Advanced Virgo dataDisplay tutorial

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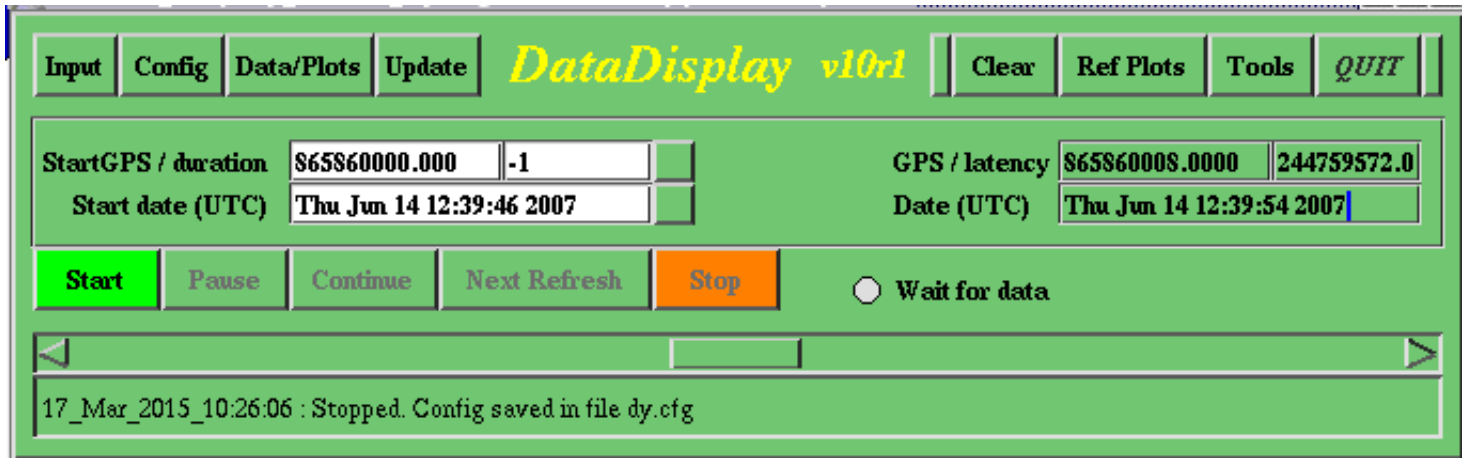
- Choose input files and do time plots
- Connect online and do FFT plots
- Configuration file
- Main browser features
- Edit plots parameters
- Use ROOT and dataDisplay features
- Use reference plots
- Tools and options

Choose input files
and
do time plots

First, type “dataDisplay” in an Xterm window

A mainpanel window should appear



Click on “Inputs” and Choose “Read FFL”

Read data online by connecting to one of the online data providers

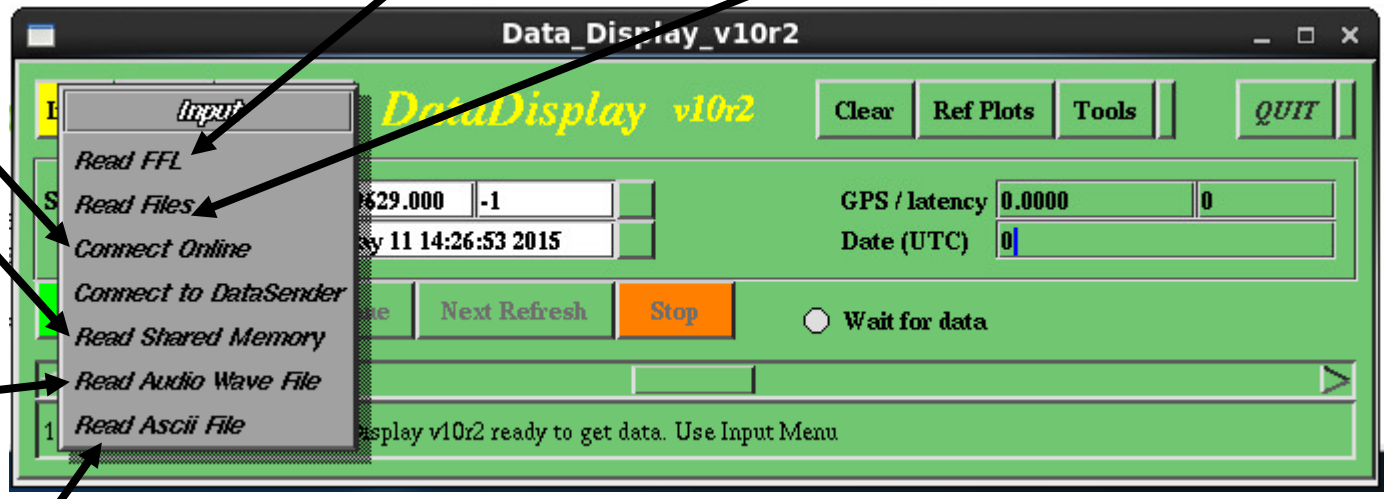
Read data from ffl files which points to frame formatted data files

Read data from frame formatted data files

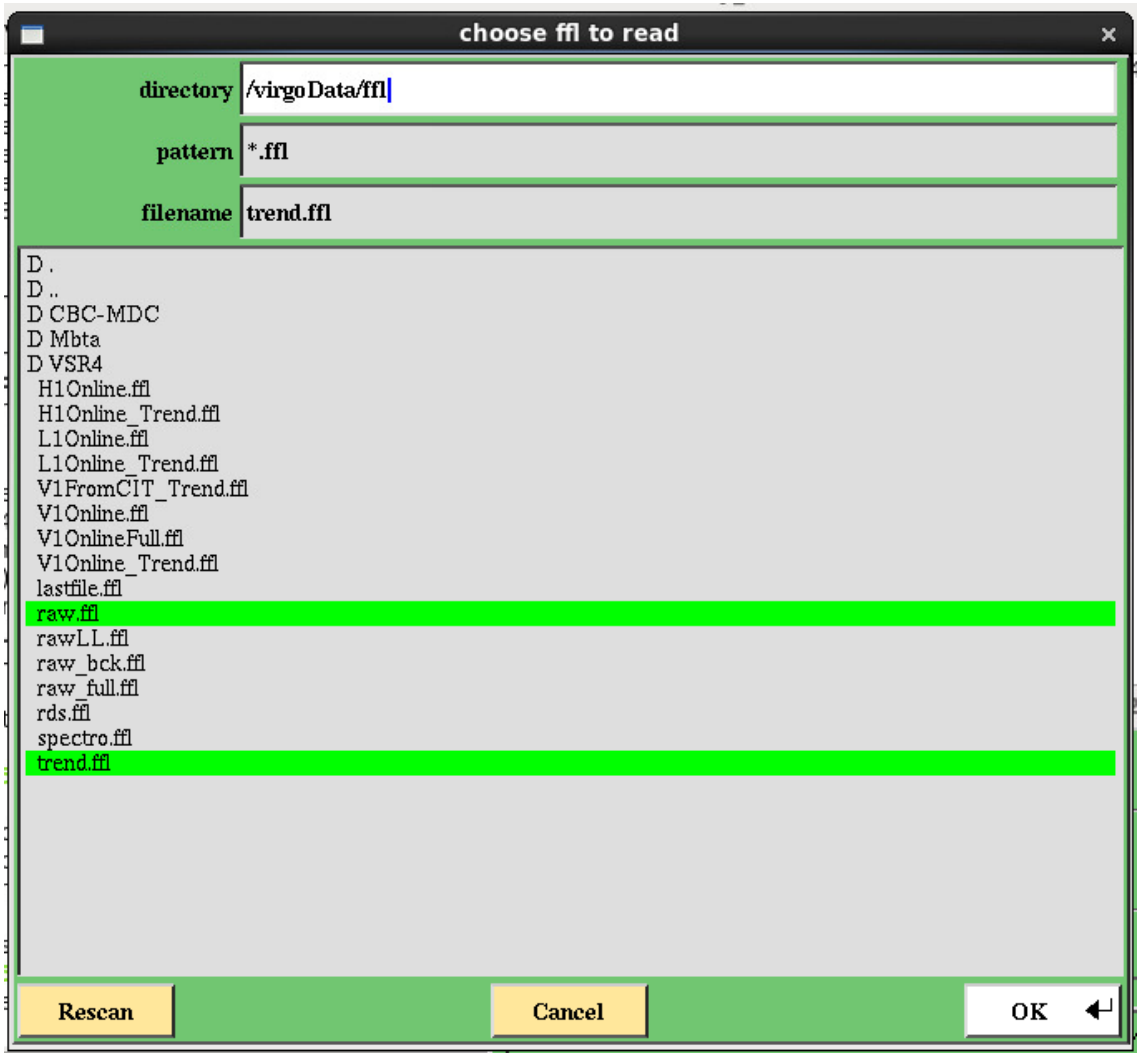
Read data online from a shared memory

Read data from an audio file (only one channel)

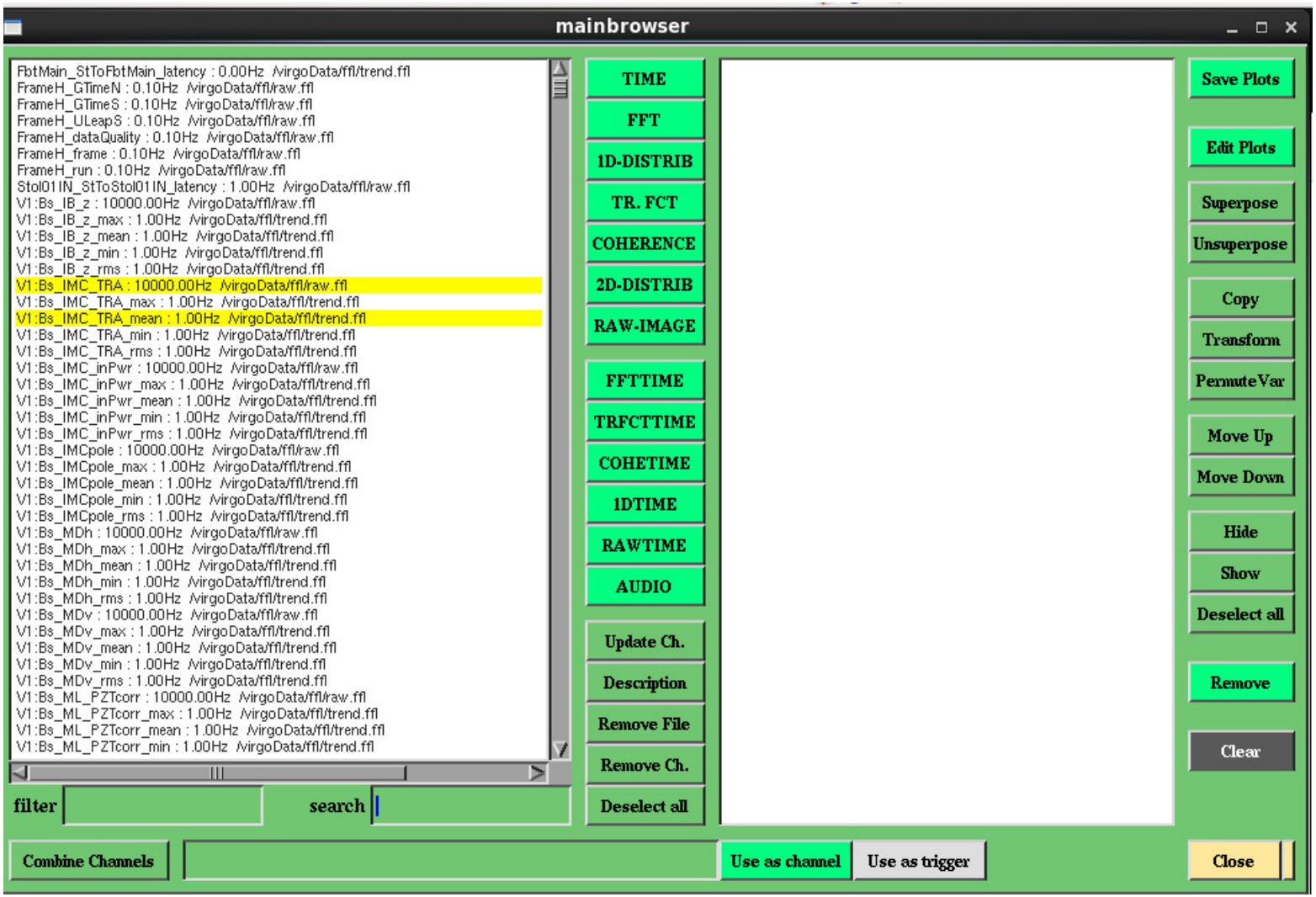
Read data from an ascii file properly formatted [time, sample value] (only one channel)



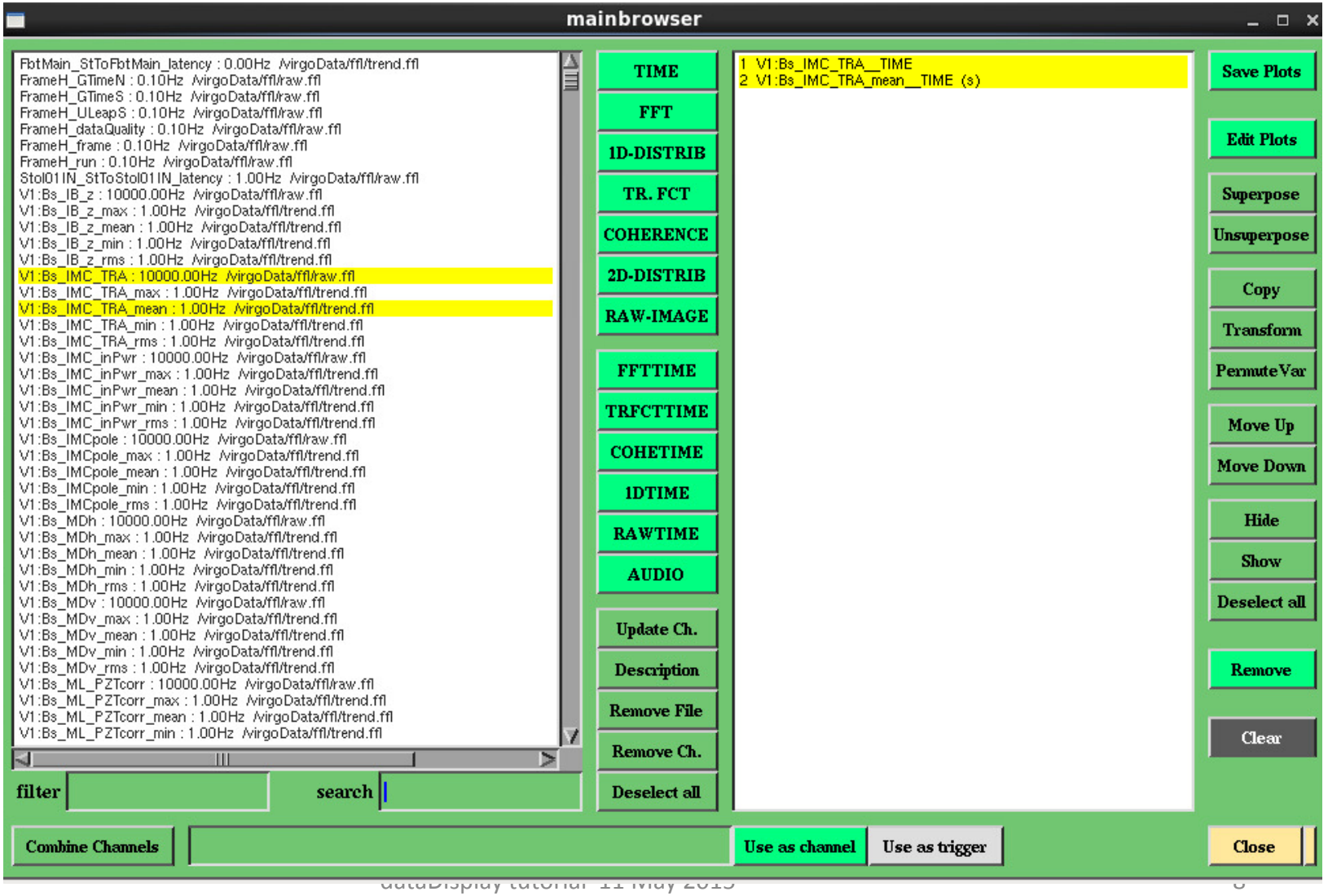
A list of files should appear
Choose “raw.ffl” and “trend.ffl”
Click on “OK” or press “Enter” on the keyboard



The mainbrowser panel should appear, with a list of channels, some taken from raw.ffl, some taken from trend.ffl
Select a couple of channels in the list



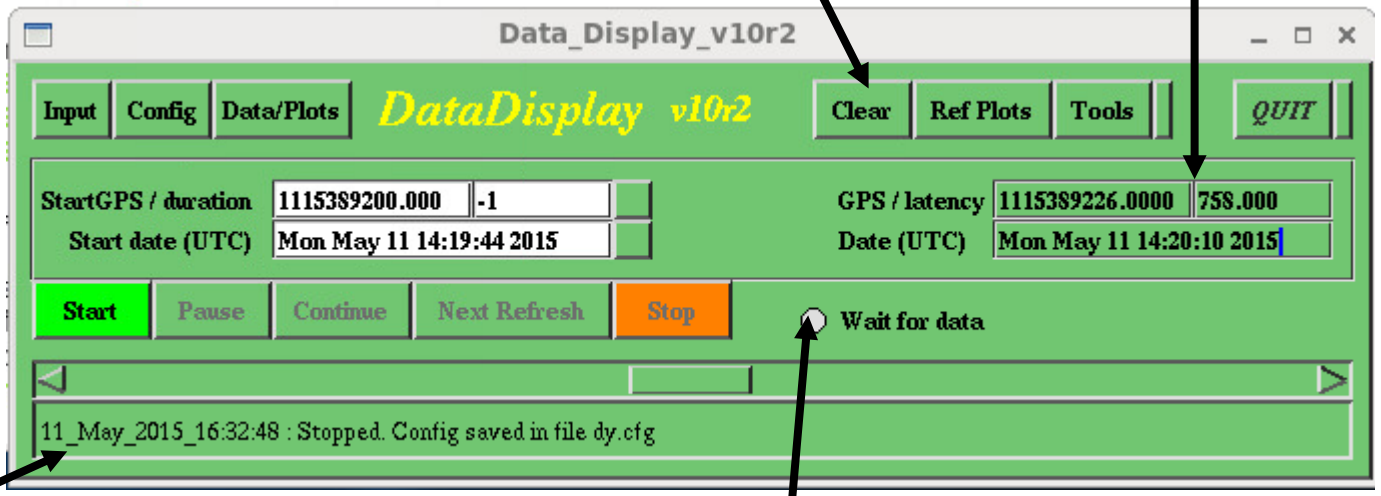
Click on “TIME” button
Two time plots are created
Select them and click on “Superpose”



Choose a start date on the mainpanel
And click on "Start"
To read data and do the plots

Remove the panel displaying the plots

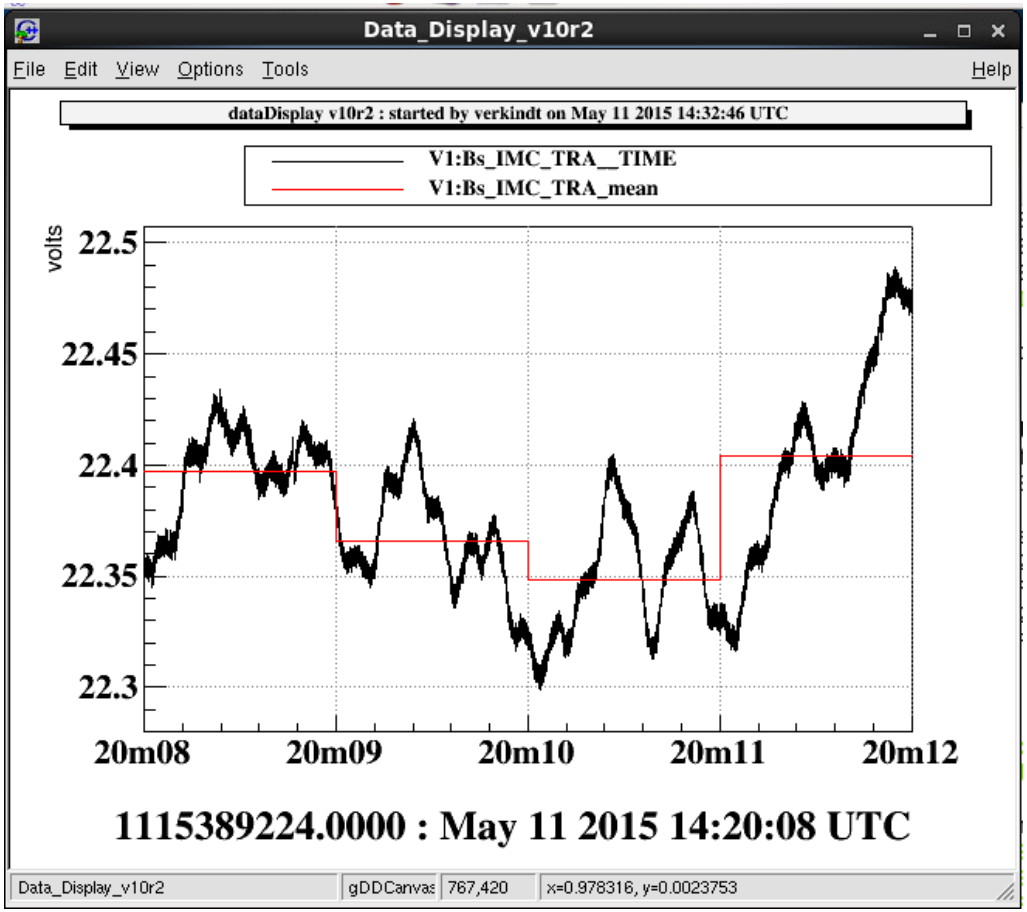
GPS time, latency and UTC date of the data read



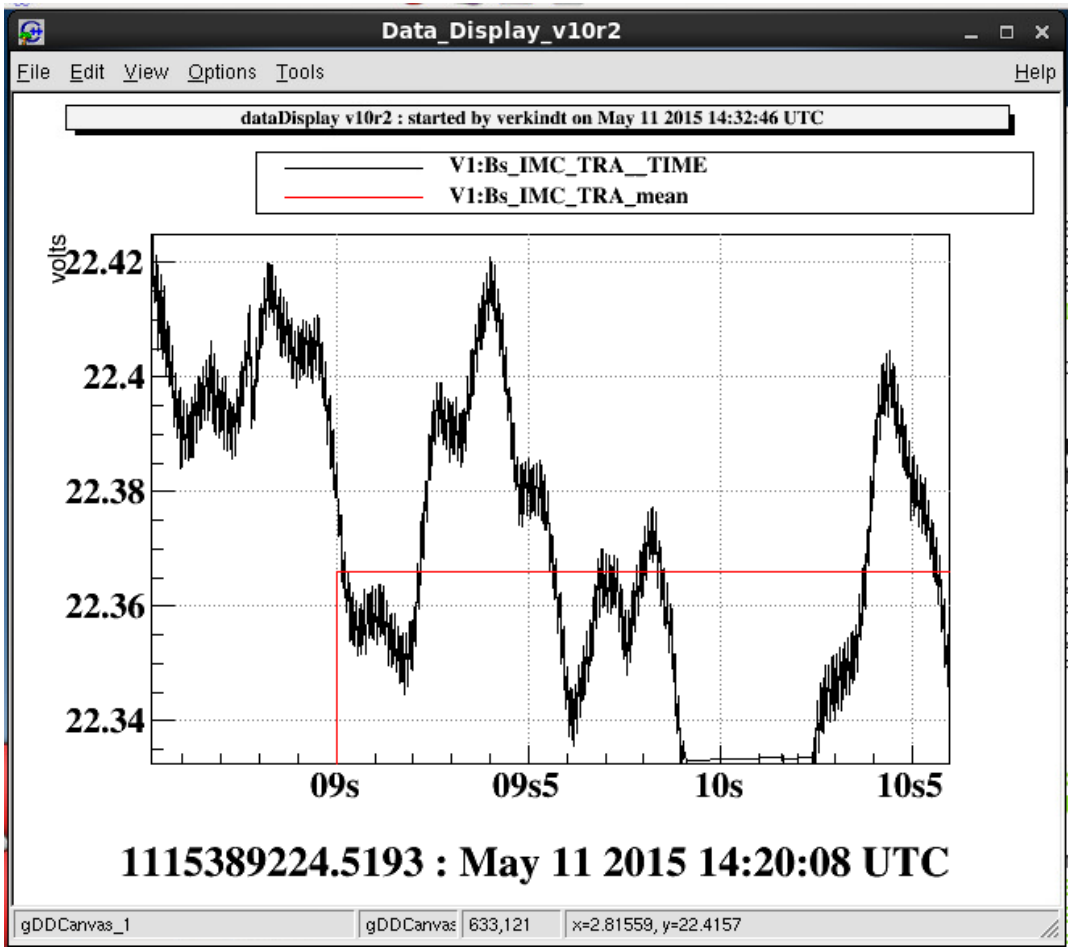
Info line about last activity of the dataDisplay

When you push this button, dataDisplay do not stop when reaching end of data file and wait for new data

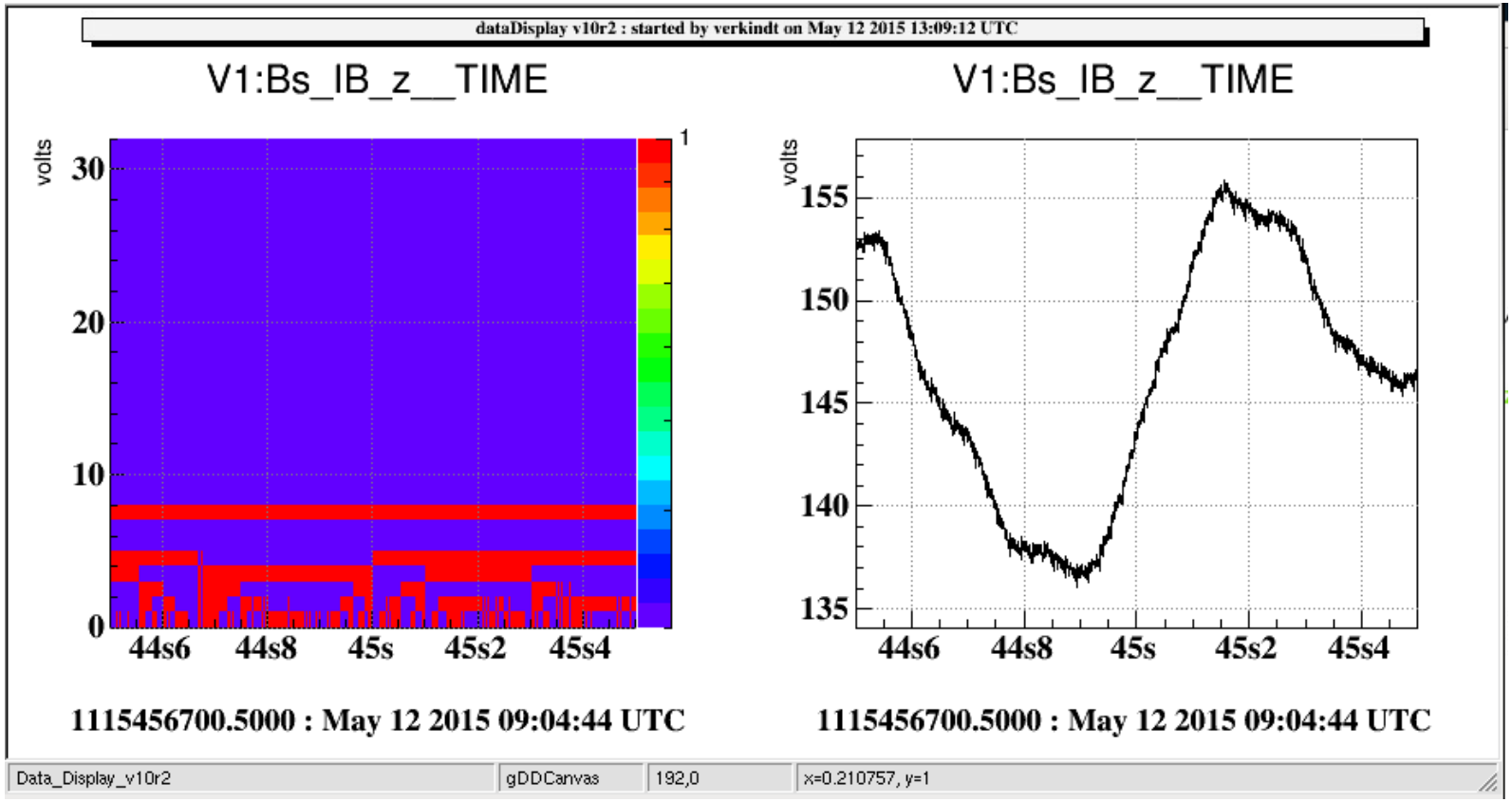
A window should appear containing the time plot of the two channels, superposed
On the X axis is shown the UTC time
With time origin indicated in a string below the plot



Once you have pressed “Stop” button, you can modify the plot using the various ROOT features or the additional features introduced by dataDisplay
Use the mouse to select a zoom on X or Y axis
Use the right button of the mouse to list the features you can use



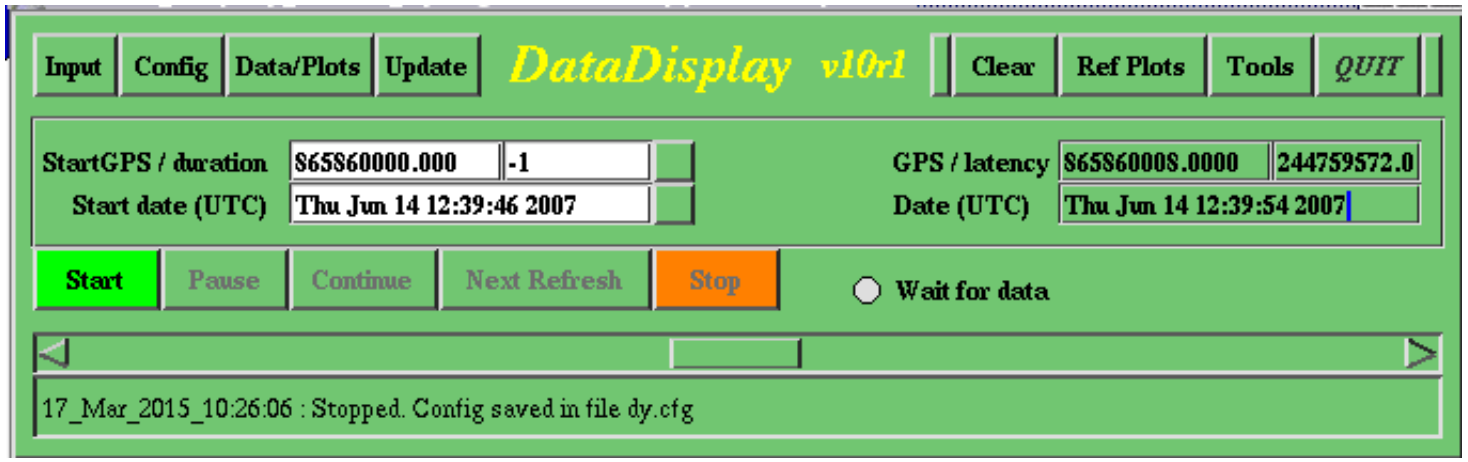
You can also visualize the bits of the data samples (see “Edit TIME plot” section)



Connect online
and
do FFT plots

First, type “dataDisplay”

A mainpanel window should appear



Click on “Inputs” and Choose “Connect online”

Read data online by connecting to one of the online data providers

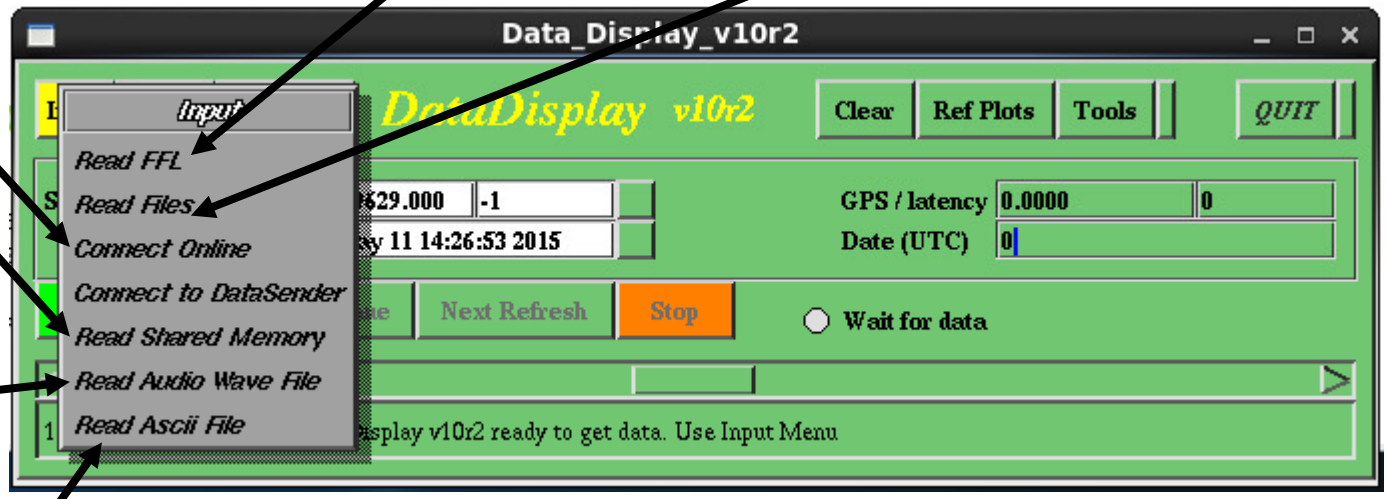
Read data from ffl files which points to frame formatted data files

Read data from frame formatted data files

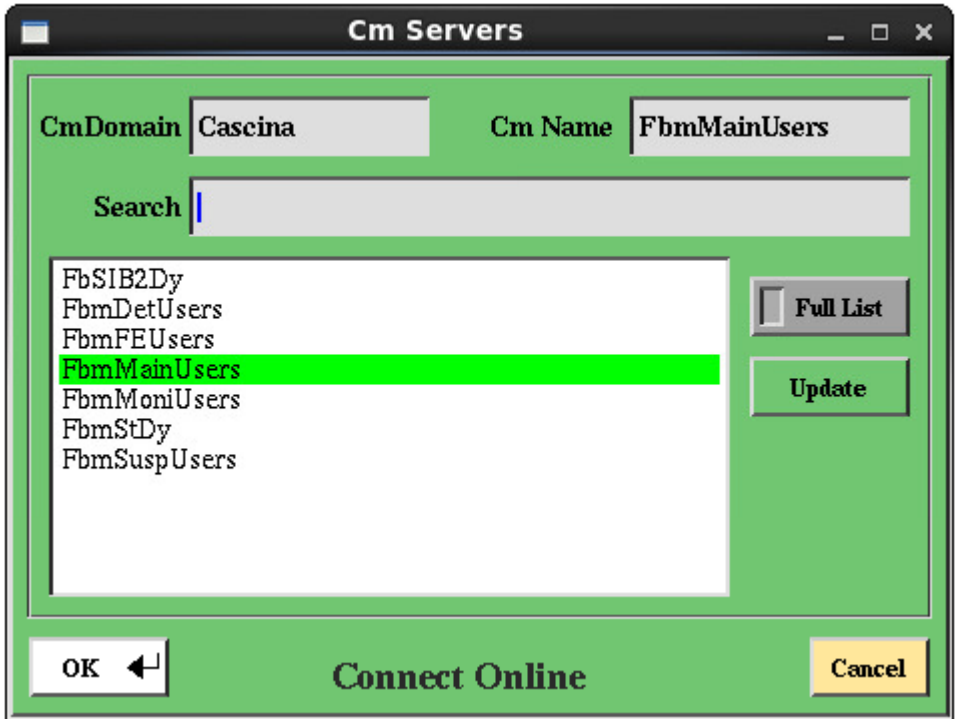
Read data online from a shared memory

Read data from an audio file (only one channel)

Read data from an ascii file properly formatted [time, sample value] (only one channel)



A list of data providers should appear
Choose one of them
Click on “OK” or press “Enter” on the keyboard



Next steps are the same as in the previous section
(just choose FFT instead of TIME plots in the mainbrowser)

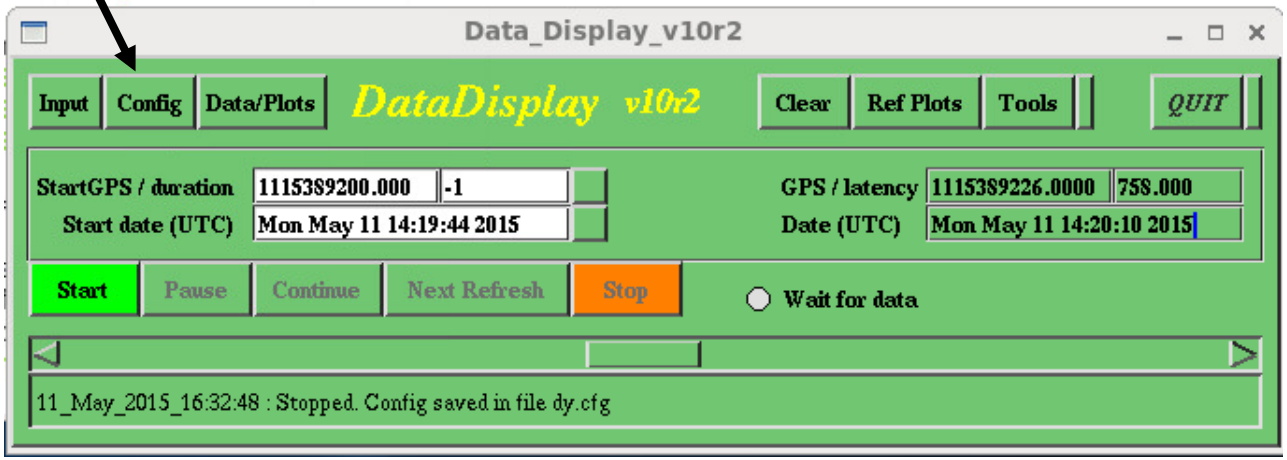
Configuration file

Each time you click “Start”, a configuration file is written on disk, containing all the parameters used by the dataDisplay.
Default name is “dy.cfg”

You can save and load configuration files.
You can also start the dataDisplay with a configuration file provided as first argument :
dataDisplay dy.cfg

```
DY_TIMING
 starttime 1115456700.000000  (Tue May 12 09:04:44 2015)
 duration  -1.000000

DY_OPTIONS
 debug            0
 debugtype        0
 noplot           0
 squareplot       0
 autodeselectplot 1
 autodeselectch   0
 colorpalette     0
 waitdata         0
 fullwhite         1
 linewidth         1
 output_tag       Qc_Moni*&Alp_Main*&Alp_Cali*&Pr_B1_ACp&h*

DY_INPUT
 chindex 0  FrameH_GTimeN
 inputtype 0
 inputname /virgoData/ffl/raw.ffl

DY_TAG " V1:Bs_IB_z "

DY_PADS
 ncol 0
 nrow 0

DY_PLOT 1 dy12
 type           7 TIME
 numpad         1
 superposed     0
 hidden         0
```

Menu to save or load configuration files



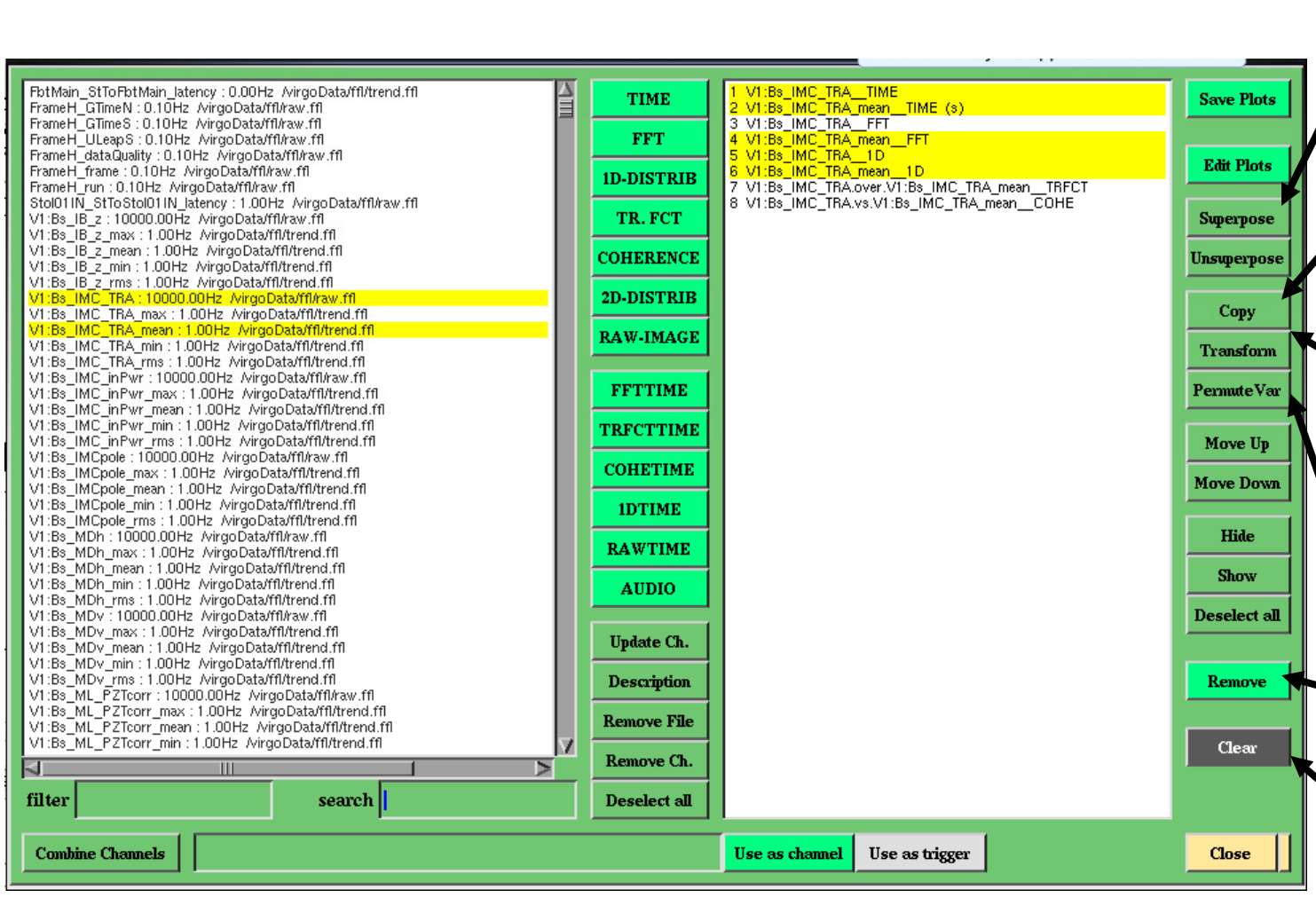
Mainbrowser features

Click on the mainpanel button “Data and Plots” to get the mainbrowser panel

The mainbrowser panel allows

- **to select channels**
- **to create plots for those channels**
- **to search for channels**
- **to combine channels to create new channels**
- **to manipulate plots or edit plot parameters**

A set of buttons allows to act on the plots without editing them



Superpose the plots selected

Create a copy of the plots selected

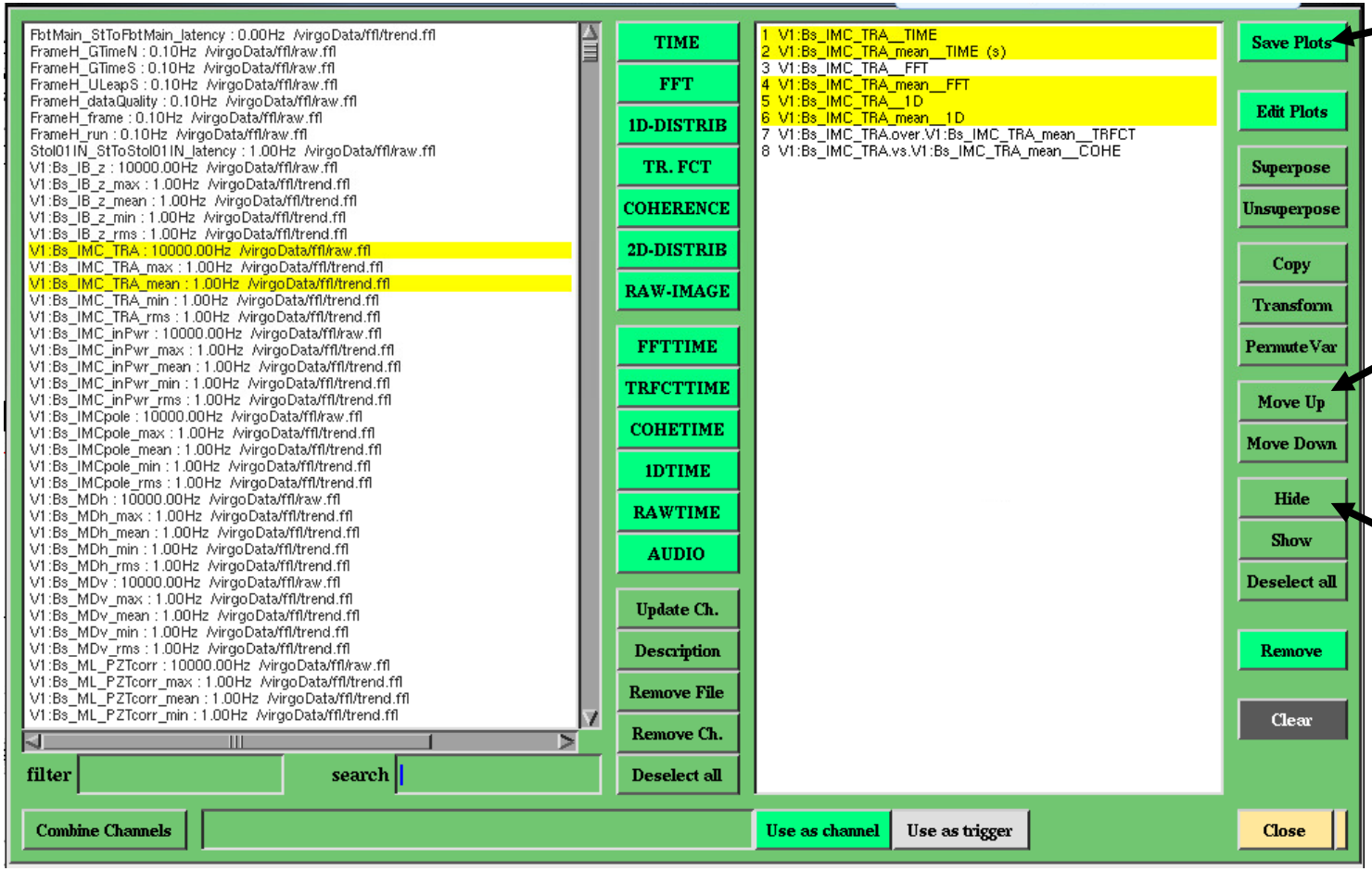
Transform the plots selected into an other type

Permute the channels of a TRFCT, COHE or 2D plot

Remove the selected plots

Remove all the plots

A set of buttons allows to act on the plots without editing them

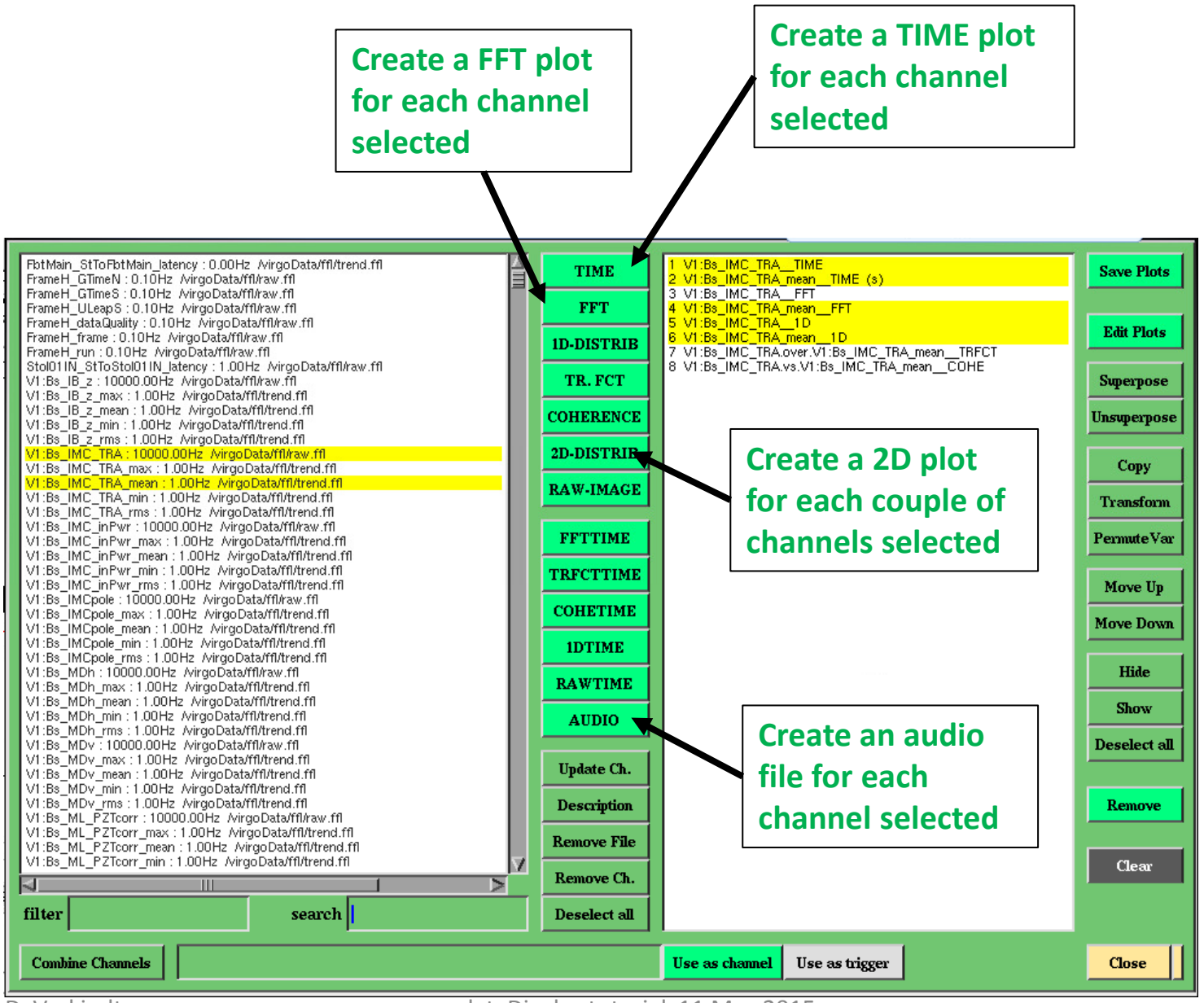


Save the plots in a ROOT file

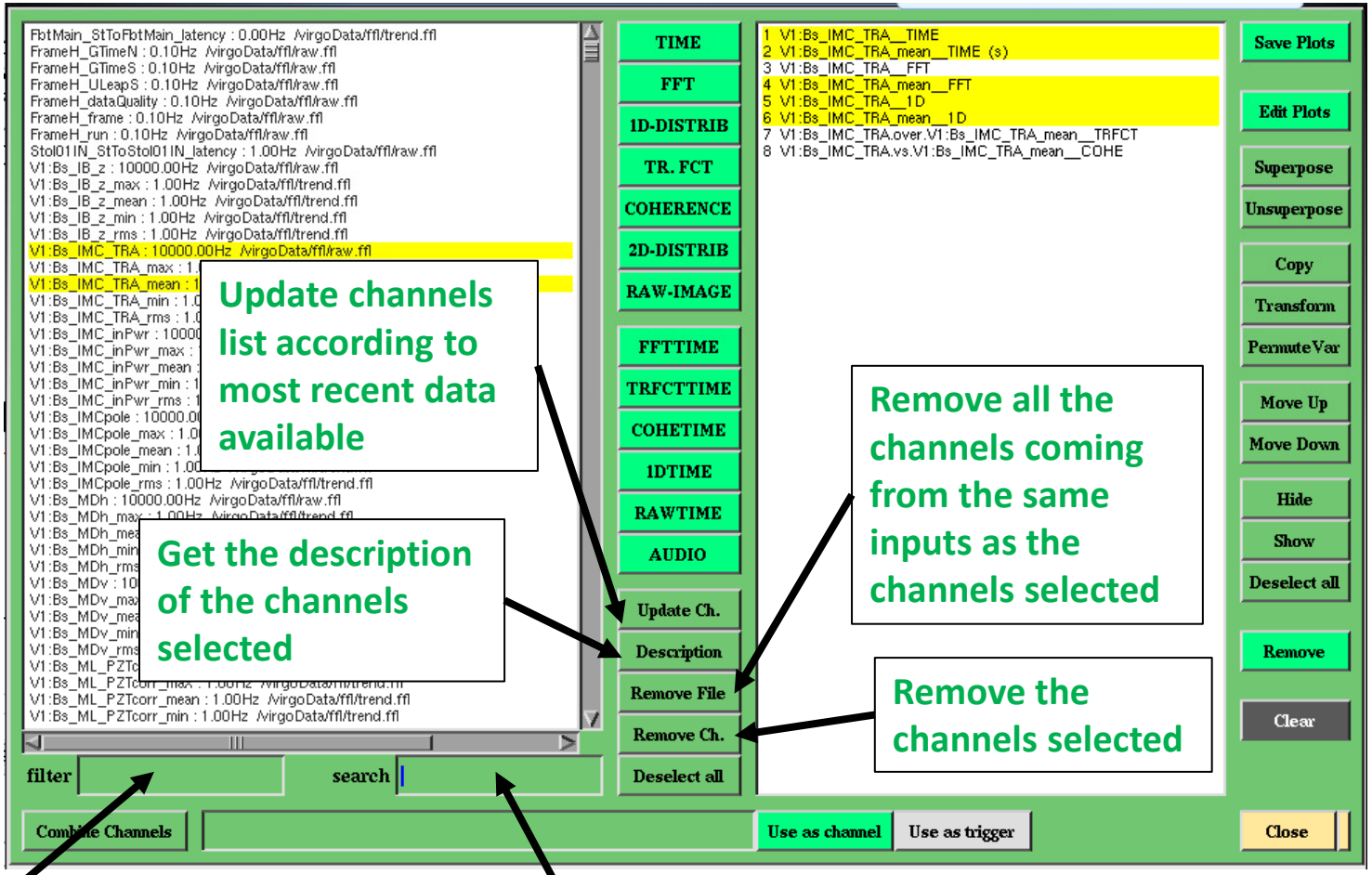
Move the selected plots up and down in the list

Do not show the selected plots

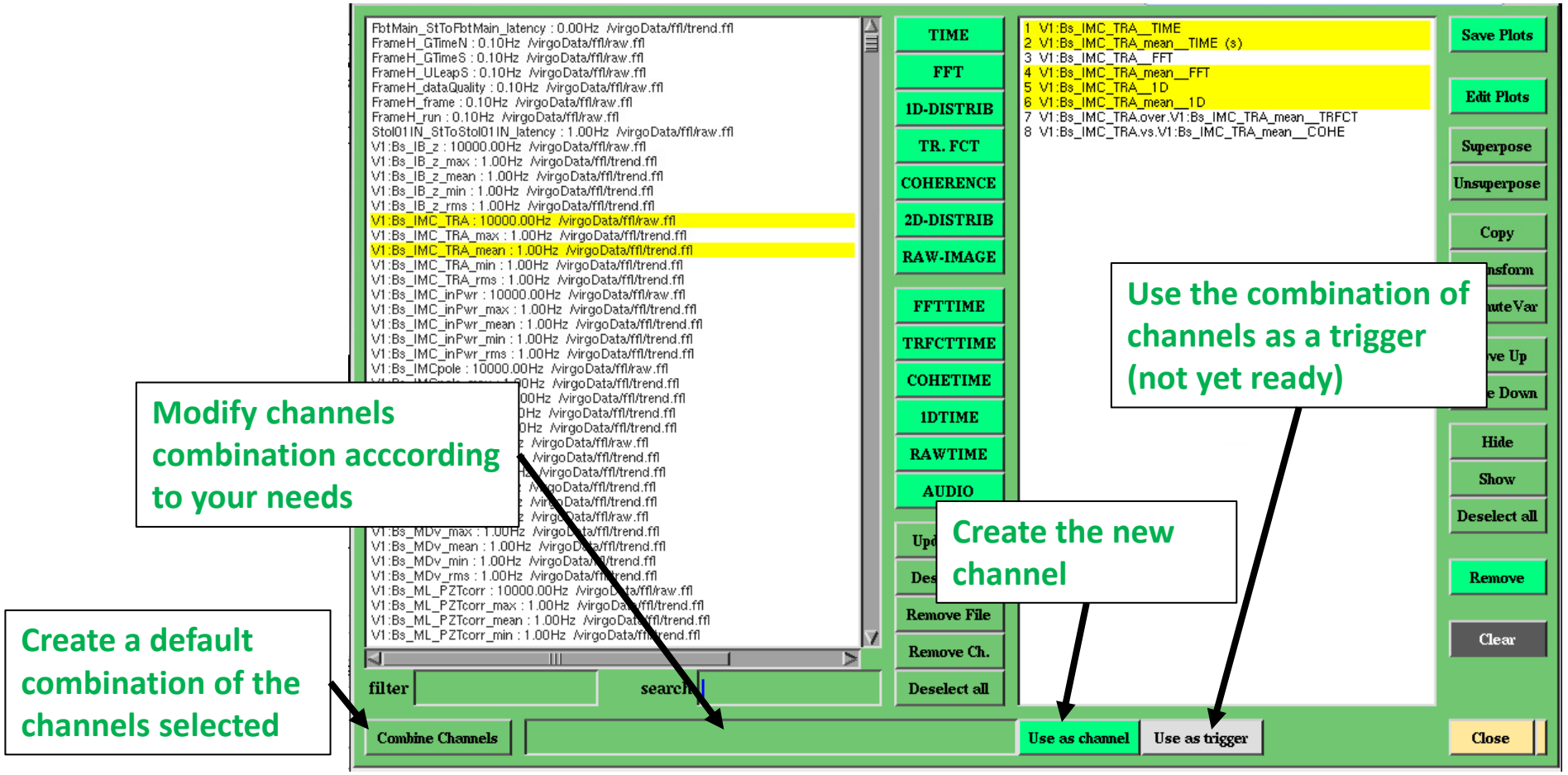
A set of buttons allows to create plots of different types



A set of buttons allows to manage channels list

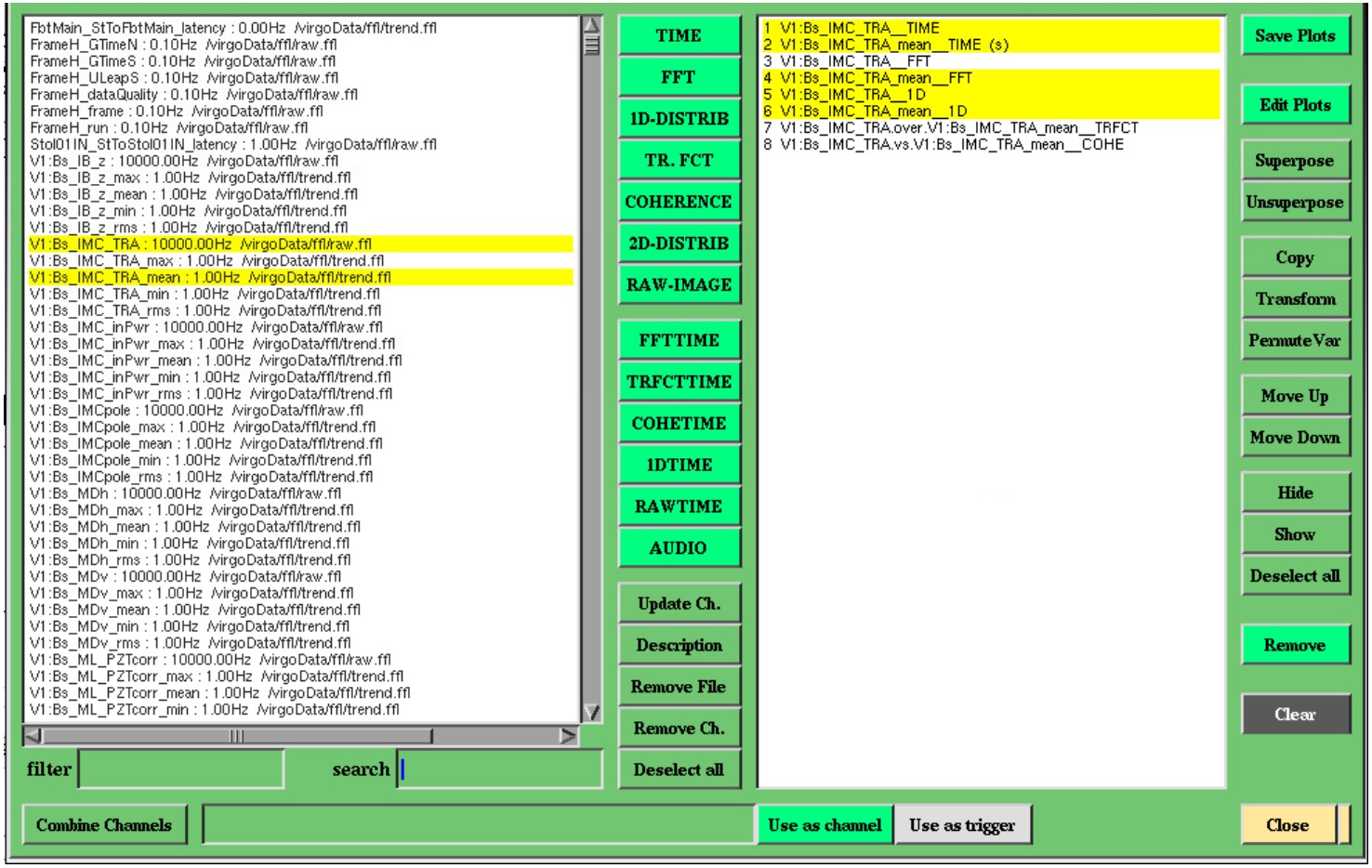


A set of buttons allows to create new channels, by using standard C operators on existing channels



Edit the plots parameters

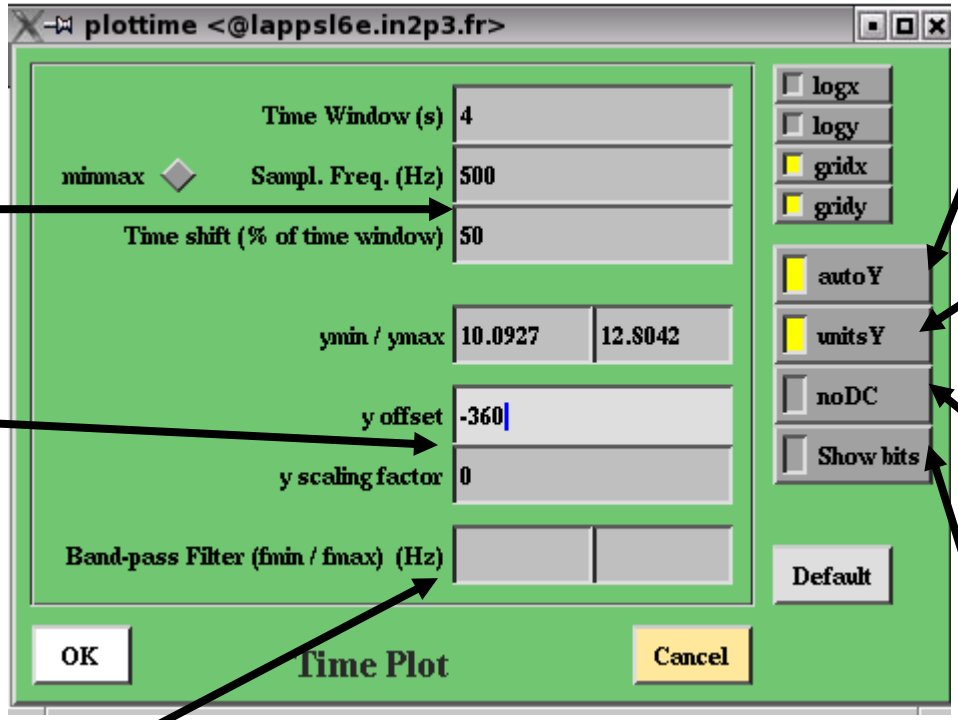
Select the plots you want to edit
Click on "Edit Plots" button
→ Only plots of the same type as the last one selected will be edited



Editing the parameters of TIME plot

Default values are:

- **Chosen to shown 2000 samplings of data**
- **Or identical to last already existing TIME plot**



Read data by bunches of x % of the time window size

Apply an offset and a scaling factor to the data

Apply a pass-band filter on the data

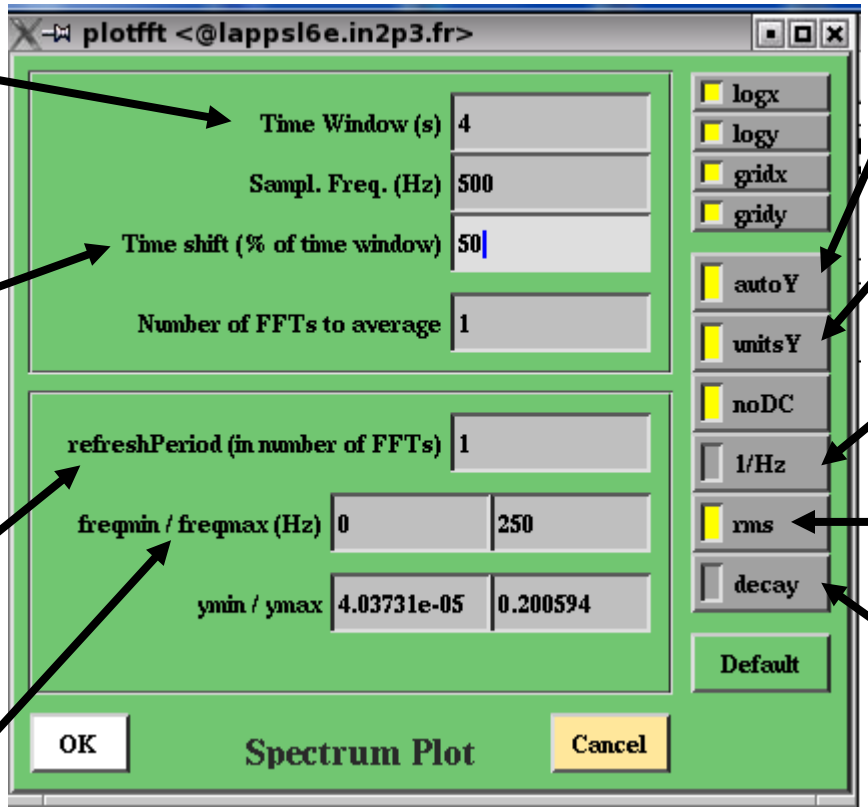
Auto scale the Y axis instead of using the ymin and ymax values

Calibrate data values on Y axis

Remove DC component

Show data values on Y axis as bits ON and OFF

Editing the parameters of FFT plot



Compute FFT on this time window

Between two FFT computations, increment data reading by x % of the time window size

Refresh the plot only every N FFT computations

Show only spectrum between fmin and fmax

Auto scale the Y axis instead of using the ymin and ymax values

Calibrate data values on Y axis

Use 1/Hz instead of 1/sqrt(Hz) units

Add a curve showing the rms vs frequency

Use a moving average of FFTs

Editing the parameters of COHERENCE plot

Compute FFT on this time window

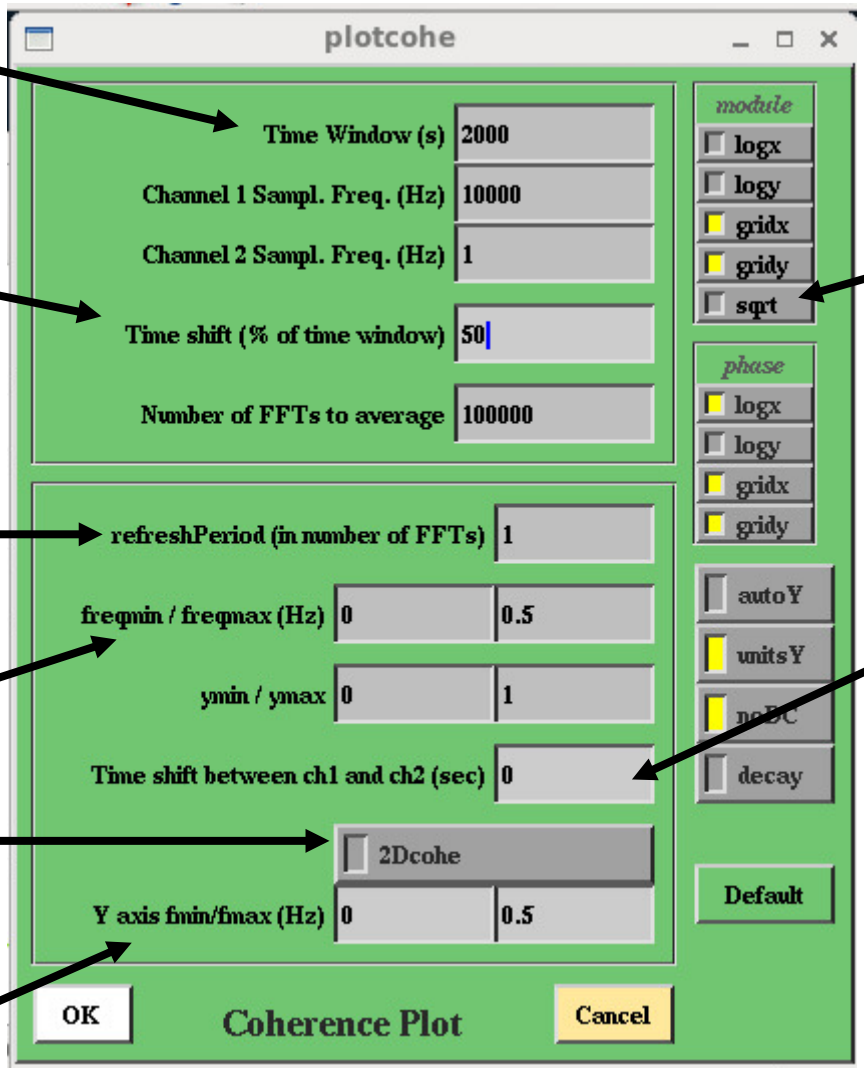
Between two FFT computations, increment data reading by x % of the time window size

Refresh the plot only every N FFT computations

Show only spectrum between fmin and fmax

Show a bicoherence plot (2D plot)

Show Y axis only between fmin and fmax in case of a bicoherence plot



Use square root of coherence module

Set a time shift between channel 1 and channel 2

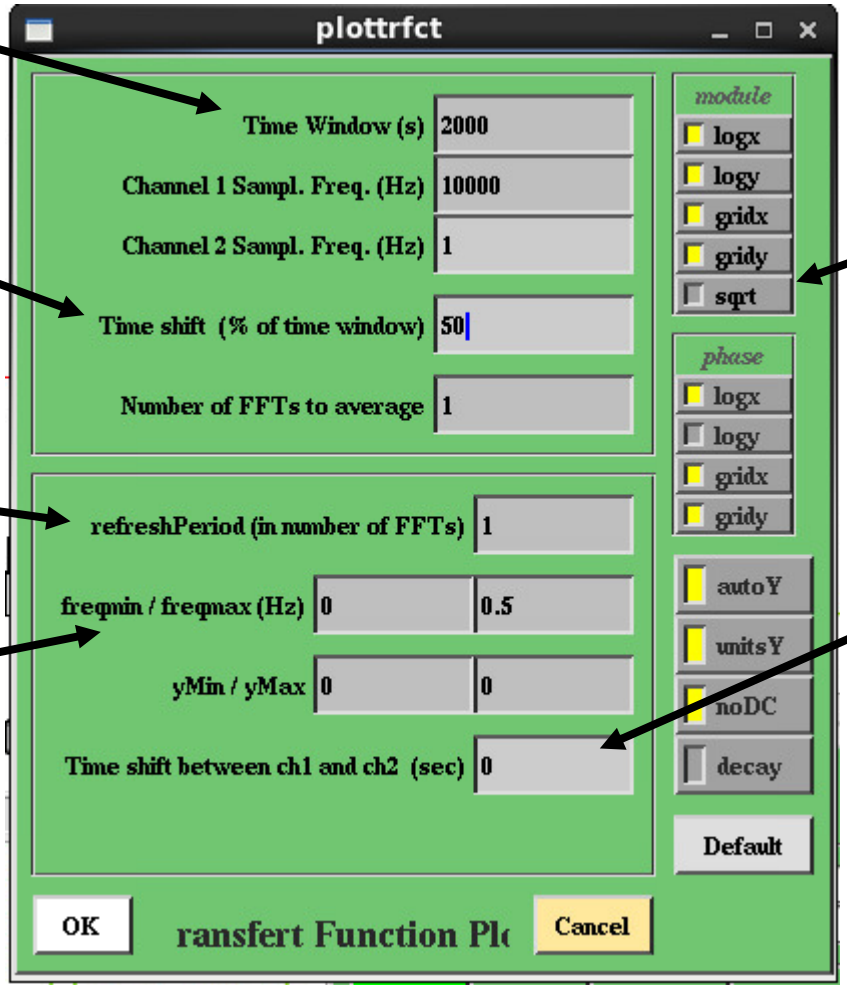
Editing the parameters of TRFCT plot

Compute FFT on this time window

Between two FFT computations, increment data reading by x % of the time window size

Refresh the plot only every N FFT computations

Show only spectrum between fmin and fmax



Use square root of transfert function module

Set a time shift between channel 1 and channel 2

Editing the parameters of FFTTIME plot

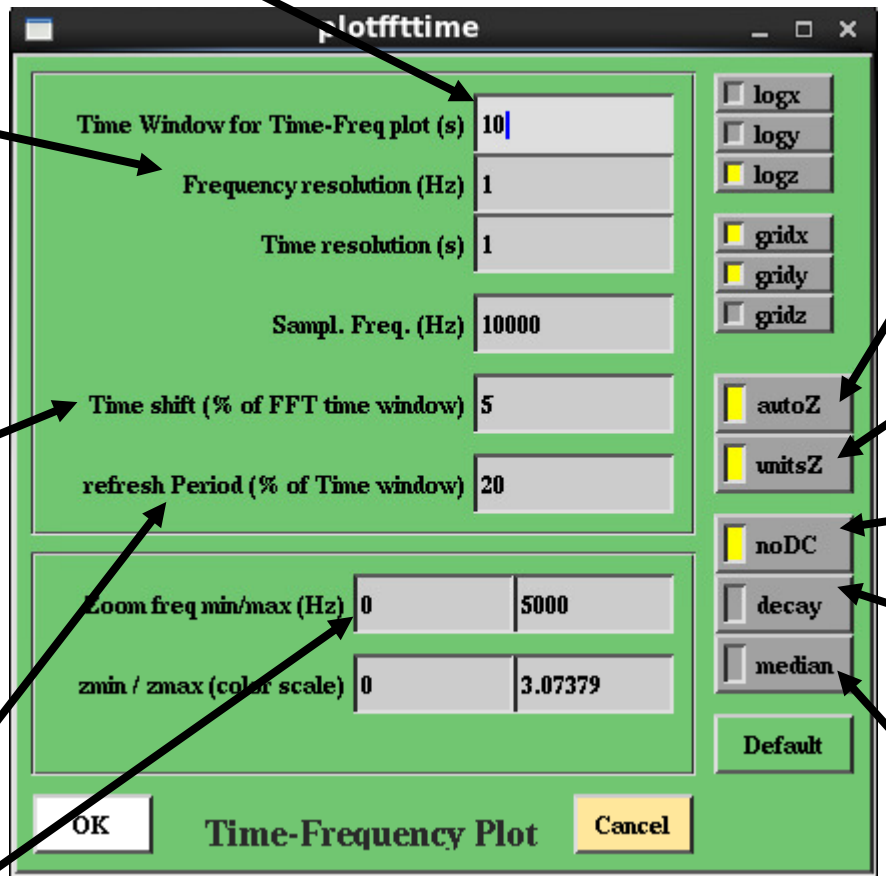
Time window over which spectrogram is shown

Frequency resolution of the spectrogram (determine the time window in which FFTs are done

Between two FFT computations, increment data reading by x % of the time window size

Refresh the plot only every N FFT computations

Show only spectrum between fmin and fmax



Auto scale the Z axis instead of using the zmin and zmax values

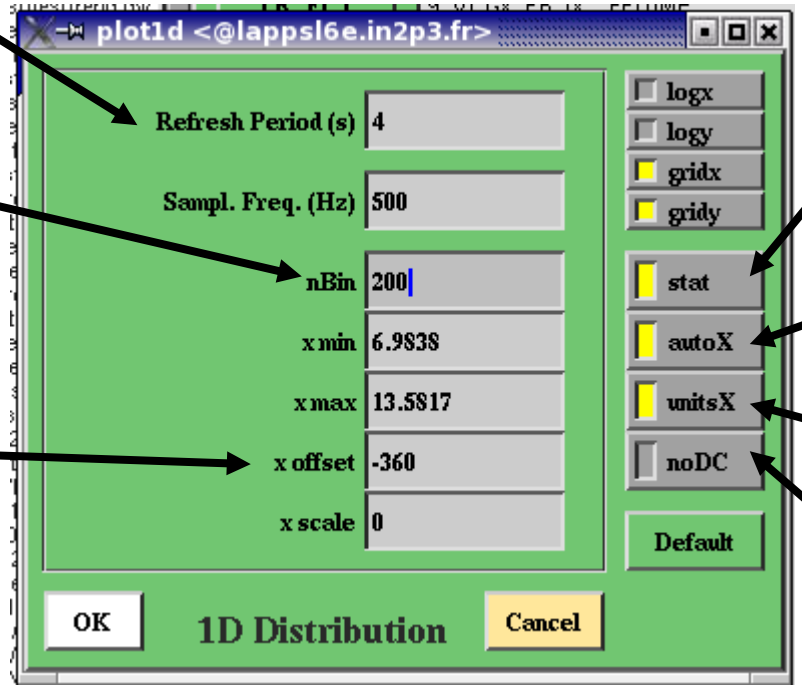
Calibrate data values on Z axis

Remove DC component

Use a moving average of FFTs

Normalize spectrogram with a median value

Editing the parameters of 1D plot



Read data by bunches of 4 seconds

Do the distribution plot over 200 bins

Apply an offset and a scaling factor to the data

Show statistics on the plot

Auto scale the X axis instead of using the xmin and xmax values

Calibrate data values on X axis

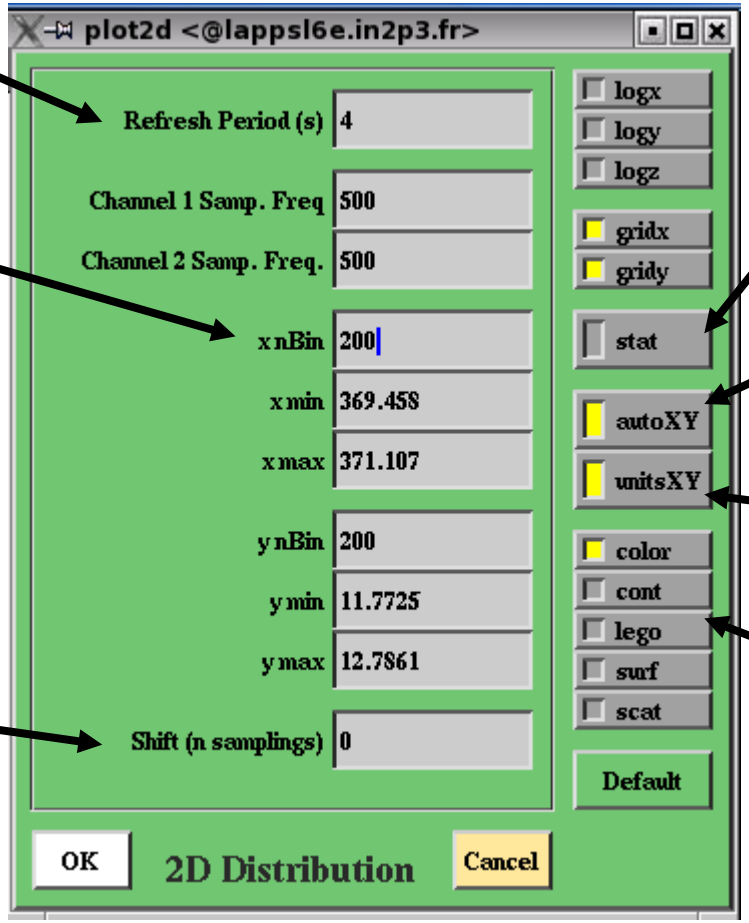
Remove DC component

Editing the parameters of 2D plot

Read data by bunches of 4 seconds

Do the distribution plot over 200 bins

Apply a shift of n samplings between channel1 and channel2



Show statistics on the plot

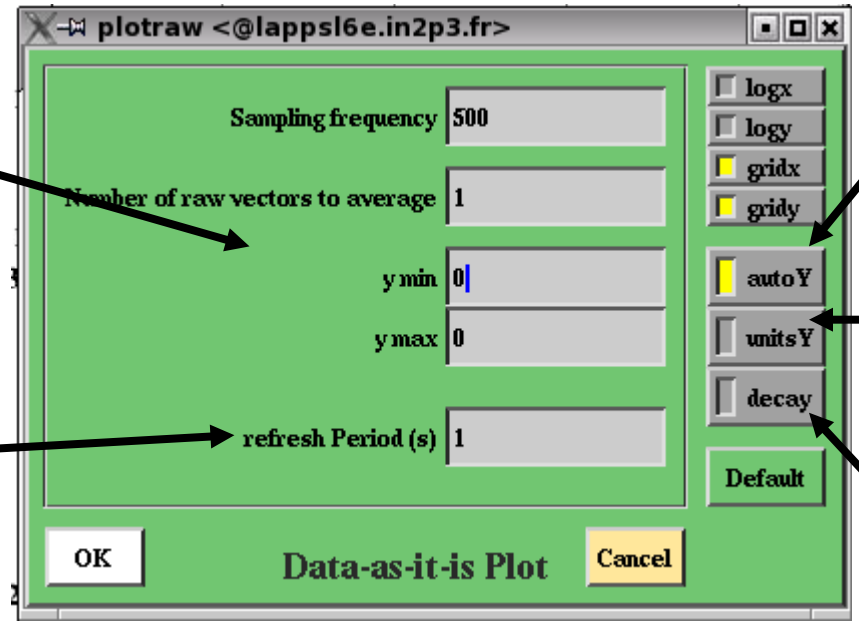
Auto scale the X and Y axis instead of using the xmin, xmax, ymin and ymax values

Calibrate data values on X and Y axis

Choose a display option of the 2D plot

Editing the parameters of RAW plot

In this case, data are read frame by frame and each raw vector of data read is shown as it is.



Do the distribution plot over 200 bins

Periodicity of plot's update

Auto scale the Y axis or on Z axis

Calibrate data values on Y axis (if 1 dim vector) or on Z axis (if 2 dim vector like camera images)

Use a moving average

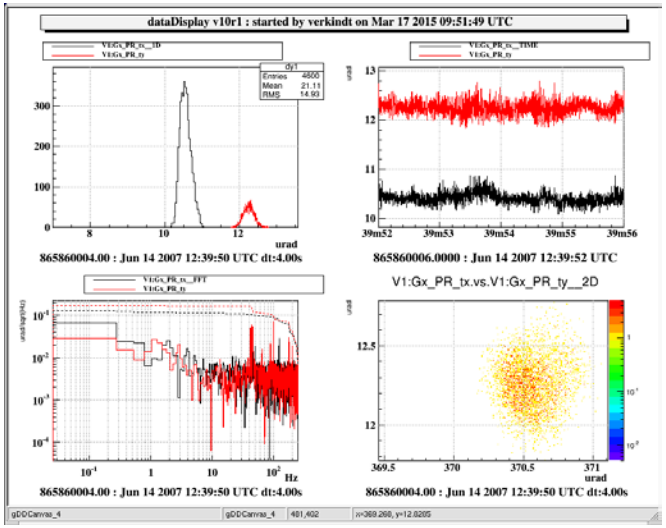
Editing the parameters of AUDIO plot

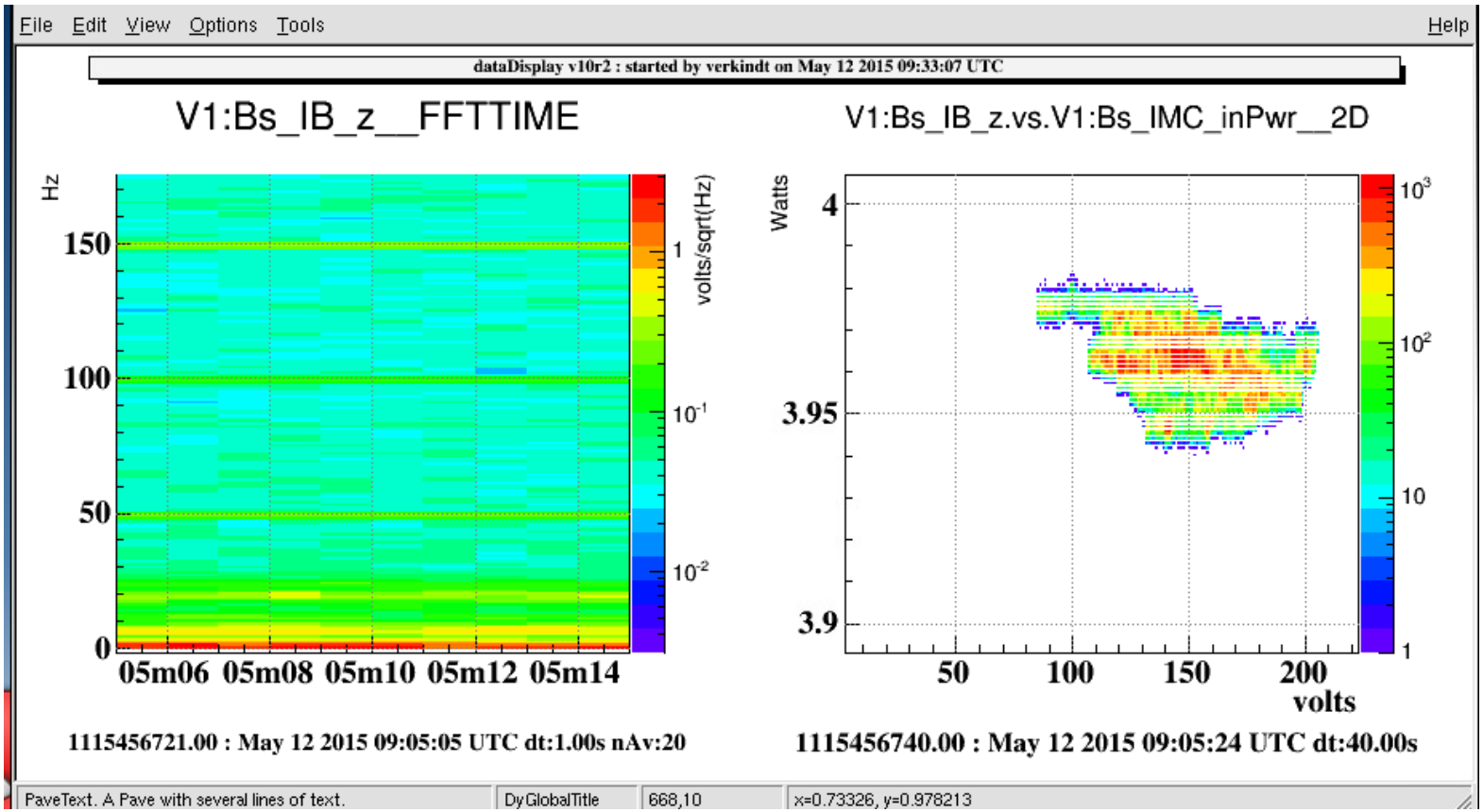
Record 10 seconds of data in an audio file

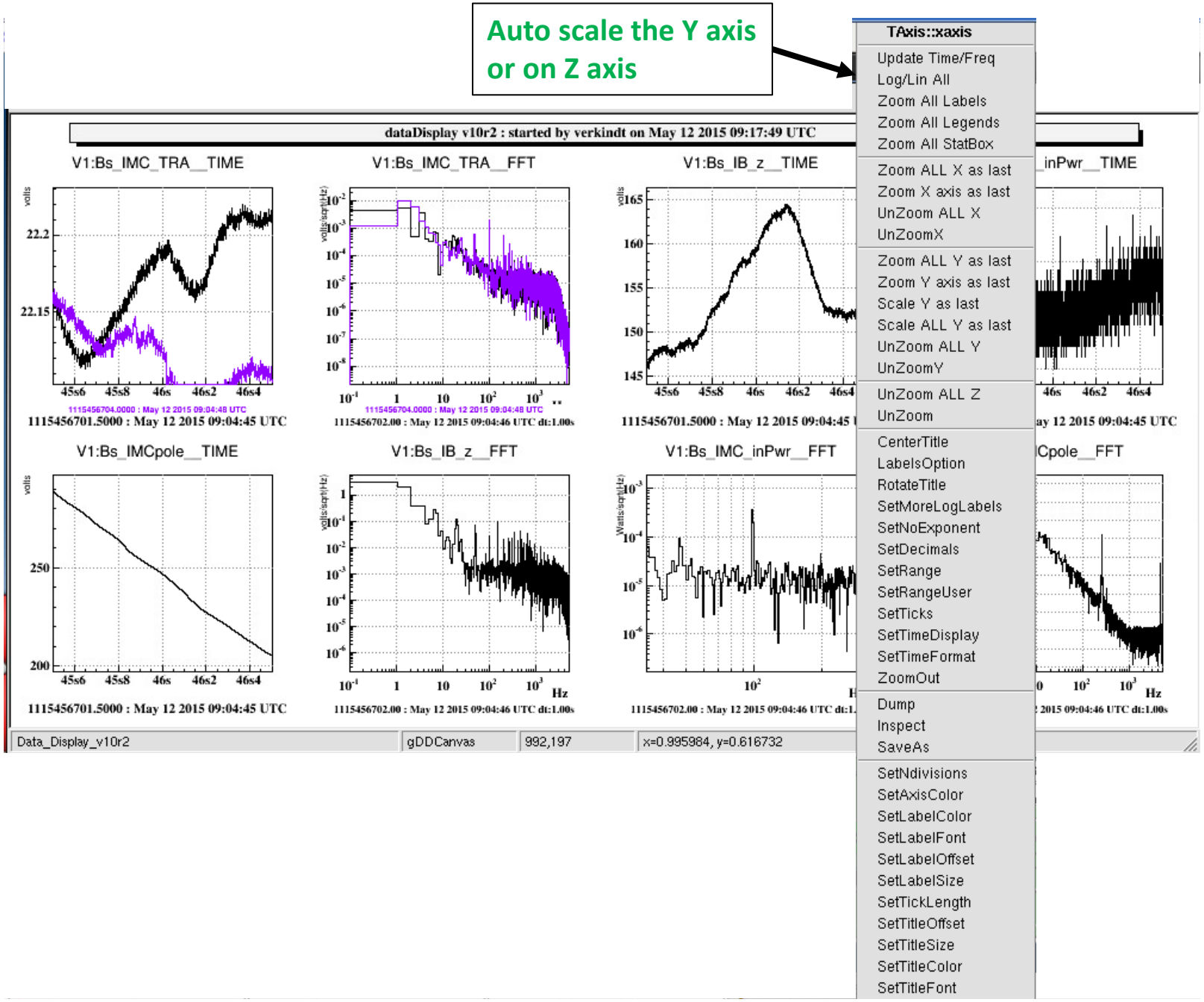
Record samples over 16 bits instead of 8 bits

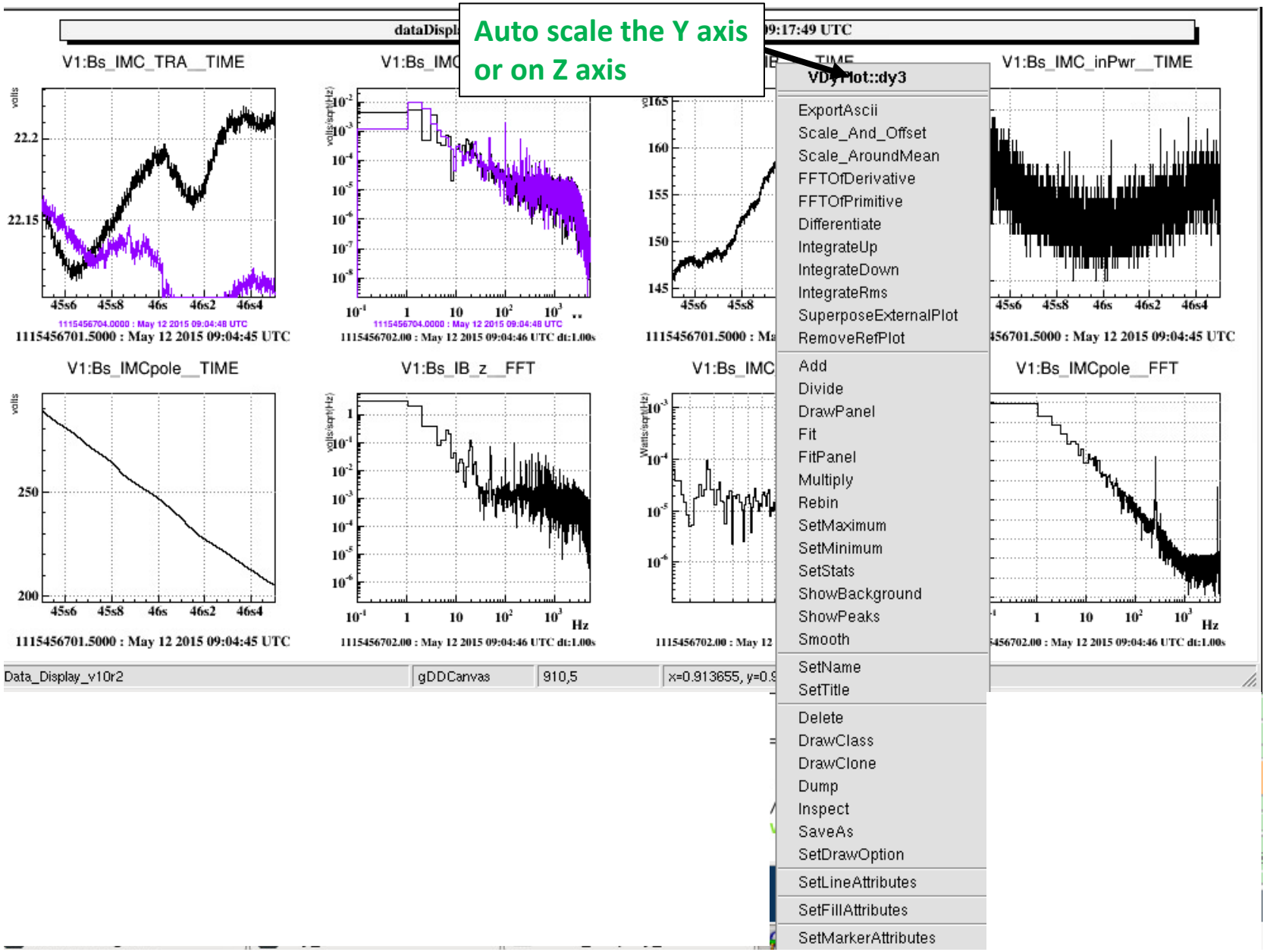
Provide sound online in addition to recording it on file

Use of ROOT and dataDisplay features dedicated to plots



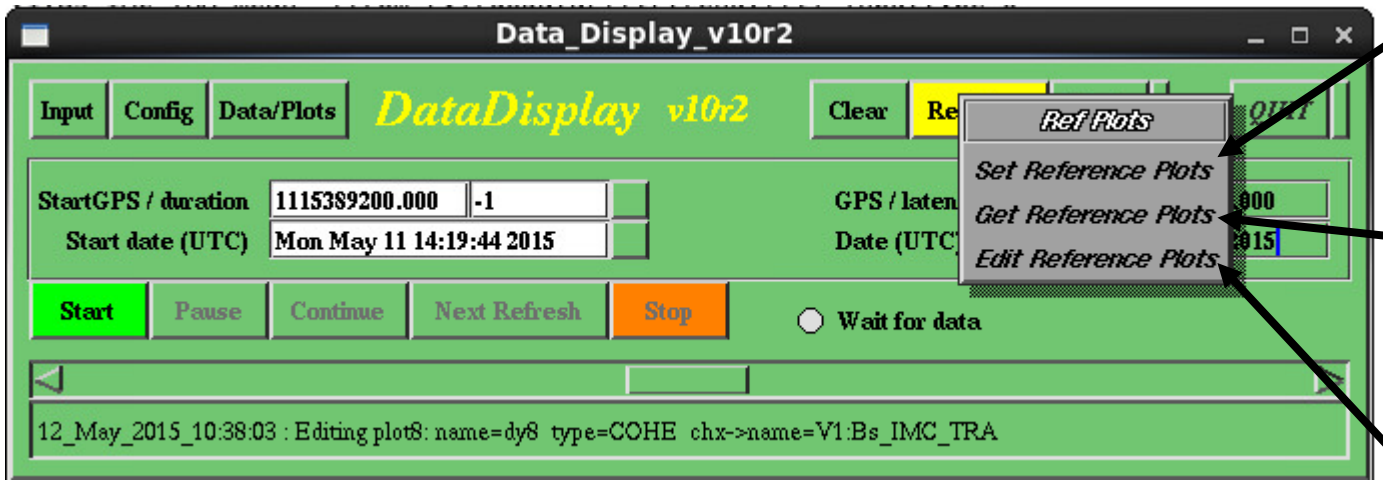

File Edit View Options Tools
Help
dataDisplay v10r2 : started by verkindt on May 12 2015 09:33:07 UTC
V1:Bs_IB_z__FFTTIME
V1:Bs_IB_z.vs.V1:Bs_IMC_inPwr__2D
Hz
150
100
50
0
05m06 05m08 05m10 05m12 05m14
volts/sqrt(Hz)
1
10^{-1}
10^{-2}
Watts
4
3.95
3.9
50 100 150 200
volts
10^{3}
10^{2}
10
1
1115456721.00 : May 12 2015 09:05:05 UTC dt:1.00s nAv:20
1115456740.00 : May 12 2015 09:05:24 UTC dt:40.00s
PaveText. A Pave with several lines of text.
DyGlobalTitle
668,10
x=0.73326, y=0.978213


Auto scale the Y axis or on Z axis
TAxis::xaxis
Update Time/Freq
Log/Lin All
Zoom All Labels
Zoom All Legends
Zoom All StatBox
Zoom ALL X as last
Zoom X axis as last
UnZoom ALL X
UnZoomX
Zoom ALL Y as last
Zoom Y axis as last
Scale Y as last
Scale ALL Y as last
UnZoom ALL Y
UnZoomY
UnZoom ALL Z
UnZoom
CenterTitle
LabelsOption
RotateTitle
SetMoreLogLabels
SetNoExponent
SetDecimals
SetRange
SetRangeUser
SetTicks
SetTimeDisplay
SetTimeFormat
ZoomOut
Dump
Inspect
SaveAs
SetNdivisions
SetAxisColor
SetLabelColor
SetLabelFont
SetLabelOffset
SetLabelSize
SetTickLength
SetTitleOffset
SetTitleSize
SetTitleColor
SetTitleFont
dataDisplay v10r2 : started by verkindt on May 12 2015 09:17:49 UTC
V1:Bs_IMC_TRA__TIME
V1:Bs_IMC_TRA__FFT
V1:Bs_IB_z__TIME
V1:Bs_IMCpole__TIME
V1:Bs_IB_z__FFT
V1:Bs_IMC_inPwr__FFT
Data_Display_v10r2
gDDCanvas
992,197
x=0.995984, y=0.616732


Auto scale the Y axis
or on Z axis
V1:Bs_IMC_TRA__TIME
V1:Bs_IMC_inPwr__TIME
V1:Bs_IMCpole__TIME
V1:Bs_IB_z__FFT
V1:Bs_IMCpole__FFT
ExportAscii
Scale_And_Offset
Scale_AroundMean
FFTOfDerivative
FFTOfPrimitive
Differentiate
IntegrateUp
IntegrateDown
IntegrateRms
SuperposeExternalPlot
RemoveRefPlot
Add
Divide
DrawPanel
Fit
FitPanel
Multiply
Rebin
SetMaximum
SetMinimum
SetStats
ShowBackground
ShowPeaks
Smooth
SetName
SetTitle
Delete
DrawClass
DrawClone
Dump
Inspect
SaveAs
SetDrawOption
SetLineAttributes
SetFillAttributes
SetMarkerAttributes
Data_Display_v10r2
gDDCanvas

Use of reference plots

A menu “Reference plots” allows you to create a set of reference plots, to load a set of reference plots and to manage to reference plots files loaded

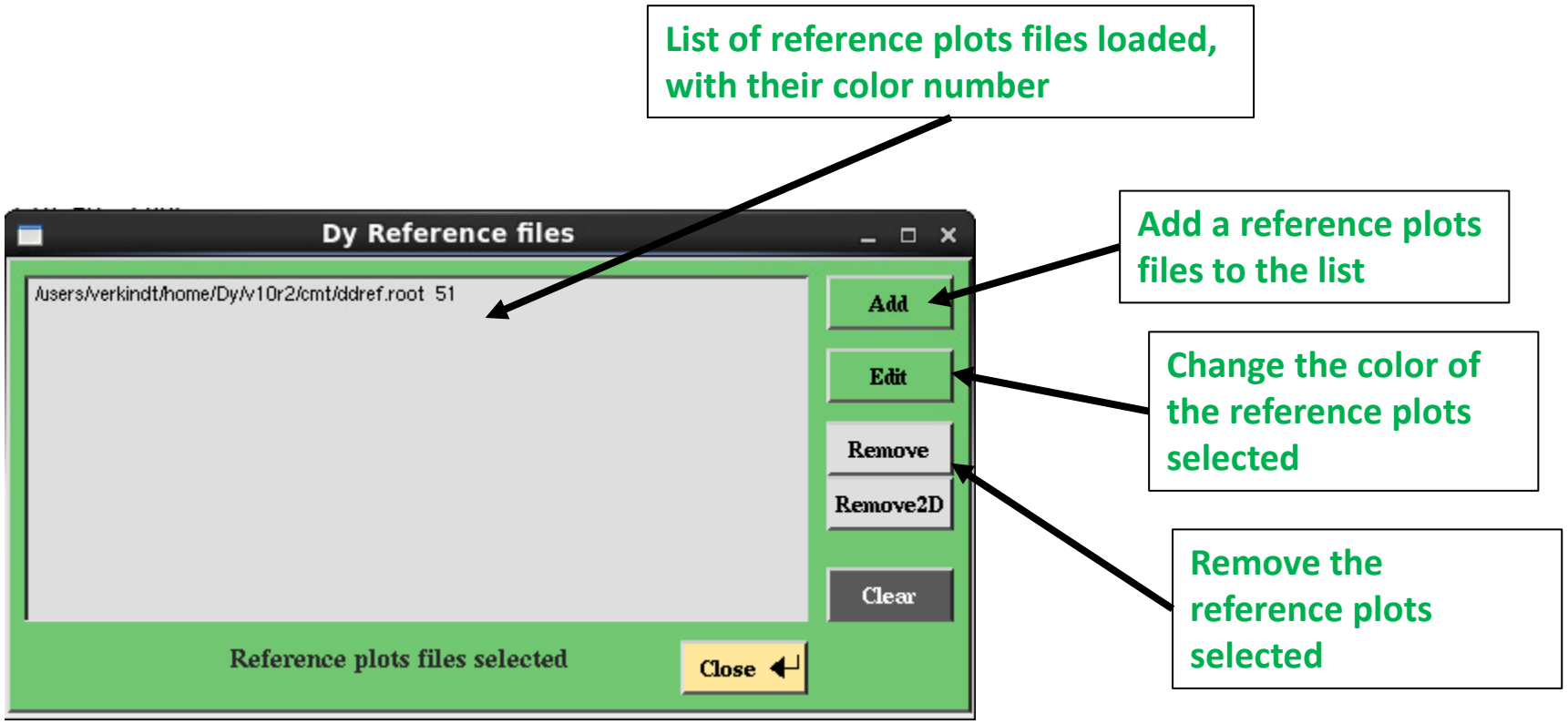


Save in a ROOT file the current plots

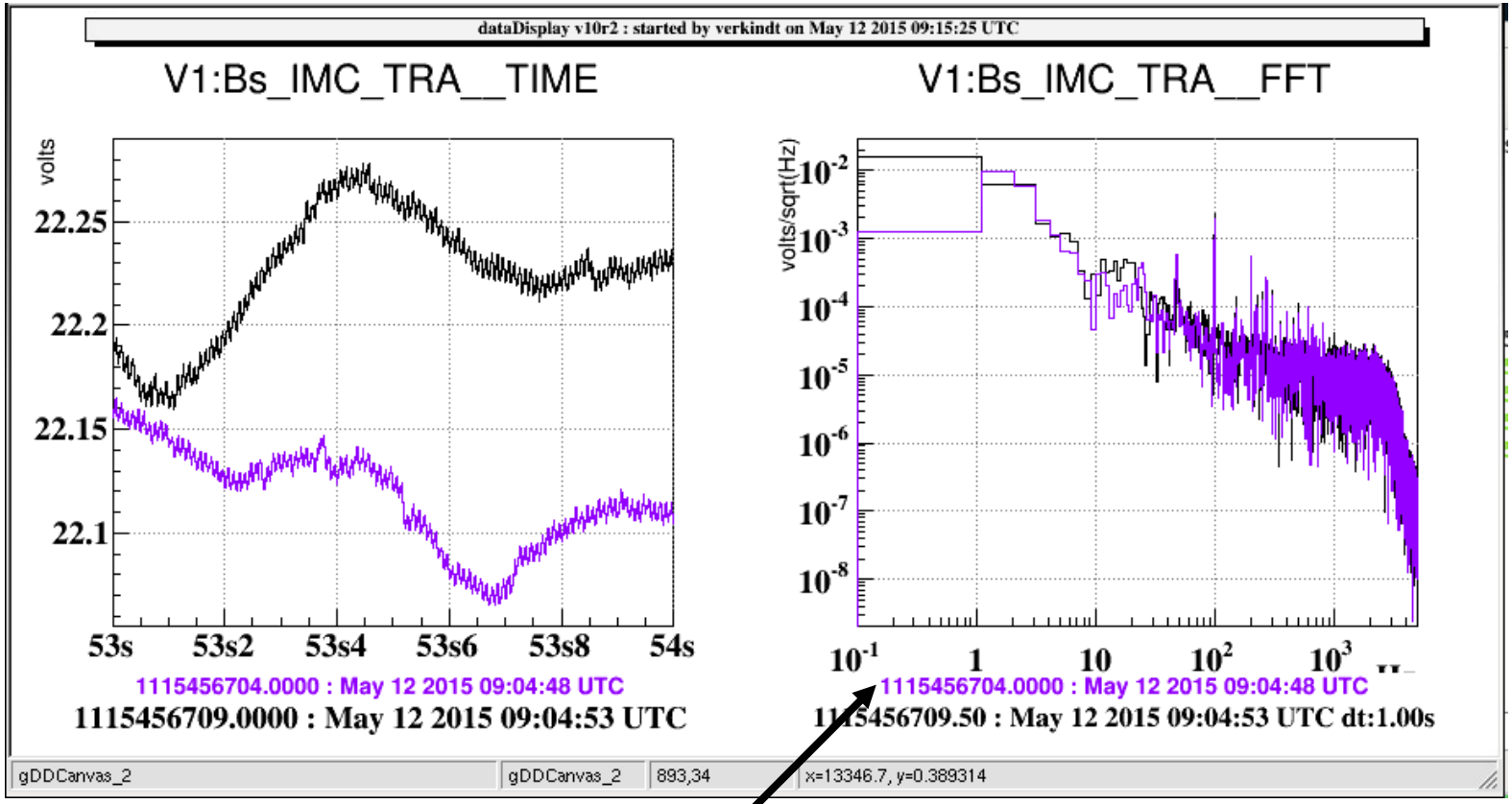
Read from a ROOT file the reference plots to be superposed to the current ones

Add, remove, change color of the reference plots

When choosing “Edit Reference Plots”, the panel below should appear



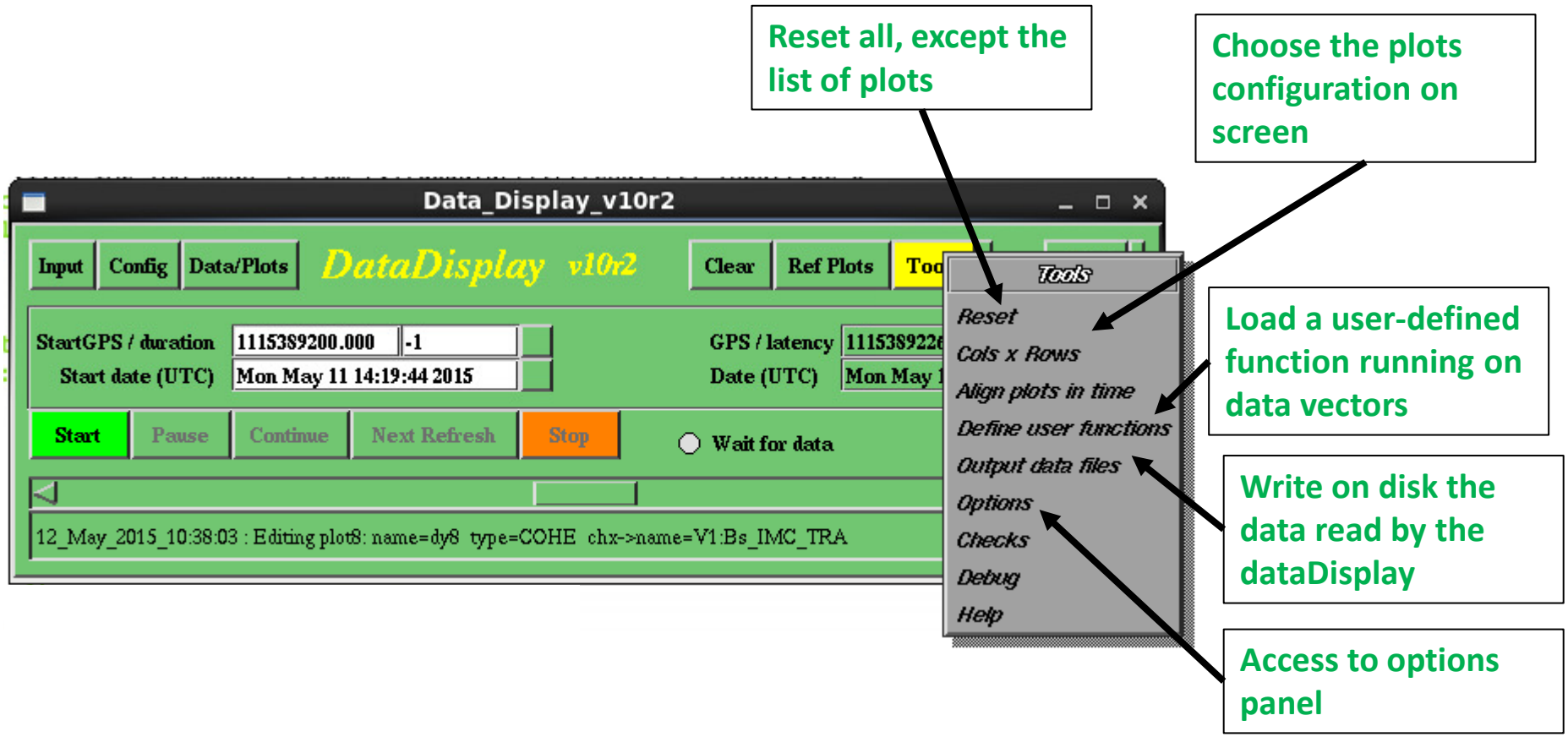
Once you "Get a Reference Plot", the reference plots contained in the ROOT file you choose should appear, superposed to the current plots
When clicking on "Start", the reference plots continue to be shown superposed to the current ones.



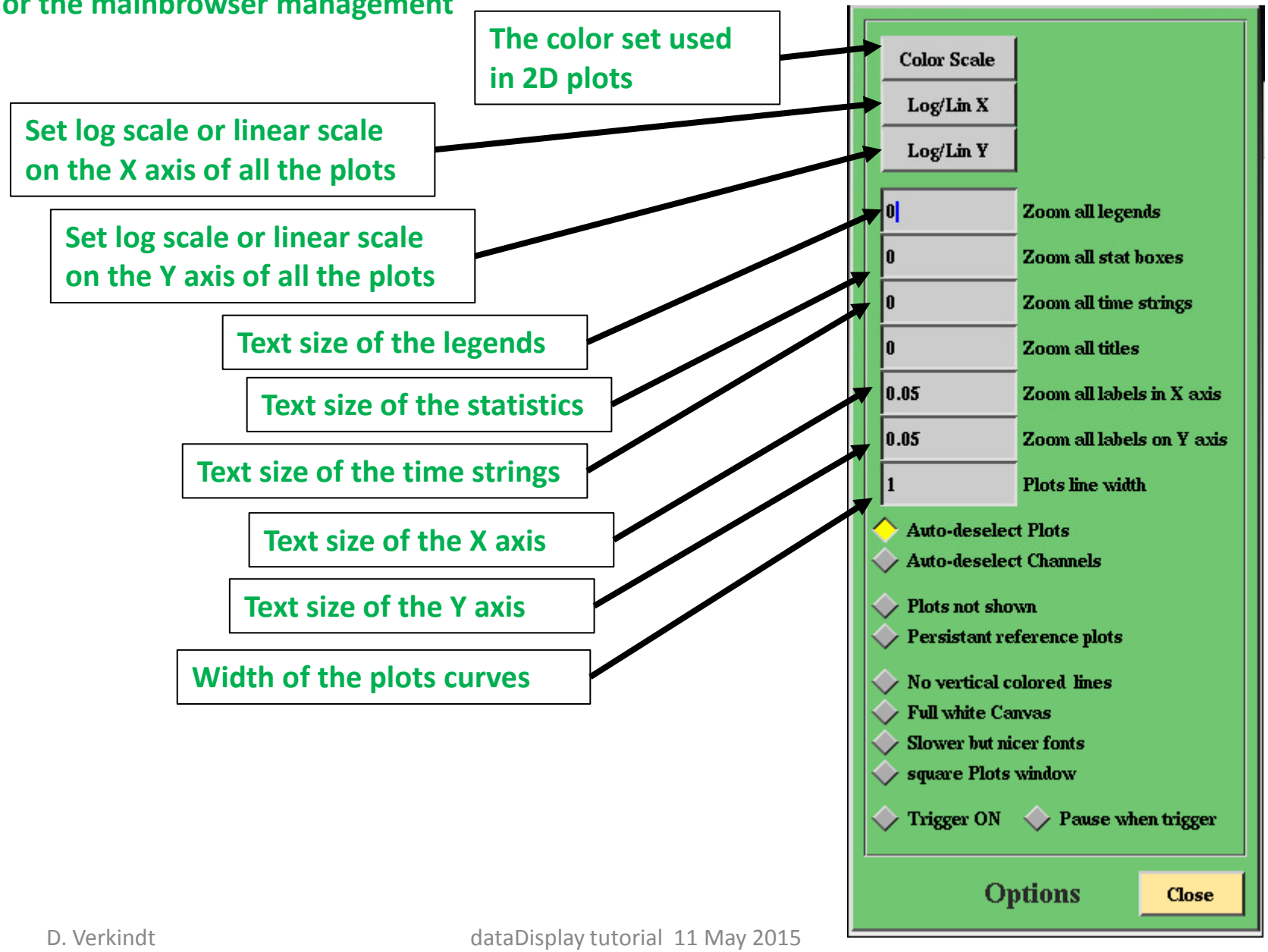
Time origin of the reference plot

Tools and Options

The menu “Tools” provide access to various additional tools and options



The "Options" panel provides various options about the plots display or the mainbrowser management



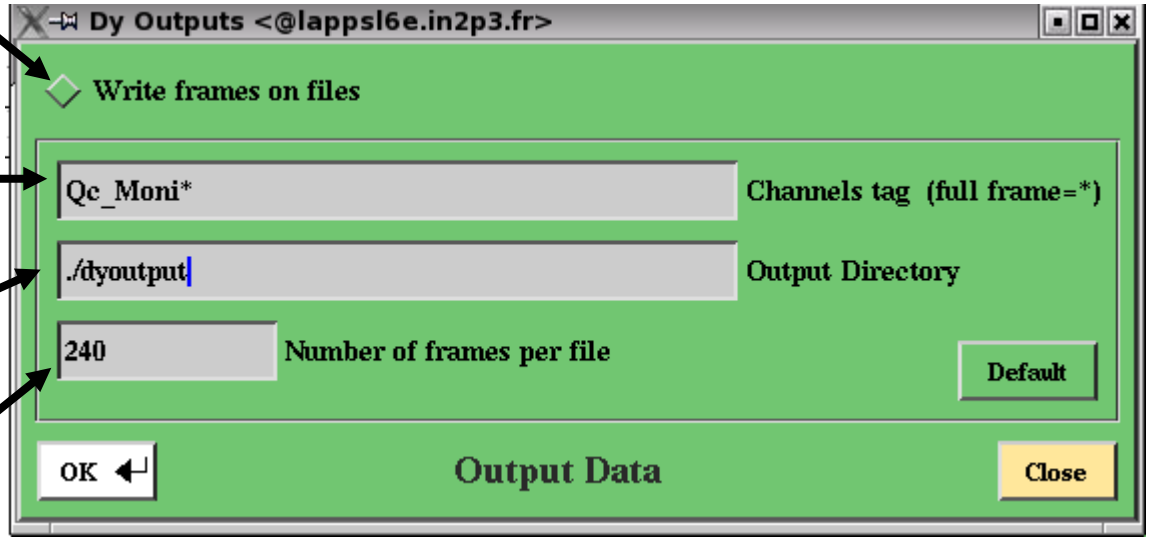
When choosing "Output data files" in the "Tools" menu, you should get the panel below, which allows to define the content and the caracteristics of the data files (frame format) written on disk.

Put this button ON if you want to write on disk the data read by the dataDisplay

List of channels to be written on disk

Directory where data files will be written

Number of frames per file



The menu “Tools” contains an item called “Help”.

It provides access to an Help panel
with a button to active Help balloons.

If you need more help, send an email to
verkindt@lapp.in2p3.fr
describing the problem and
telling where can be find the configuration file dy.cfg
that you used