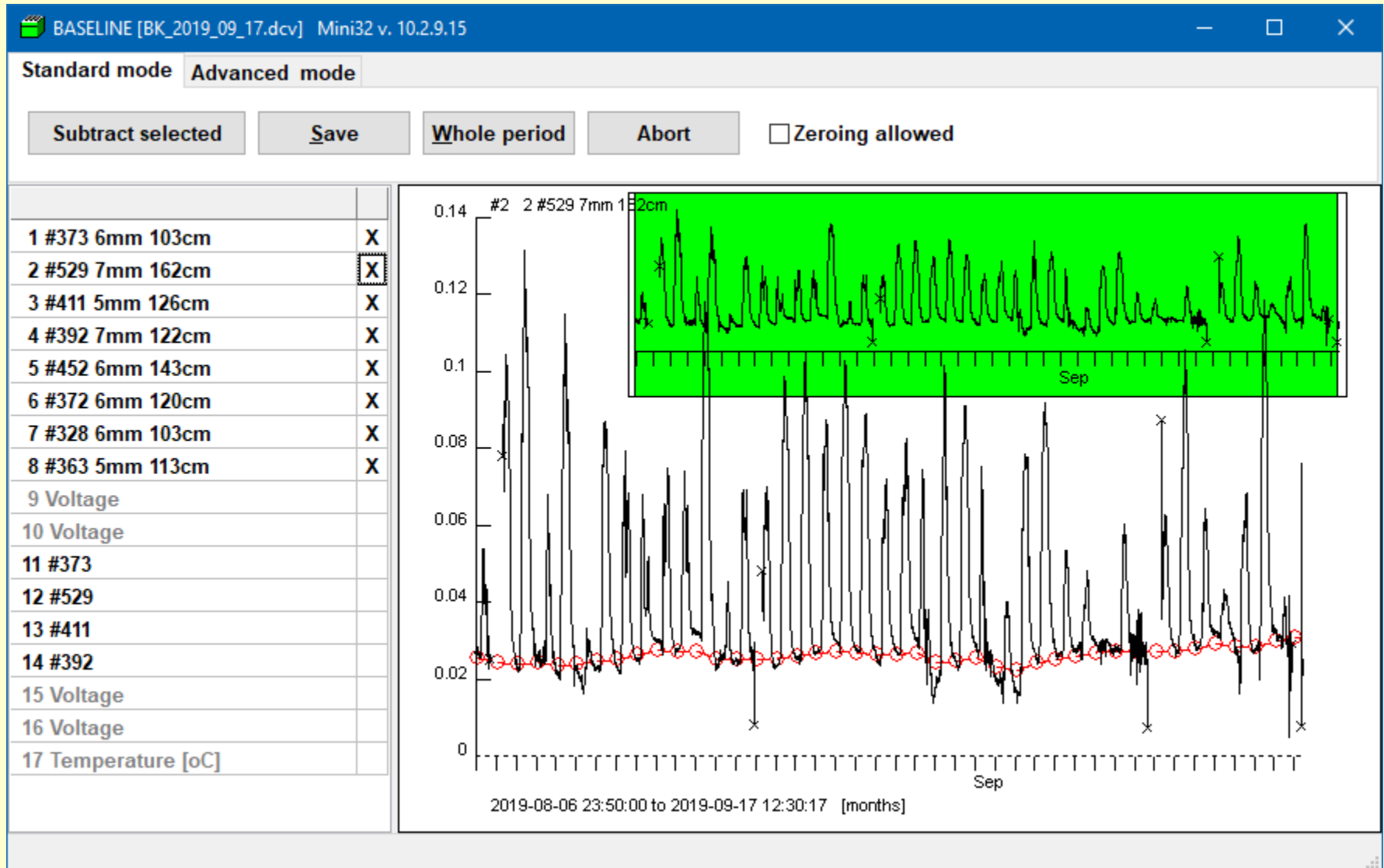
Operation with opened file.

Recognition of variables – in lower window.



Operation with opened file.

Baseline subtraction (mainly intended for sap flow measurement).

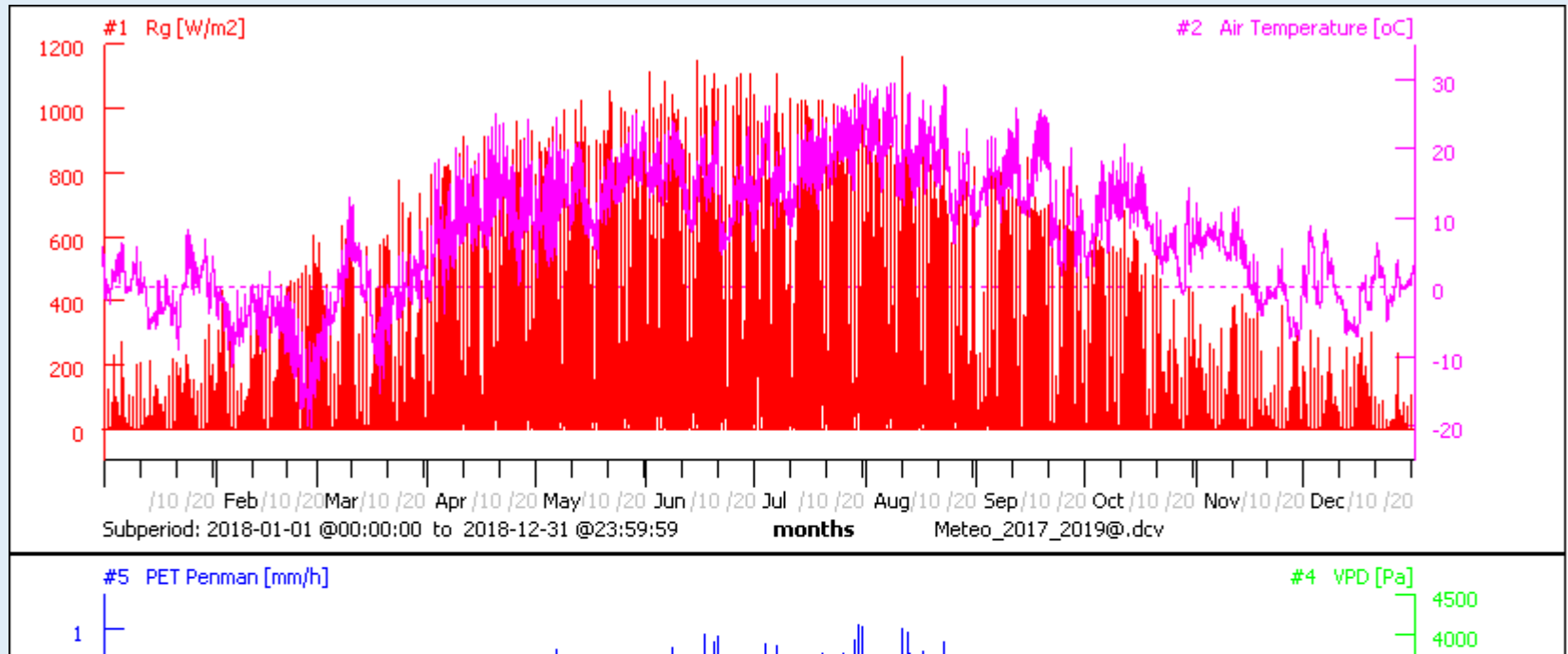


Items of pop-up menu in graphics screen.

It concerns only the displayed data!

Items of pop-up menu

Variable statistics



STATISTICS - [Meteo_2017_2019@d.v] Mini32 v. 10.2.9.15

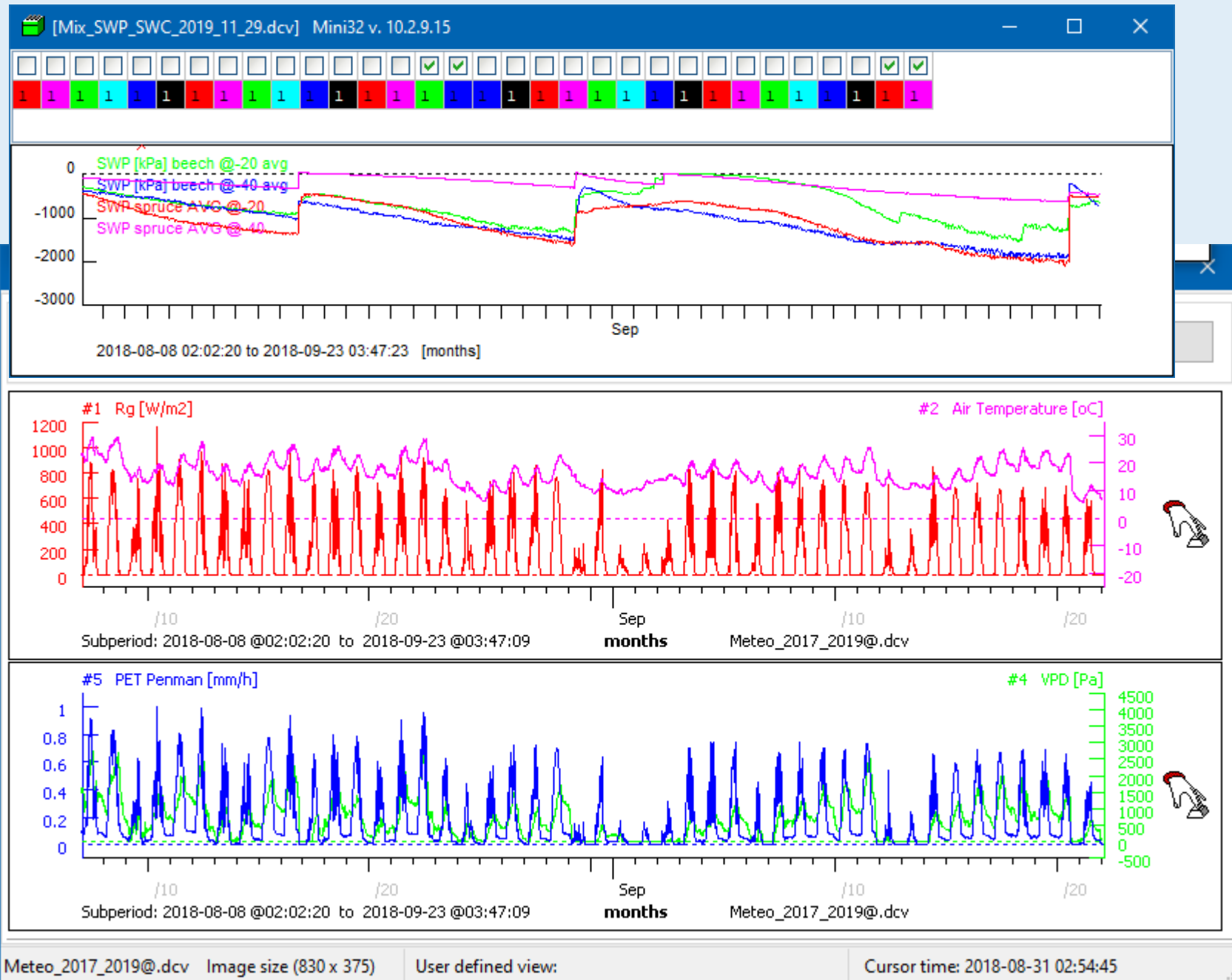
All variables
 CSV format

File name: Meteo_2017_2019@d.v (calculated only from displayed values)

Time period: 2018-01-01 - 2018-12-31 23:59:59

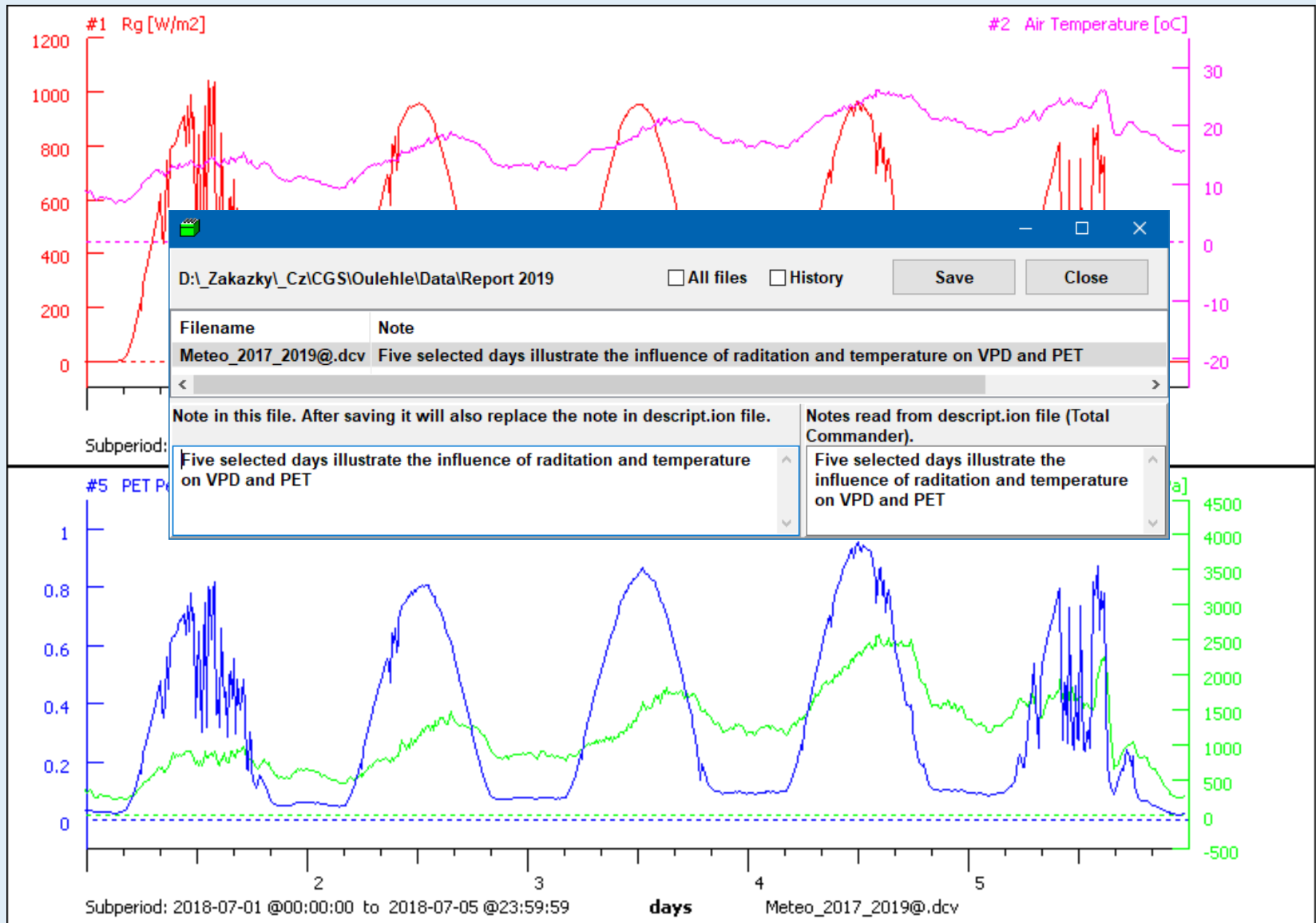
Var.	Description	Min	Max	Average	Records	Total	Std. dev.
#1	Rg [W/m2]	-0.1347328	1160.166	134.2007	52559	7053454	226.5843
#2	Air Temperature [oC]	-20.1002	29.5062	7.677511	52557	403506.9	9.241148
#4	VPD [Pa]	0	3020.046	323.8629	52557	1.702126E007	483.3285
#5	PET Penman [mm/h]	-7.476653E-005	1.011505	0.1203598	52557	6325.751	0.1951578

Items of pop-up menu - subgraph



Items of pop-up menu

Notes



Items of pop-up menu

Notes are visible also in file history and in file browser. They are shared with file comments in Total commander (description file).

The screenshot displays the Mini32 v. 10.2.9.15 software interface. At the top, a blue title bar reads "FILE OPERATIONS Mini32 v. 10.2.9.15". Below it is a menu bar with buttons: History, Drawing, Files, Export, Append file, Mix files, PrgmCalc, Read setup, Save setup, and Close. A secondary bar contains checkboxes for "El. val." (unchecked) and "File preview" (checked), along with buttons for "Recent files", "Notes", and "Channels to use".

The main area shows file details for "Meteo_2017_2019@.dcv":
File Name: Meteo_2017_2019@.dcv
Number of variables: 5
Time period: 2017-04-11 16:00:00 to 2019-12-31 23:50:00

A file list below shows the following entries and notes:

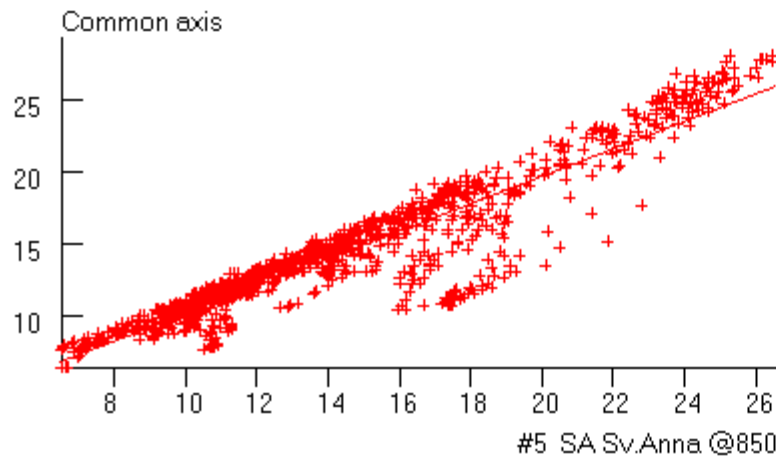
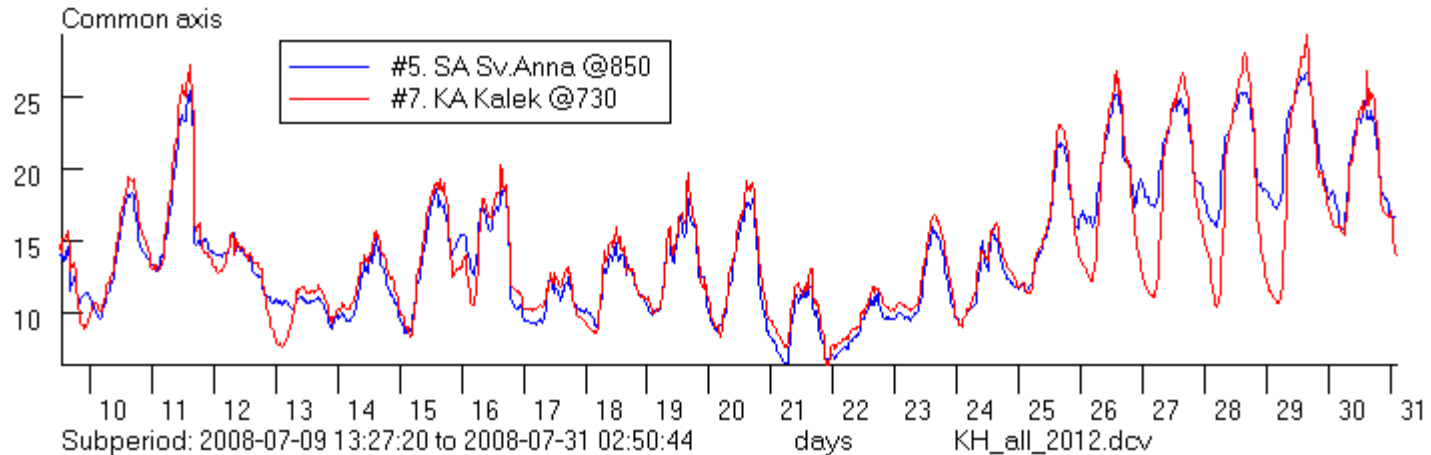
Filename	Note
Buk_Meteo_2017_2019_mvc@_1 h_24h_acc.dcv	
Meteo_2017_2019@.dcv	Five selected days illustrate the influence of raditation and temperature on V...
Meteo_2017_2019@_1 h.dcv	Filename: RTH_2018.dcvTime: 2019-02-06 16:06:14Chybejici data z konce roku ...
Meteo_2017_2019@_1 h_24h.dcv	Filename: RTH_2018.dcvTime: 2019-02-06 16:06:14Chybejici data z konce roku ...

A "File preview" window is open, showing details for "Meteo_2017_2019@.dcv":
File Name: Meteo_2017_2019@.dcv
Number of variables: 5
Time period: 2017-04-11 to 2019-12-31
File: Meteo_2017_2018.dcv

At the bottom, a "Notes" tab is active, displaying the text: "Five selected days illustrate the influence of raditation and temperature on VPD and PET".

Items of pop-up menu

Fast regression – double view



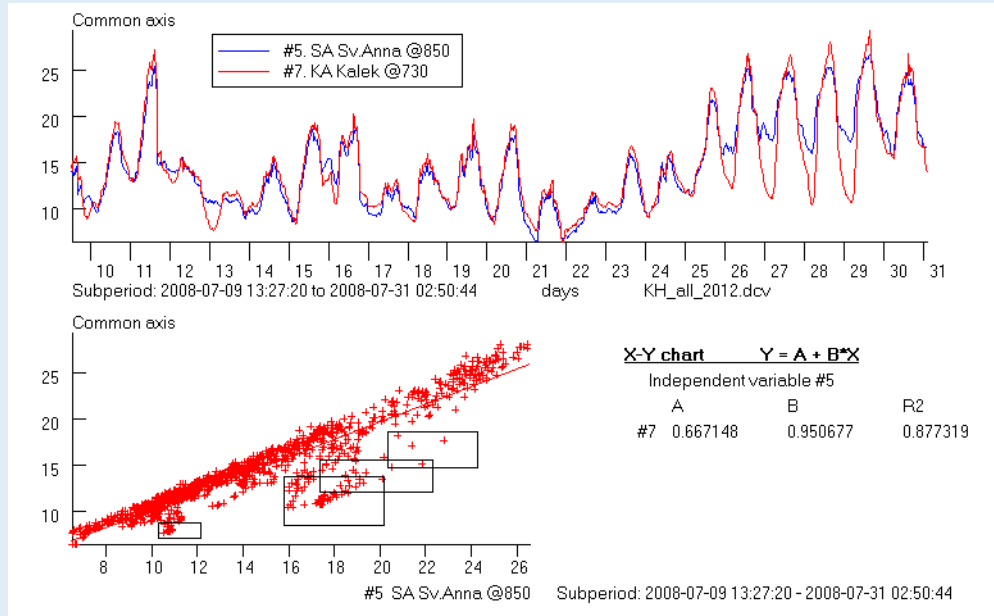
X-Y chart **Y = A + B*X**

Independent variable #5			
	A	B	R2
#7	0.667148	0.950677	0.877319

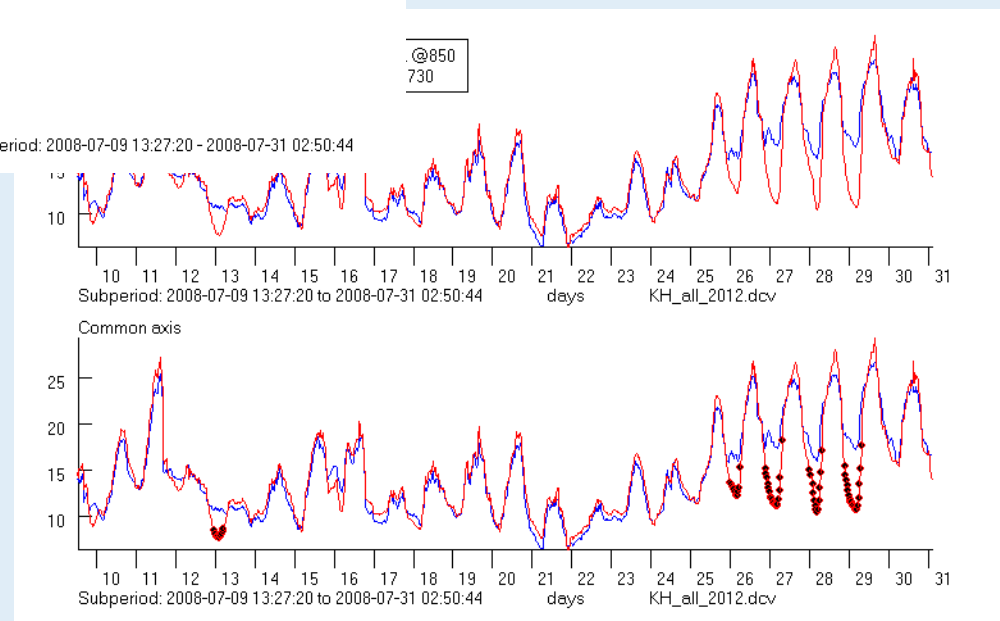
Subperiod: 2008-07-09 13:27:20 - 2008-07-31 02:50:44

Items of pop-up menu

Scatter plot erasing



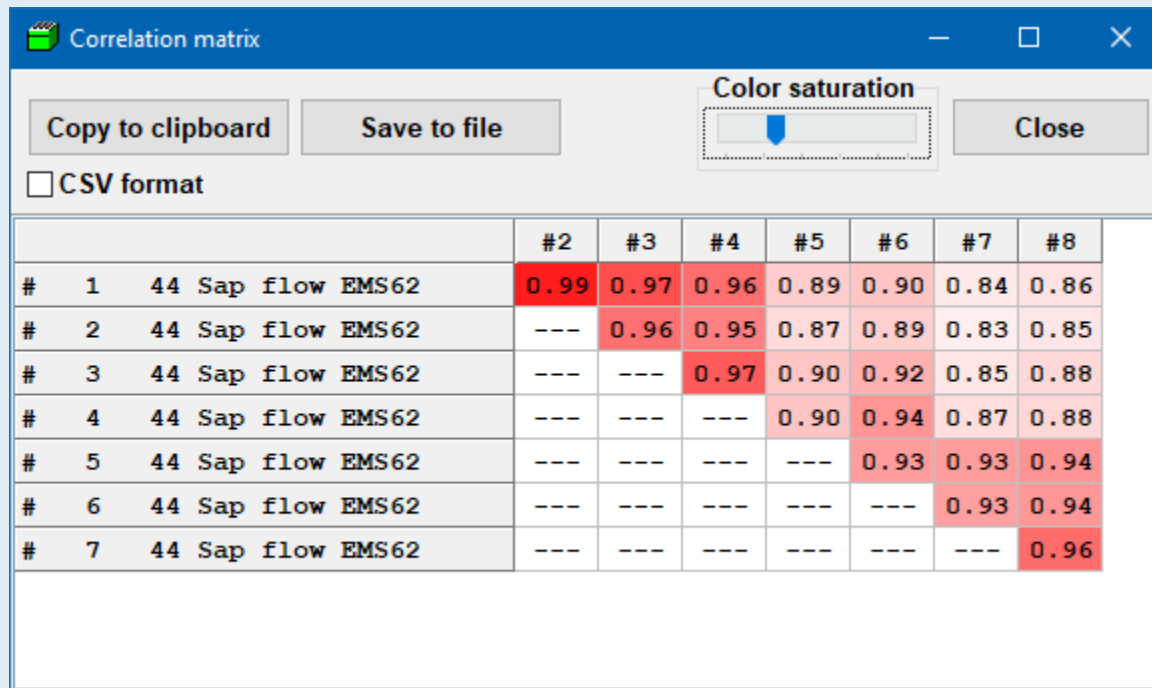
Selecting points



Ready for erase

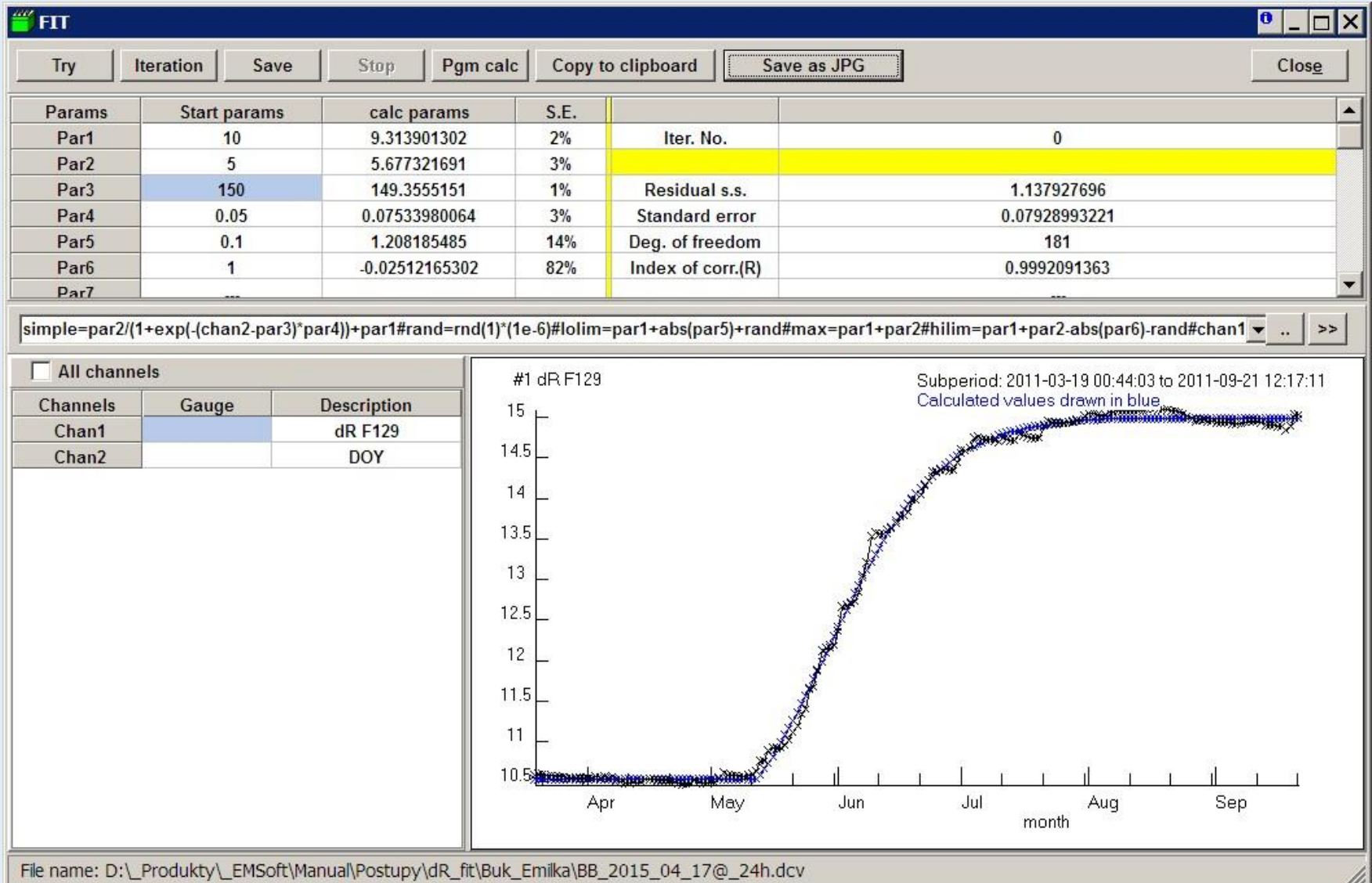
Items of pop-up menu

Correlation matrix



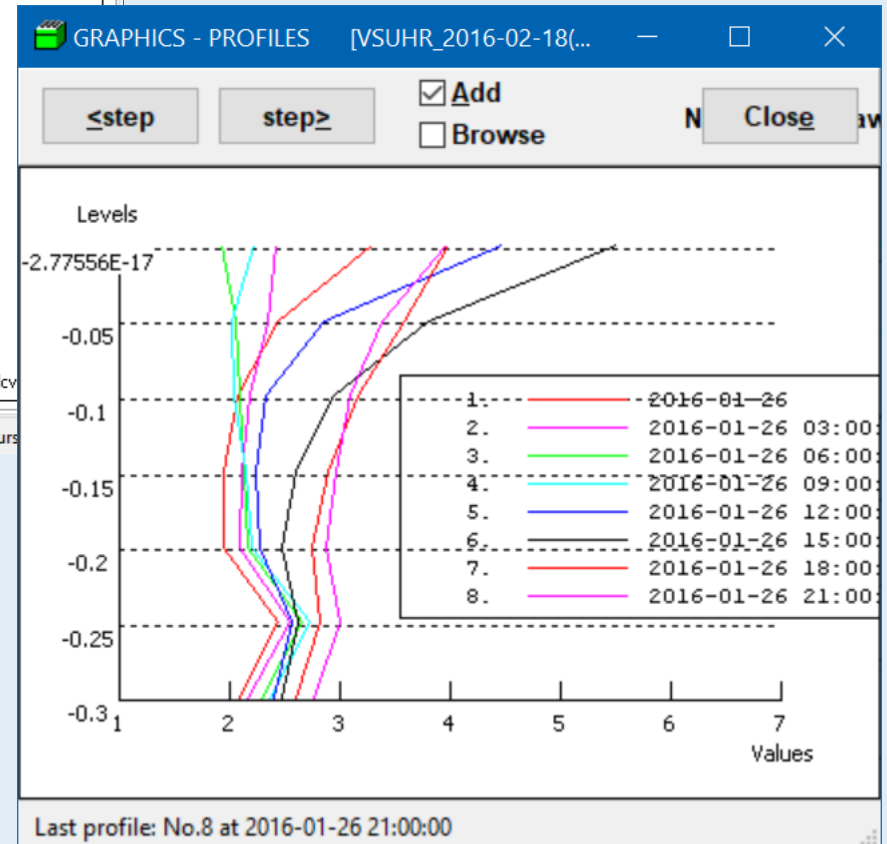
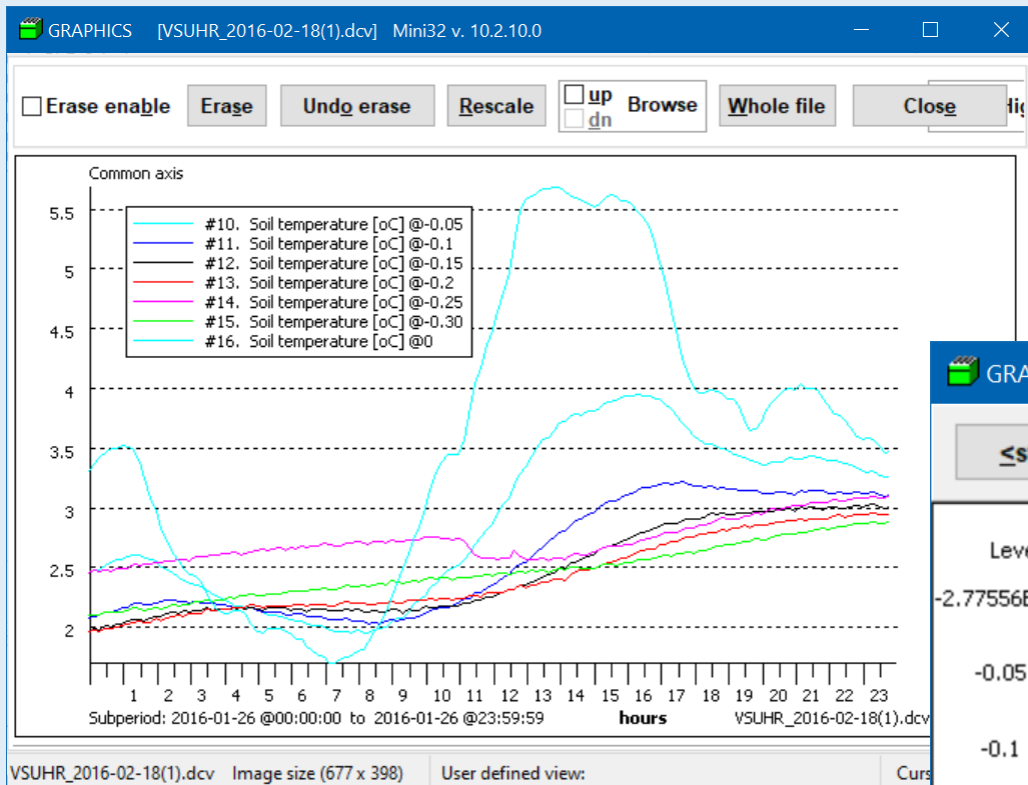
Items of pop-up menu

Curve fitting



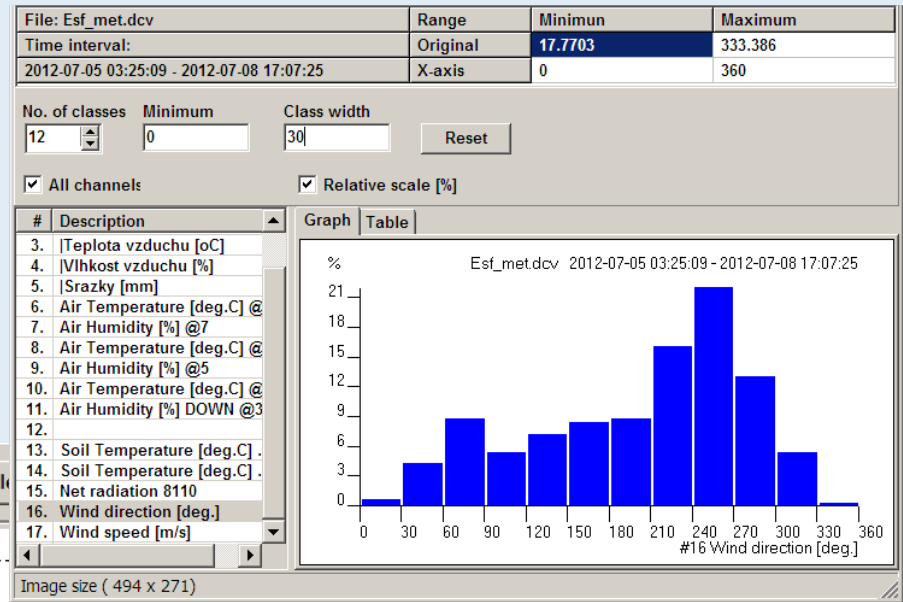
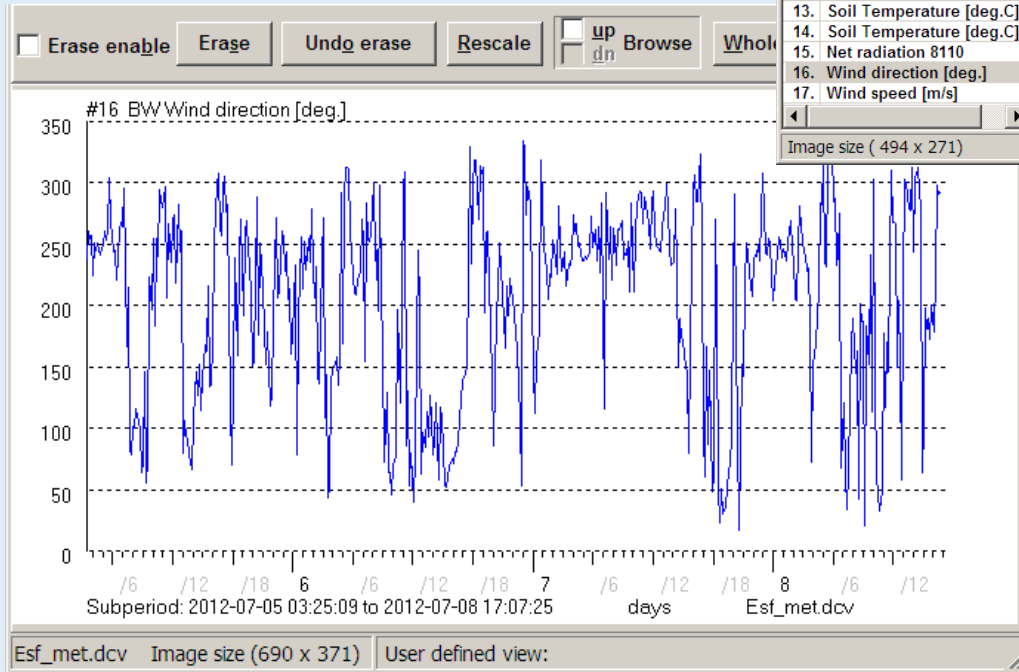
Items of pop-up menu

Vertical profiles

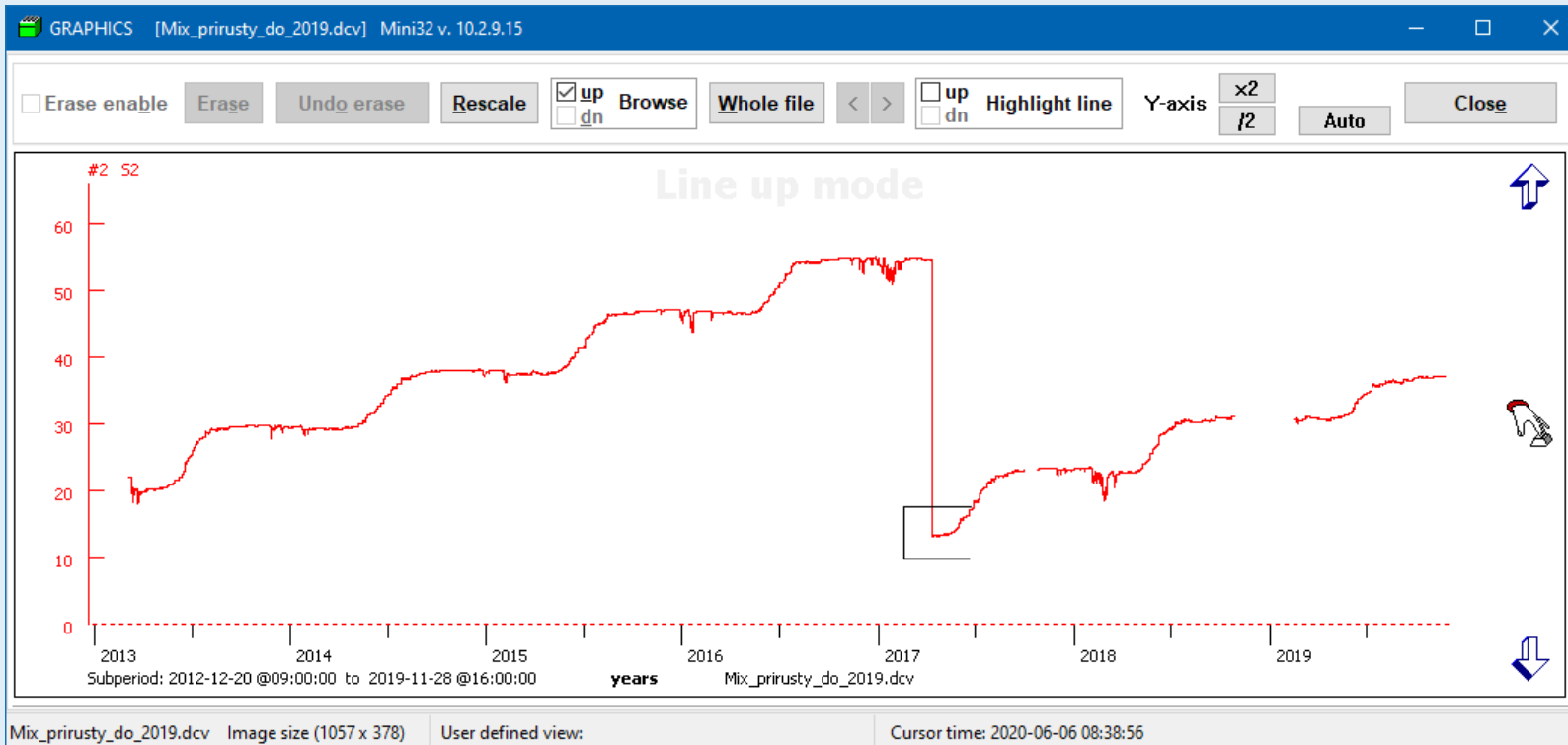


Items of pop-up menu

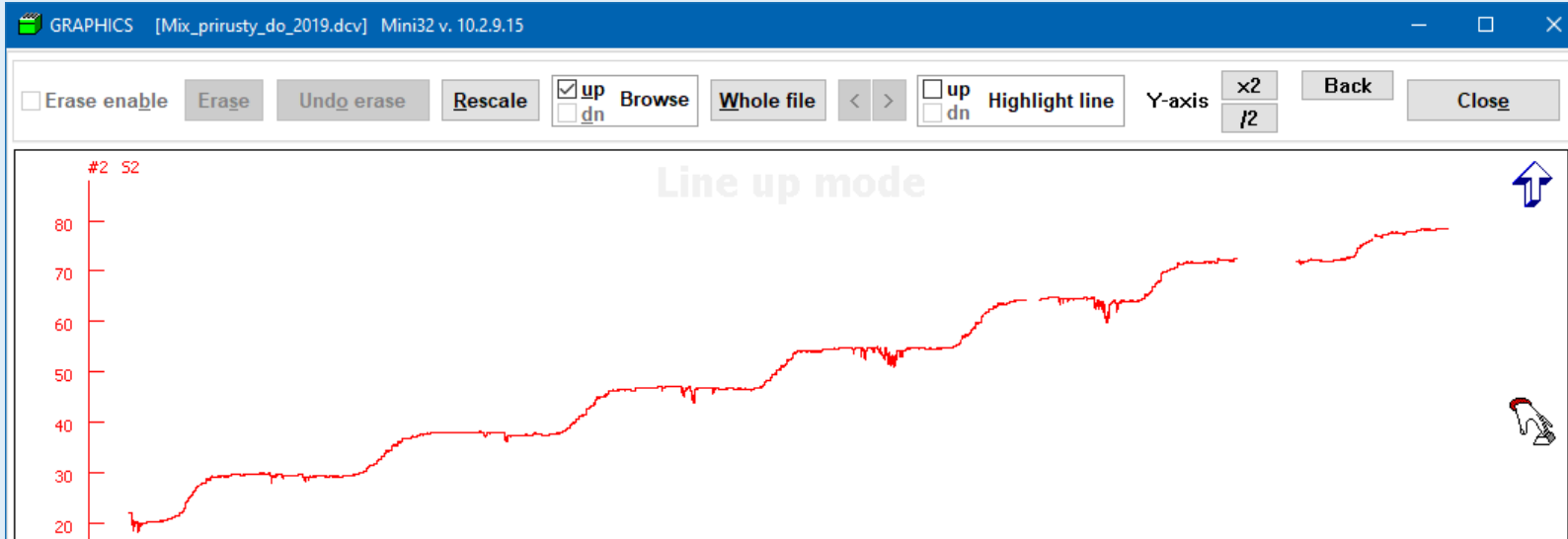
Histogram (Frequency distribution)



Items of pop-up menu – line-up



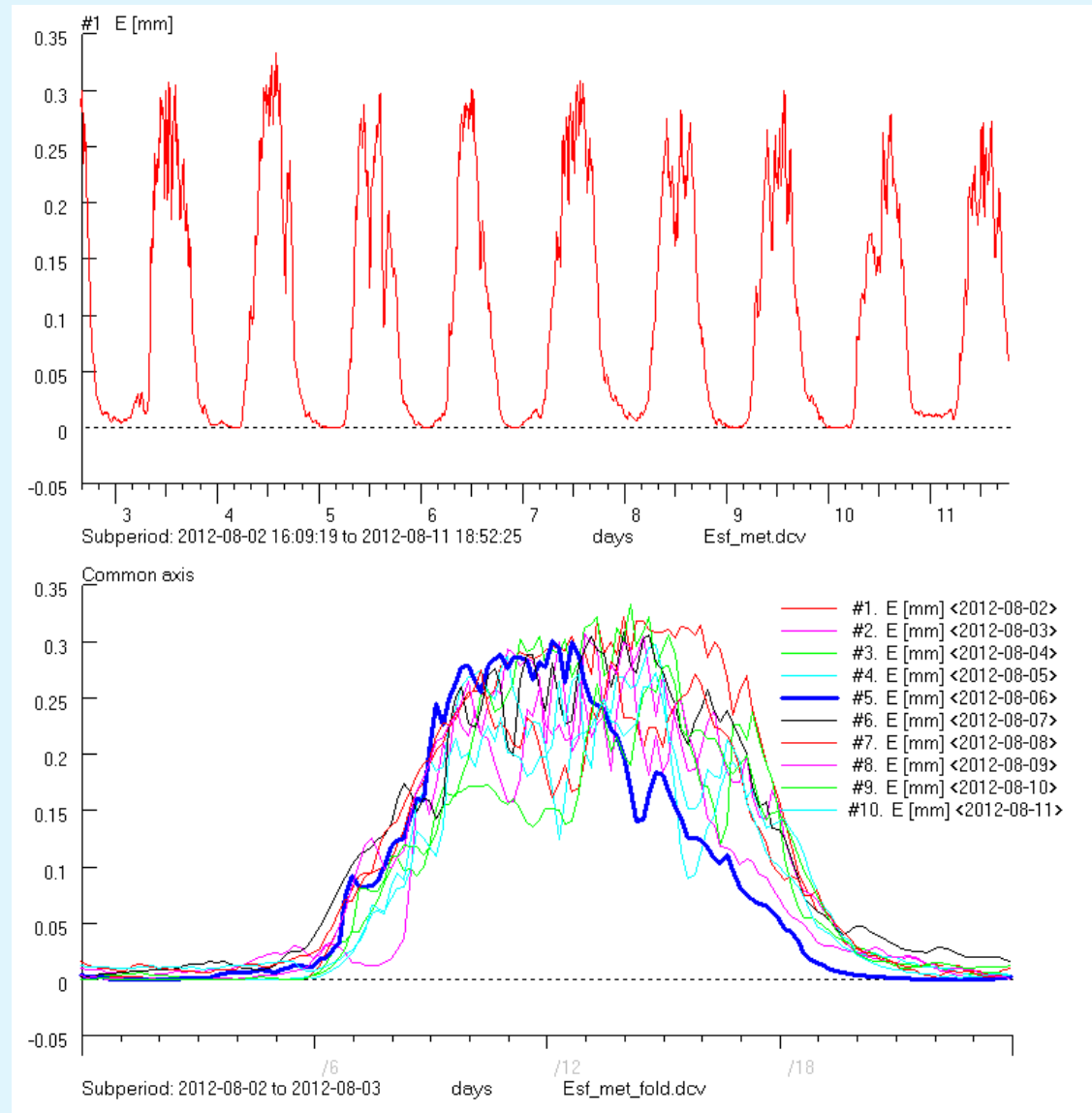
There are two operating modes – auto and manual. Changing the scale helps at high amplitude.



Items of pop-up menu - export

Export from graphic screen

- Crop file (shorter file)
- Text file
- Excel file
- **Time folding**



Creating new files

“Export” submenu – processing of the whole file.

Creating new files

"Export" submenu

FILE OPERATIONS - ModuLog Mini32 v. 10.2.9.15

History Drawing Files **Export** Append file Mix files PrgmCalc Read setup Save setup Close

El. val. File preview Recent files Notes Channels to use

File name: PS_2018_05_20.dcv
Device type: ML03029
Device code: PS
Batt: 12.7 V

Time period: 2018-05-01 to 2018-05-20 23:50:00
Measuring interval: 1 m / warm-up 1 s
Storing interval: 10 m
First record at: 2018-05-01

#	Type	ON/off	Range	Gauge	Description (F2 to edit)
1.	Voltage	ON	1250 mV	Air T EMS33 (H) [oC]	Air Temp. UP [deg.C]
2.	Voltage	ON	1250 mV	Air RH EMS33 (H) [%]	Air Hum. UP [%]

CREATING NEW FILES Mini32 v. 10.2.9.15

File Refinement Crop file Mean values Statistics Differ / Accum Text file Excel file Time shift Multi-variable calculations Channels to use

- Adds missing empty rows inside the file
- Adds empty rows outside original data period
- Performs linear interpolation of missing data

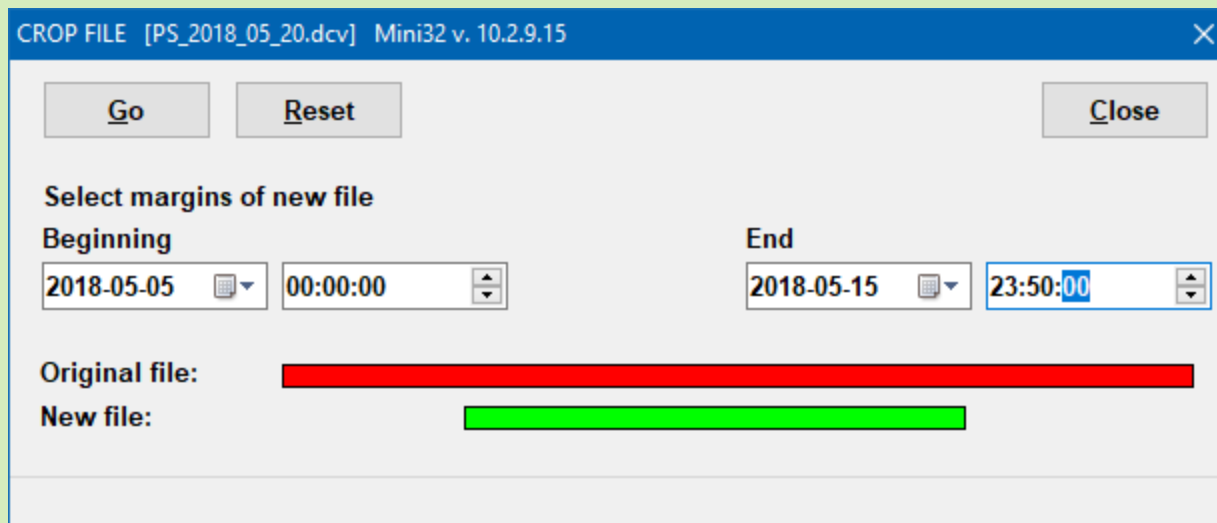
Next Cancel

12. voltage 011 2500 mv voltage

PS_2018_05_20.dcv Press F2 for channel edit; [p] to see the parameters of equations.

Creating new files

"Export" submenu – Crop file



Creating new files

"Export" submenu – Mean values

MEAN VALUES [PS_2018_05_20.dcv] Mini32 v. 10.2.9.15

Go Number of missing values allowed for calculation: 3 Close

Select time interval of averaging (consider percentage of existing records in parentheses).

24 h 4 h 30 m 10 m (100%) 3 m 20 s 6 s 2 s

12 h 3 h 20 m 6 m 2 m 15 s 5 s 1 s

8 h 2 h 15 m 5 m 1 m 12 s 4 s month

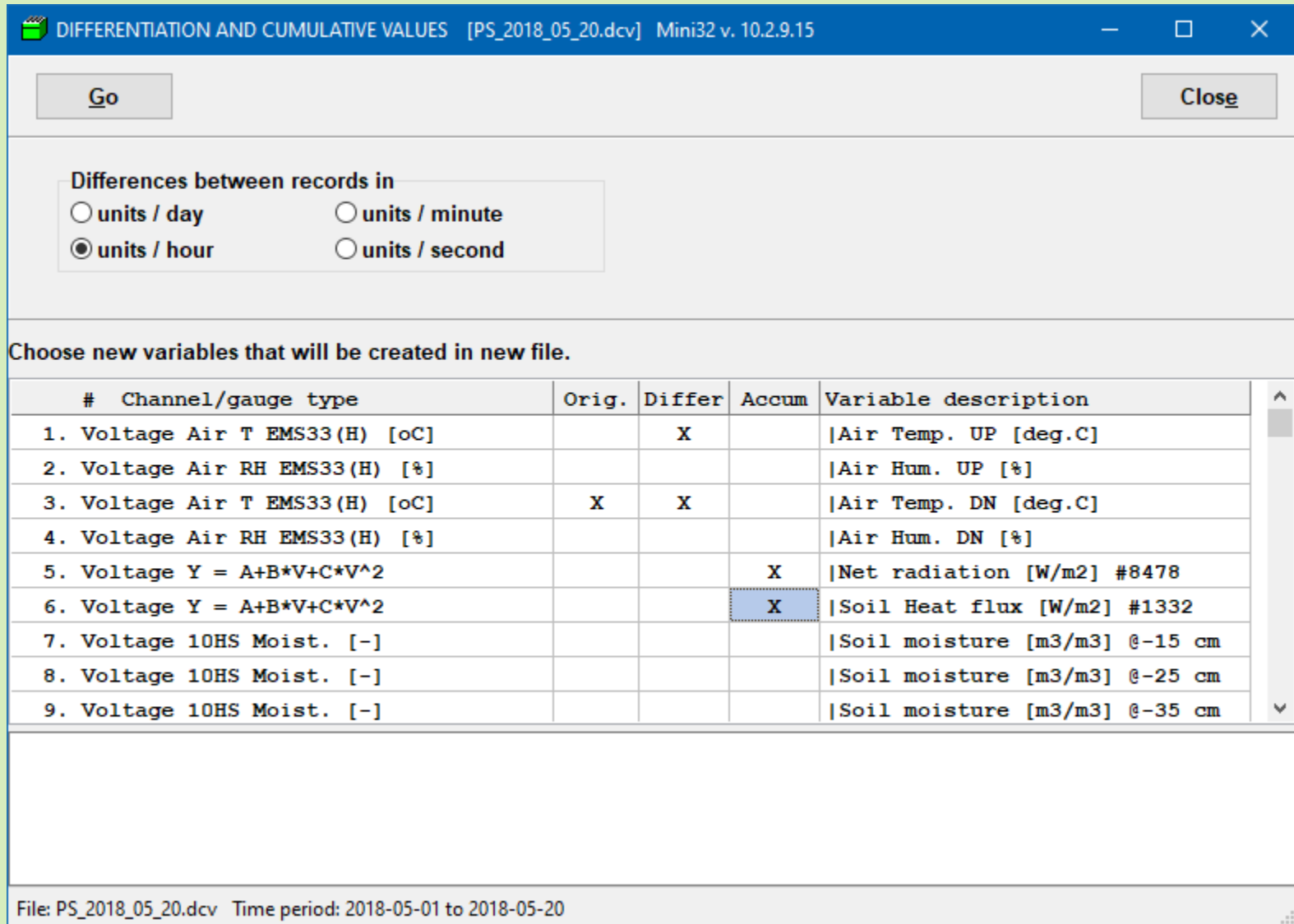
6 h 1 h 12 m 4 m 30 s 10 s 3 s year

Please choose the way of processing. Note that some variables need a special handling. Do not allow averaging by cumulative values (rain) and keep only the last value of the processed interval by some special variables as it is wind direction for instance

#	Channel/gauge type	Mean	Total	Last	Variable descriptionn
1.	Voltage Air T EMS33(H) [oC]	X			Air Temp. UP [deg.C]
2.	Voltage Air RH EMS33(H) [%]	X			Air Hum. UP [%]
3.	Voltage Air T EMS33(H) [oC]	X			Air Temp. DN [deg.C]
4.	Voltage Air RH EMS33(H) [%]	X			Air Hum. DN [%]
5.	Voltage Y = A+B*V+C*V^2	X			Net radiation [W/m2] #8478
6.	Voltage Y = A+B*V+C*V^2	X			Soil Heat flux [W/m2] #1332
7.	Voltage 10HS Moist. [-]	X			Soil moisture [m3/m3] @-15 cm
8.	Voltage 10HS Moist. [-]	X			Soil moisture [m3/m3] @-25 cm
9.	Voltage 10HS Moist. [-]	X			Soil moisture [m3/m3] @-35 cm
10.	Voltage Voltage	---	---	---	
11.	Voltage Voltage	---	---	---	
12.	Voltage Voltage	---	---	---	

Creating new files

“Export” submenu – Differ/Accum – difference between following records and calculation accumulated values



DIFFERENTIATION AND CUMULATIVE VALUES [PS_2018_05_20.dcv] Mini32 v. 10.2.9.15

Go Close

Differences between records in

units / day units / minute
 units / hour units / second

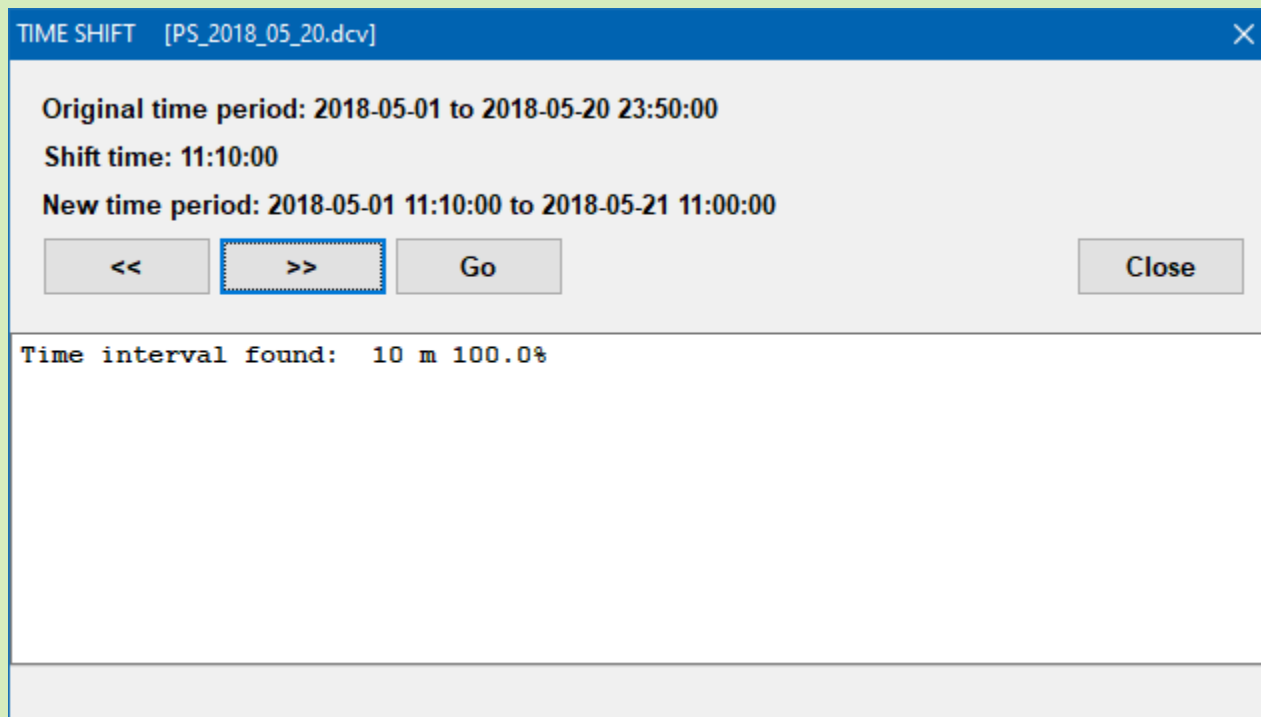
Choose new variables that will be created in new file.

#	Channel/gauge type	Orig.	Differ	Accum	Variable description
1.	Voltage Air T EMS33(H) [oC]		X		Air Temp. UP [deg.C]
2.	Voltage Air RH EMS33(H) [%]				Air Hum. UP [%]
3.	Voltage Air T EMS33(H) [oC]	X	X		Air Temp. DN [deg.C]
4.	Voltage Air RH EMS33(H) [%]				Air Hum. DN [%]
5.	Voltage Y = A+B*V+C*V^2			X	Net radiation [W/m2] #8478
6.	Voltage Y = A+B*V+C*V^2			X	Soil Heat flux [W/m2] #1332
7.	Voltage 10HS Moist. [-]				Soil moisture [m3/m3] @-15 cm
8.	Voltage 10HS Moist. [-]				Soil moisture [m3/m3] @-25 cm
9.	Voltage 10HS Moist. [-]				Soil moisture [m3/m3] @-35 cm

File: PS_2018_05_20.dcv Time period: 2018-05-01 to 2018-05-20

Creating new files

“Export” submenu – Time shift – correction of wrongly set data acquisition time
(with resolution of time span between lines)



Creating new files

“Export” submenu – Multi-variable calculation

Multi-variable calculations

Go

Right mouse button click opens pop-up menu for adding next columns.

Channel description		1	2	3	4
Type of operation >	Orig.	Avg ▾	Max ▾	Min ▾	Max ▾
Minimum count of variables for calculation >		2	2	2	2
1 Air Temp. UP [deg.C]	X	X		X	X
2 Air Hum. UP [%]	X		X		
3 Air Temp. DN [deg.C]	X	X		X	X
4 Air Hum. DN [%]	X		X		
5 Net radiation [W/m2] #8478	X				
6 Soil Heat flux [W/m2] #1332	X				
7 Soil moisture [m2/m2] @ 15 cm					

Hide original File structure - original channels behind calculated ones

Created variable	Editable description
Channel 1	Air Temp. UP [deg.C]
Channel 2	Air Hum. UP [%]
Channel 3	Air Temp. DN [deg.C]
Channel 4	Air Hum. DN [%]
Channel 5	Net radiation [W/m2] #8478
Channel 6	Soil Heat flux [W/m2] #1332
AVG(1,3)	Temperature average [oC]
MAX(2,4)	Humidity maximum [%]
MIN(1,3)	Temperature minimum [oC]
MAX(1,3)	Temperature mmaximum [oC]

Creating new files

“Export” submenu – Channels to use – new file will contain only channels of one’s interest

Channels to use

Go Close

MV_2024_09_29_1 h.dcv 4 channels selected

#	Channel	ON/off	Range	Gauge	Description	Sel
1	Temperature	ON	---	Temperature [oC]	Soil Temp. [°C] #1	
2	Temperature	ON	---	Temperature [oC]	Soil Temp. [°C] #2	
3	Events	ON	---	Weighted event	Precipitation [mm]	X
4	Voltage	ON	---	Supply voltage [V]	Supply Voltage [V]	
5	Temperature	ON	---	Temperature [oC]	Internal Temp. [°C]	
6	Humidity	ON	---	Humidity [%]	Internal Humidity [%]	
7	Internal	ON	---	Available energy [%]	Available Energy [%]	
8	SDI-12 1/1	ON	---	Glob. rad. [W/m2] EM	Global rad. [W/m2] 1/1	X
9	SDI-12 2/1	ON	---	Temperature [°C] EMS	Air Temperature [°C] 2/1	X
10	SDI-12 2/1	ON	---	Humidity [%] EMS33S	Air humidity [%] 2/1	X

FILE OPERATIONS - GreyBox Mini32 v. 10.2.17.0

History Drawing Files Export Append file Mix files PrgmCalc Read setup Save setup Close

El. val. File preview Recent files Notes Channels to use

File Name: MV_2024_09_29_1 h_sel.dcv

Number of variables: 4

Time period: 2023-12-31 01:00:00 to 2024-09-29 14:00:00

MV_2024_09_29_1 h.dcv

#	Type	d. c.	Range	Gauge	Description (F2 to edit)
1.	Events	MV	---	Weighted event	Precipitation [mm]
2.	SDI-12 1/1	MV	---	Glob. rad. [W/m2] EM	Global rad. [W/m2] 1/1
3.	SDI-12 2/1	MV	---	Temperature [°C] EMS	Air Temperature [°C] 2/1
4.	SDI-12 2/1	MV	---	Humidity [%] EMS33S	Air humidity [%] 2/1

Creating new files

Directly from file info screen – file chaining (append files of the same structure to opened file)

The screenshot shows the 'FILE CHAINING' window for the file 'GR_2009_11_12.dcv'. The window title is 'Mini32 v. 10.2.9.15'. It features buttons for 'Add file(s)', 'Connect', 'File preview' (checked), and 'Close'. A note states: 'Note: Priority of common values in connected files decreases with the list of files.'

The file chain is visualized as a staircase of colored bars:

- GR_2009_11_12.dcv (Red bar)
- GR_2010_04_18.dcv (Green bar)
- GR_2010_11_11.dcv (Green bar)
- GR_2011_05_20.dcv (Green bar)
- GR_2011_10_18.dcv (Green bar)
- GR_2011_11_30.dcv (Green bar)
- GR_2012_04_19.dcv (Green bar)
- GR_2012_05_11.dcv (Green bar)
- New file (Yellow bar)

Below the chain is a table comparing the files:

File name ^	From	To		File differs in:
GR_2009_11_12.dcv	2009.05.13 14:30:00	2009.11.12 13:30:00		
GR_2010_04_18.dcv	2009.06.09 01:00:00	2010.04.18 13:00:00	Delete	
GR_2010_11_11.dcv	2010.04.18 14:00:00	2010.11.11 15:00:00	Delete	
GR_2011_05_20.dcv	2010.11.11 15:30:00	2011.05.20 11:00:00	Delete	
GR_2011_10_18.dcv	2010.12.09 02:00:00	2011.10.18 14:00:00	Delete	
GR_2011_11_30.dcv	2011.01.21 00:00:00	2011.11.30 12:00:00	Delete	
GR_2012_04_19.dcv	2011.06.11 00:00:00	2012.04.19 10:00:00	Delete	
GR_2012_05_11.dcv	2011.07.03 00:00:00	2012.05.11 10:30:00	Delete	
New file	2009.05.13 14:30:00	2012.05.11 10:30:00		

Creating new files

Directly from file info screen – mixing files from similar time period with different variables

MIX FILES [19_2019_11_29.dcv] Mini32 v. 10.2.9.15

Remove empty variables

New file length
 Longest file (OR)
 Shortest file (AND)
 File preview

File name	From	To	Spacing	Occur.	
19_2019_11_29.dcv	2019.05.08 11:00:00	2019.11.29 10:00:00	1 h	100%	
28_2019_11_29.dcv	2017.04.11 17:00:00	2019.11.29 10:00:00	1 h	100%	Delete
30_2019_11_29.dcv	2017.04.11 14:00:00	2019.11.29 10:00:00	1 h	100%	Delete
41_2019_11_29.dcv	2019.05.08 11:00:00	2019.11.29 10:00:00	1 h	100%	Delete
44_2018_11_30.dcv	2018.10.17 03:00:00	2018.11.30 09:00:00	1 h	100%	Delete
44_2019_11_29.dcv	2019.10.06 20:00:00	2019.11.29 10:00:00	1 h	100%	Delete
52_2019_11_29.dcv	2017.04.11 17:00:00	2019.11.29 10:00:00	1 h	100%	Delete
63_2019_11_29.dcv	2017.04.11 17:00:00	2019.11.29 10:00:00	1 h	100%	Delete
87_2019_11_29.dcv	2019.05.08 11:00:00	2019.11.29 10:00:00	1 h	100%	Delete
New file	2017.04.11 14:00:00	2019.11.29 10:00:00			

Creating new files

Directly from file info screen – User defined calculation

USER DEFINED CALCULATION [meteo_input.dcv] Mini32 v. 10.2.9.15

Prepare Go Abort Convert to plain text Decimal separator dot (.) comma (,) Highlight "Var" Highlight "Chan" Close

Available channels << >>

#	Description
Chan1	Global radiation [W/m2] #2871
Chan2	Air temperature [deg.C]
Chan3	Air humidity [%]
Chan4	
Chan5	
Chan6	
Chan7	
Chan8	
Chan9	Wind speed [m/s] 014
Chan10	Precipitation [mm] 0.2/tip
Chan11	
Chan12	

Programming window

Example 1: $Var3 = (Chan1 + Chan2)/2$; comment (new variable)
(Note: Drag&drop a channel as a new variable. Then insert variable name.)
There are three variables which carry their value to subsequent data line during calculation
Their names are memo1, memo2 and memo3.

```
Var1 = Chan1 ; Global radiation [W/m2] #2871
Var2 = Chan2 ; Air temperature [deg.C]
Var3 = Chan3 ; Air humidity [%]
Var4 = Chan9 ; Wind speed [m/s] 014
Var5 = Chan10 ; Precipitation [mm] 0.2/tip
;
  Tabs = Chan2 + 273.16; [K]
  Es = 10^(9.244 - 2305/(Tabs) - 500/(Tabs^2) - 100000/(Tabs^3))*100;
Var6 = Es * (1-Chan3/100); VPD [Pa]
temp1 = 5418 * Es/Tabs/Tabs
temp2 = temp1/(temp1+66)
temp3 = Chan1 * 0.75; net radiation (Rn not measured)
temp4 = temp2 * temp3 * 3600/2.35e6; 1-st part
temp5 = 66/(66 + temp1)
wind = 2; wind speed - constant (not measured)
temp6 = temp5 * Var6 * 0.0026*(1 + 0.54 * wind)/24; 2-nd part
Var7 = temp4 + temp6; PET Perman [mm/h]
```

Source file name:

The End