

Lofar Status Meeting

Toolkit for LOFAR dynamic spectra



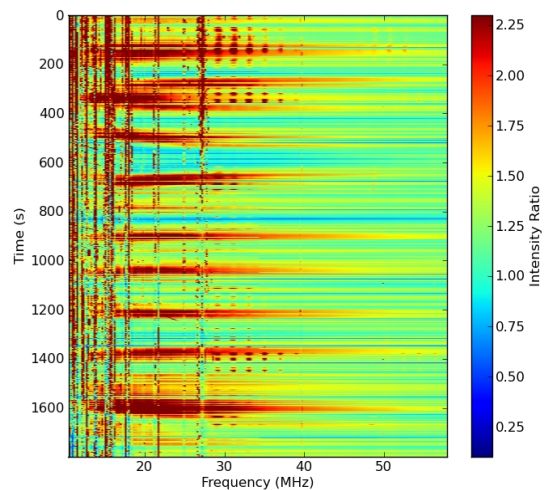
Why dynamic spectra ?

Science Context :

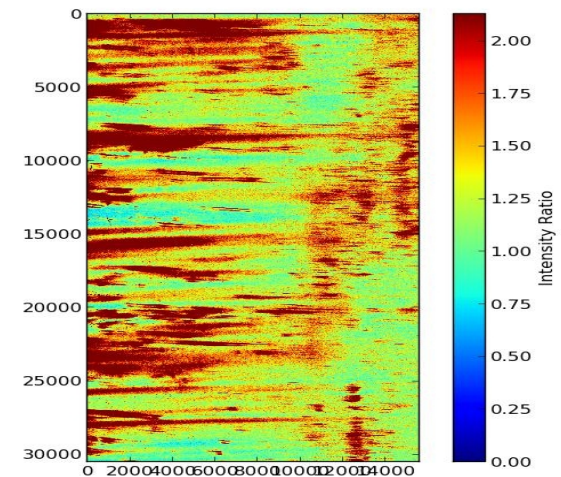
Studying quick transient phenomenon (~hours) :

- Solar Flares
- Flare stars
- Terrestrial lightning and sprites
- Pulsars
- Interplanetary scintillation
- Planets (Io-Jupiter)
- RFI surveys
- Etc

Cas A

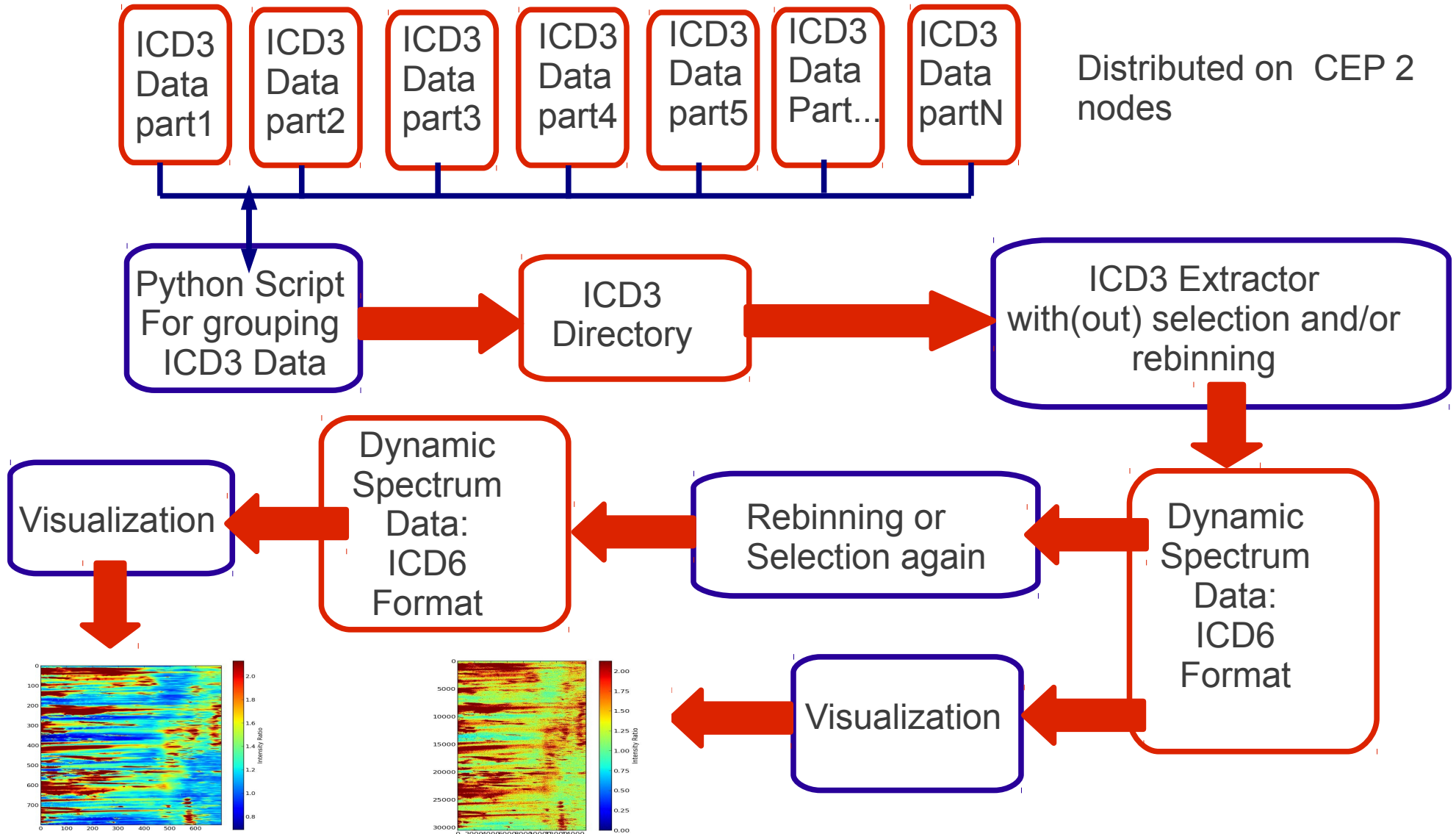


Sun

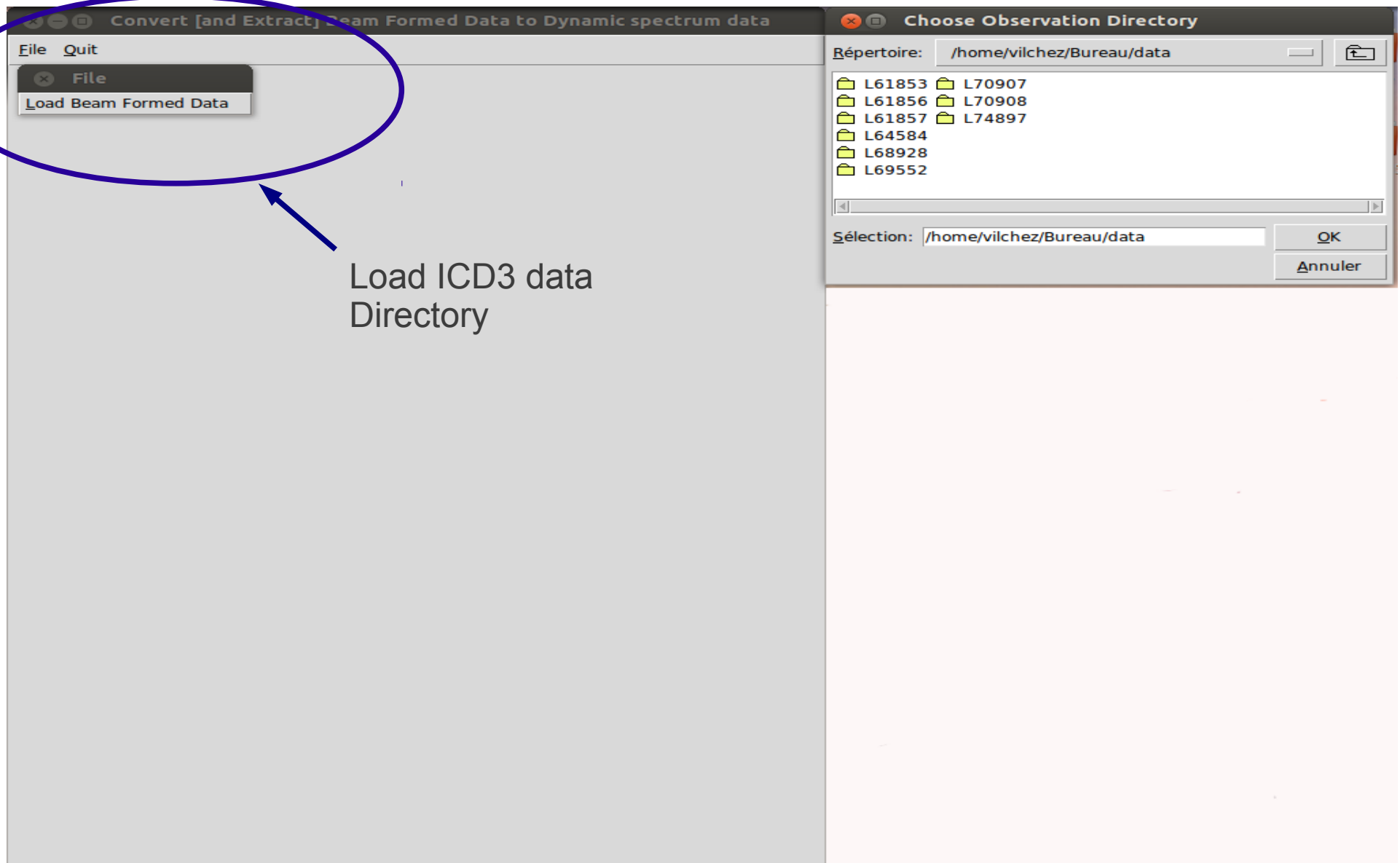


Dynamic spectrum toolkit

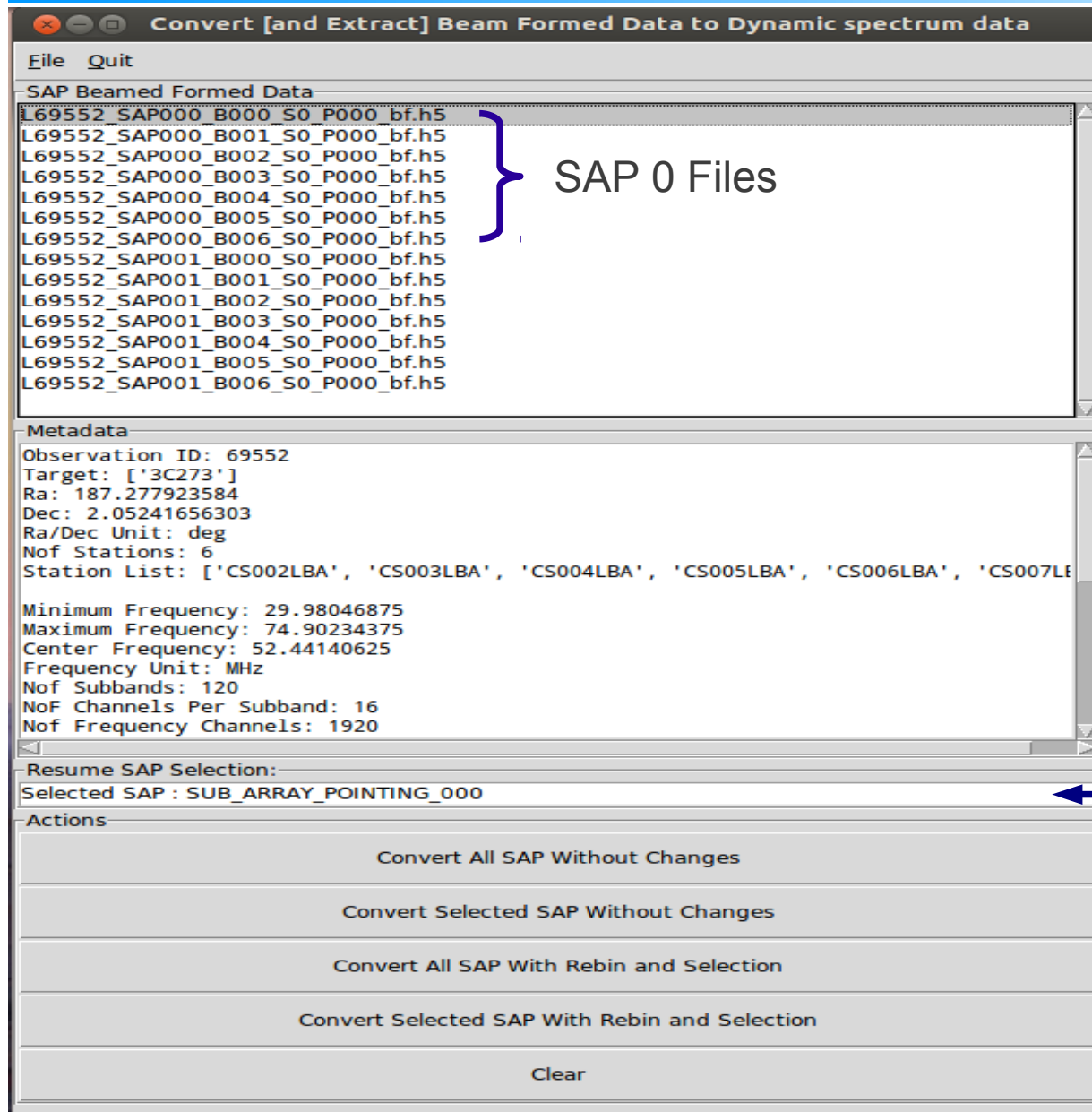
Definition of the toolkit « dynamic spectrum v1.0 »



Dynamic spectrum Extraction(1/2)



Dynamic spectrum Extraction(2/3)



ICD3 Data

ICD3
MetaData

Selected SubArrayPointing

4 choices for processing

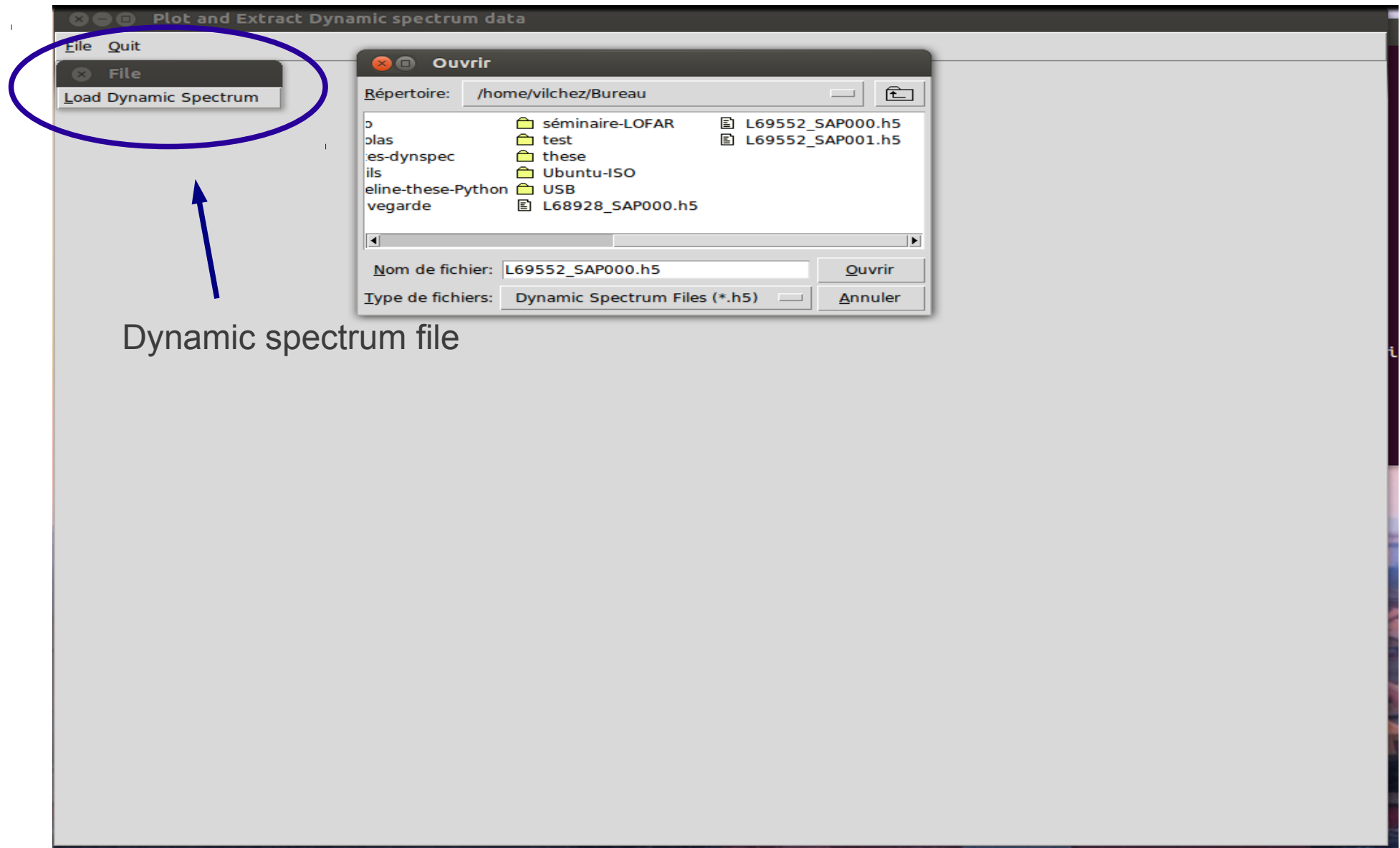
Dynamic spectrum Extraction(3/3)

The screenshot displays the 'Convert [and Extract] Beam Formed Data to Dynamic spectrum data' application. The main window is divided into several sections:

- Selection & Rebinning window:** Lists SAP files (e.g., L69552_SAP000_B000_SO_P000_bf.h5) and provides input fields for Time Start (0), Time Stop (100), Frequency Start (25), Frequency Stop (50), New Time increment (1), and New Number of Channels per subbands (1). A 'GO' button is at the bottom.
- Overview Selection:** Shows the parameters for the selected SAPs: Time Start (0.0), Time Stop (100.002368599), Frequency Start (29.980468), Frequency Stop (49.890136), New Time increment (0.999424031576 s), New Number of Channels per subbands (1), and Number of SAP to process (2). It also shows 'Optimal RAM Quantity (in Go) for processing: 0.05' and 'Optimal Processing Time Estimation (in s): 0.00410385794465'. 'GO' and 'STOP' buttons are present.
- Processing Information:** Displays 'Start Processing at: Wed Jan 16 14:51:26 2013', 'Data Flow to Process (Go): 0.000291141620224', 'Number of SAP to process: 2', 'Optimal RAM to process (Go): 0.05', 'Selected RAM Quantity (Go):', and 'Optimal Processing Time Estimation (in s): 0.00410385794465'.
- RAM Selector:** A dialog box asking 'How much RAM do you want to use ? [Default:1Go, OPTIMAL: 0.05 Go]' with a 'GO' button and an input field.
- Metadata:** Shows observation details: Observation ID: 69552, Target: ['3C273'], Ra: 187.277923584, Dec: 2.05241656303, Ra/Dec Unit: deg, Nof Stations: 6, Station List: ['CS002LBA', 'CS003LBA', 'CS004LBA', 'CS005LBA', 'CS006LBA', 'CS007LBA'], Minimum Frequency: 29.98046875, Maximum Frequency: 74.90234375, Center Frequency: 52.44140625, Frequency Unit: MHz, Nof Subbands: 120, Nof Channels Per Subband: 16, Nof Frequency Channels: 1920.
- Actions:** Includes buttons for 'Convert All SAP Without Changes', 'Convert Selected SAP Without Changes', 'Convert All SAP With Rebin and Selection', 'Convert Selected SAP With Rebin and Selection', and 'Clear'.

Annotations with blue arrows point to the 'Selection & Rebinning window', 'Overview Selection', 'RAM Selector', and 'Processing information window'.

Dynamic spectrum Visualization(1/3)

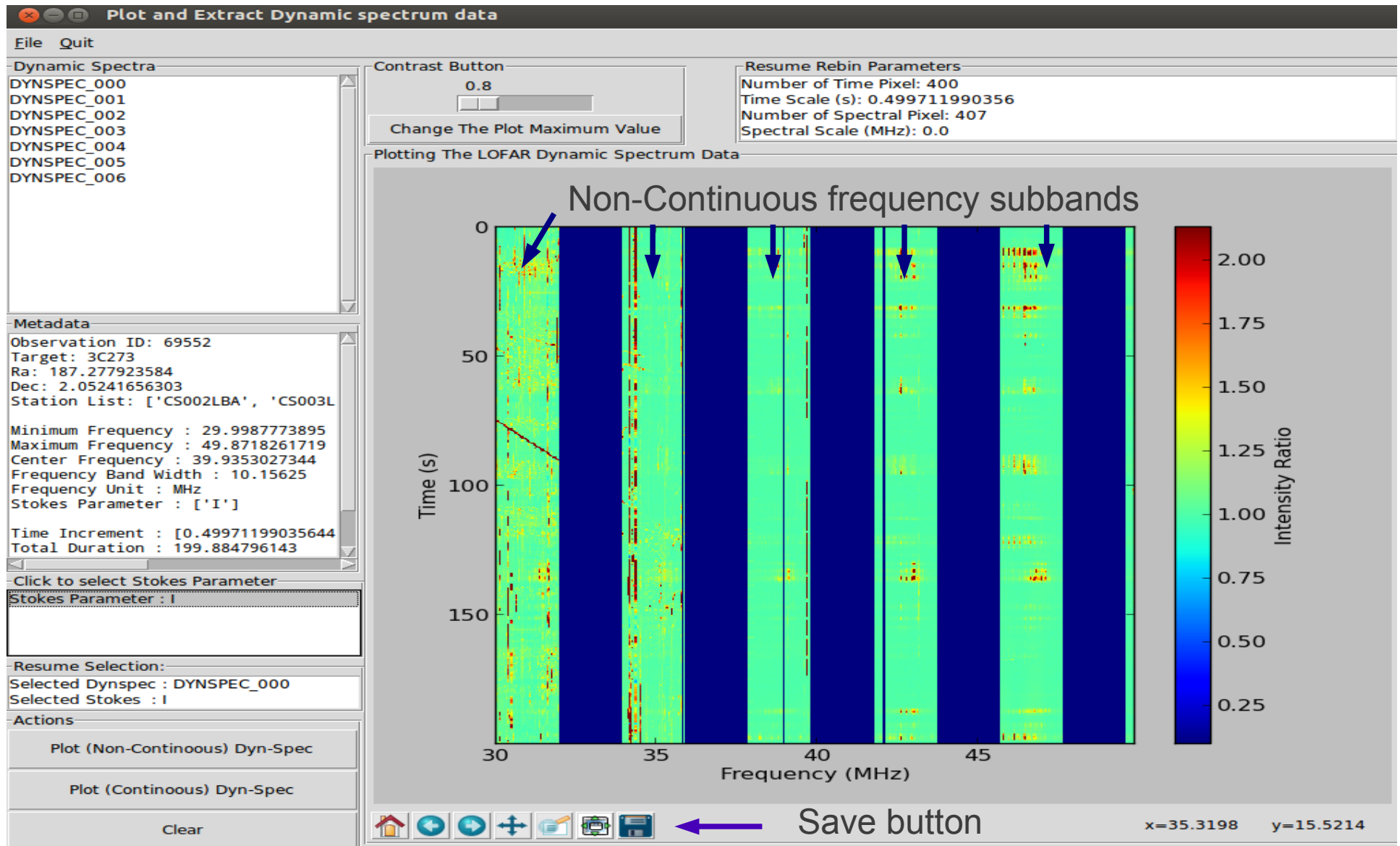


Dynamic spectrum Visualization(2/3)

The screenshot shows the 'Plot and Extract Dynamic spectrum data' application window. The interface is divided into several sections:

- Dynamic Spectra:** A list of dynamic spectra files (DYNESPEC_000 to DYNESPEC_006) is shown on the left. A blue bracket and the text 'Dynamic Spectra' are overlaid on this list.
- Metadata:** A section containing observation details such as 'Observation ID: 69552', 'Target: 3C273', 'Ra: 187.277923584', 'Dec: 2.05241656303', 'Station List: ['CS002LBA', 'CS003L]', 'Minimum Frequency: 30.0720214844', 'Maximum Frequency: 49.7985801697', 'Center Frequency: 39.9353027344', 'Frequency Band Width: 10.15625', 'Frequency Unit: MHz', 'Stokes Parameter: ['I']', 'Time Increment: [0.99942398071289]', and 'Total Duration: 99.9423980713'. A blue bracket and the text 'Selected dynamic Spectrum metadata' are overlaid on this section.
- Stokes Parameter:** A dropdown menu labeled 'Click to select Stokes Parameter' is shown with 'Stokes Parameter : I' selected. A blue arrow and the text 'Availbe Stokes parameter' (note the typo) point to this dropdown.
- Resume Selection:** A section showing 'Selected Dynspec : DYNESPEC_000' and 'Selected Stokes : I'.
- Actions:** A section with three buttons: 'Plot (Non-Continoous) Dyn-Spec', 'Plot (Continoous) Dyn-Spec', and 'Clear'. A blue bracket and the text '2 plot options' are overlaid on these buttons.
- Contrast Button:** A slider control for 'Contrast Button' is set to 0.8. A blue arrow and the text 'Contrast Button' point to this slider.
- Plotting Area:** A large empty area titled 'Plotting The LOFAR Dynamic Spectrum Data'.
- Footer:** A standard Linux-style taskbar with icons for home, back, forward, search, and save.

Dynamic spectrum Visualization(3/3)



Dynamic spectra :

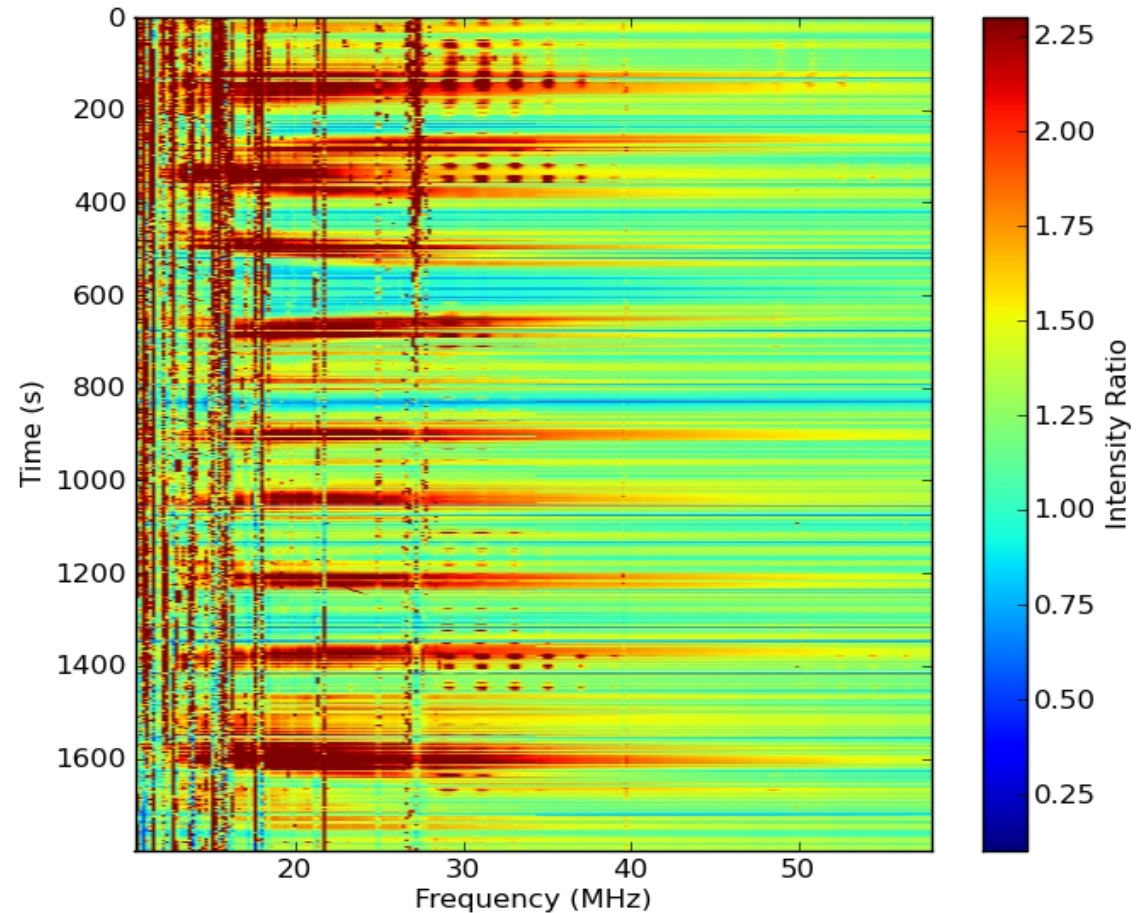
Installation/Update of the pipeline :

Installed CEP 1

Cas A =>
30 min, $5.12E-6$ s binning
244 continuous subbands
From 10 to 58 Mhz
=>

Time rebinning with 1s
13 To data processed ...
24 h later :
40 Mo
=>

To be continued



Prospects:

