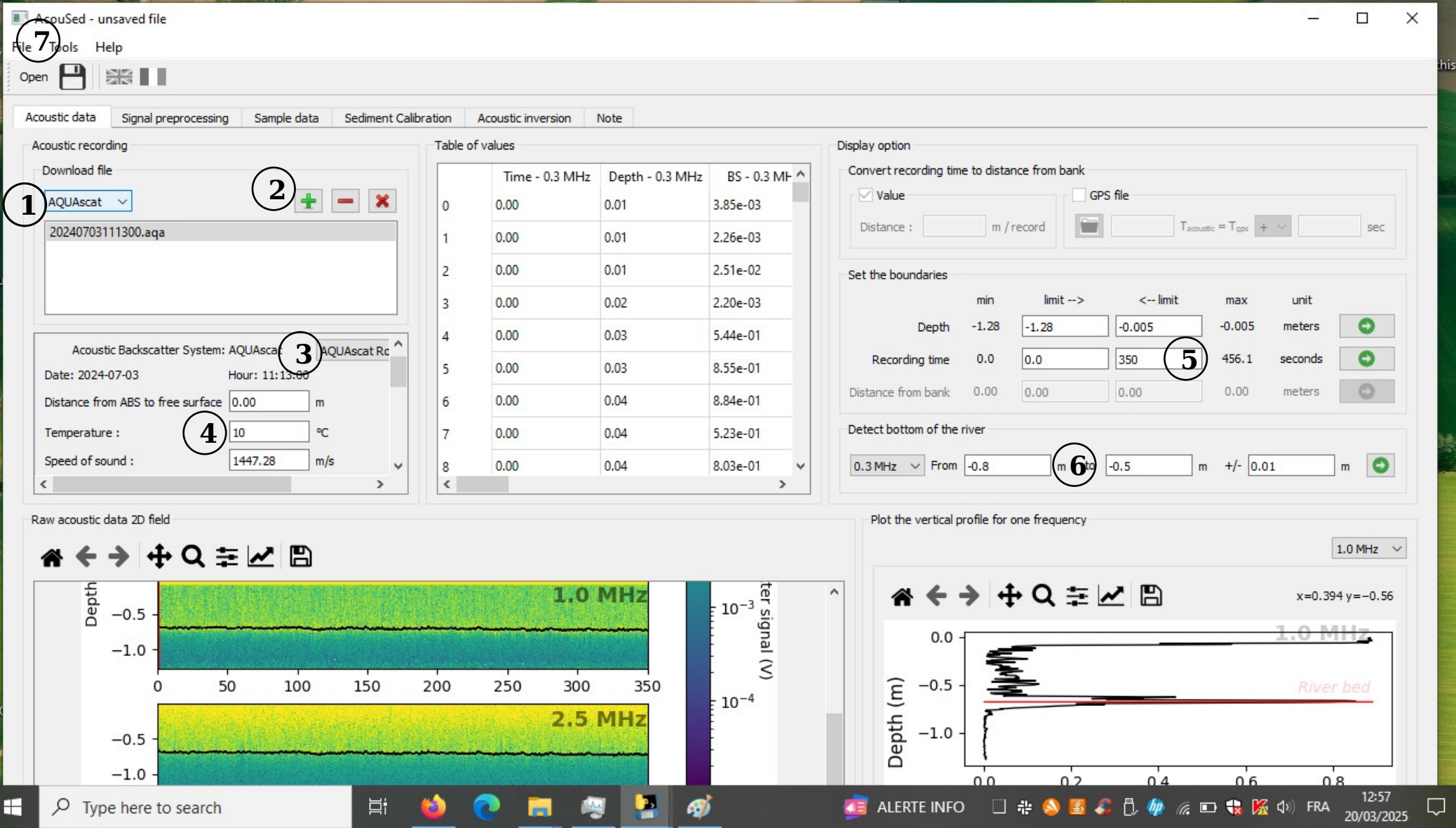




- Step 1  
Select *AQUA*scat
- Step 2  
Click on green cross button and select file *20240703111300.aqa*
- Step 3  
Select *AQUA*scat *Romanche 2024*
- Step 4  
Set the temperature to 10°C and press Enter
- Step 5  
Set the upper limit to 350 sec and press green arrow button (on the same line)
- Step 6  
Select 0,3 MHz and set -0,8 m and -0,5 m for, respectively, the interval start and end of the first interrogation area.  
Set 0,01 m for the next interrogation area gap
- Step 7  
File → Export → Table of Backscatter values  
Select a folder. Data are record in a csv file with the default name  
*Table\_20240703111300.csv (Table\_\*acoustic file name\*.csv)*

Open



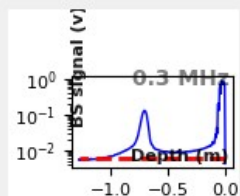
Acoustic data Signal preprocessing Sample data Sediment Calibration Acoustic inversion Note

## Study data

Data to be processed

20240703111300.aqa

Plot noise field

☐ Noise file☒ Profile tail

0.3 MHz

0.000

350.000

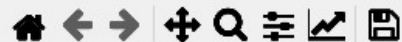


0.006

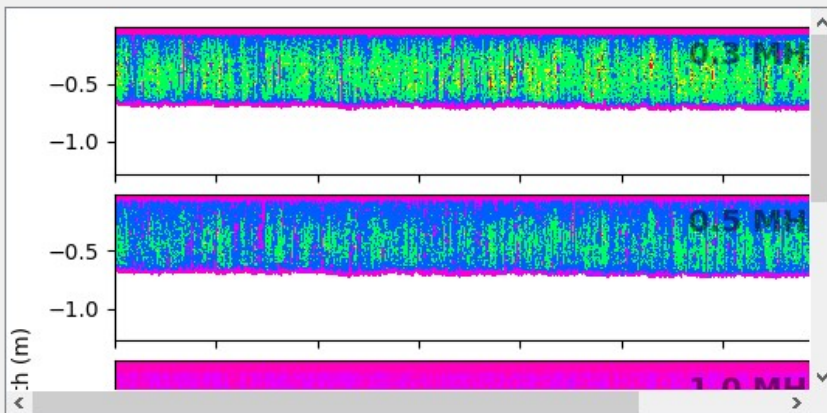
Volts



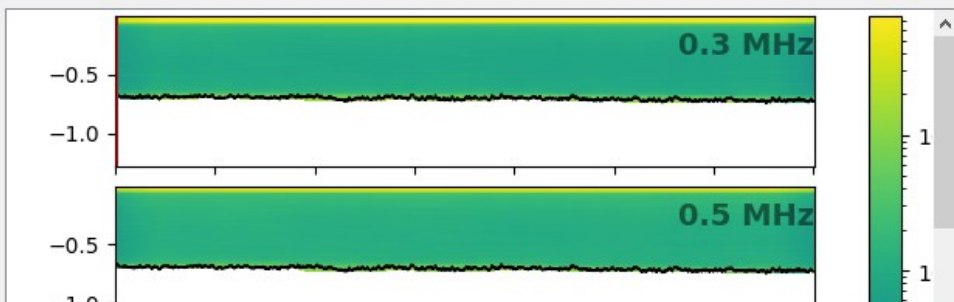
## Plot SNR



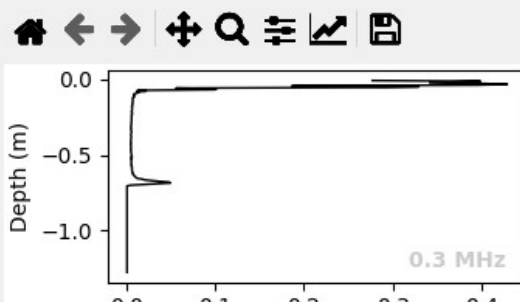
x=303.2 y=-0.98



## Display pre-processed data 2D fields



## Display pre-processed data profile



## Pre-processing options

SNR filter

SNR &lt;

0

4



Despiking the signal

<V<sup>2</sup>>/<V><sup>2</sup> <=

10

% x 4/pi

Despiking the signal

Horizontal averaging

Horizontal +/-

160.0

cells = +/- 10.0 sec



## List pre-processed data: user label

|  |
|--|
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

- Step 1  
Click on blue refresh button
- Step 2  
Select *Profile tail* method
- Step 3  
Set the noise value to 0,006 Volts and click on green arrow button
- Step 4  
Set the SNR to 0 and press green arrow button (optional - for this case, inversion works well without filtering with SNR)
- Step 5  
Set the number of profile to  $\pm 160$  cells and press enter. This number is converted to time in seconds.
- Step 6  
Click on red arrow button to compute average and to update plots.

Open



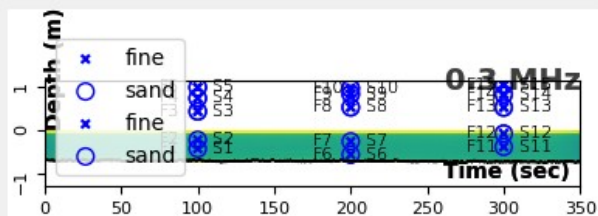
Acoustic data Signal preprocessing Sample data Sediment Calibration Acoustic inversion Note

Plot samples positions

1 Plot Acoustic data

20240703111300.aqa

0.3 MHz



Fine sediments

2 fine\_sample.ods

| Color | Sample                                 | time | depth  |
|-------|----------------------------------------|------|--------|
| b     | <input checked="" type="checkbox"/> F1 | 100  | -0.42  |
| b     | <input checked="" type="checkbox"/> F2 | 100  | -0.22  |
| b     | <input checked="" type="checkbox"/> F3 | 100  | 0.43   |
| b     | <input checked="" type="checkbox"/> F4 | 100  | 0.73   |
| b     | <input checked="" type="checkbox"/> F5 | 100  | 0.98   |
| b     | <input checked="" type="checkbox"/> F6 | 200  | -0.556 |
| b     | <input checked="" type="checkbox"/> F7 | 200  | -0.256 |
| b     | <input checked="" type="checkbox"/> F8 | 200  | 0.524  |

Sand sediments

3 sand\_sample.ods

| Color | Sample                                 | time | depth  |
|-------|----------------------------------------|------|--------|
| b     | <input checked="" type="checkbox"/> S1 | 100  | -0.42  |
| b     | <input checked="" type="checkbox"/> S2 | 100  | -0.22  |
| b     | <input checked="" type="checkbox"/> S3 | 100  | 0.43   |
| b     | <input checked="" type="checkbox"/> S4 | 100  | 0.73   |
| b     | <input checked="" type="checkbox"/> S5 | 100  | 0.98   |
| b     | <input checked="" type="checkbox"/> S6 | 200  | -0.556 |
| b     | <input checked="" type="checkbox"/> S7 | 200  | -0.256 |
| b     | <input checked="" type="checkbox"/> S8 | 200  | 0.524  |

Display options

Total concentration plot

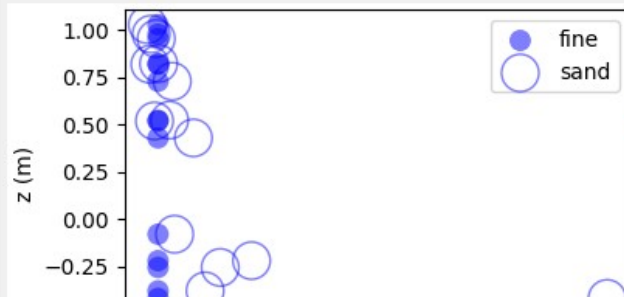
x axis Concentration (g/L)

y axis z (m)

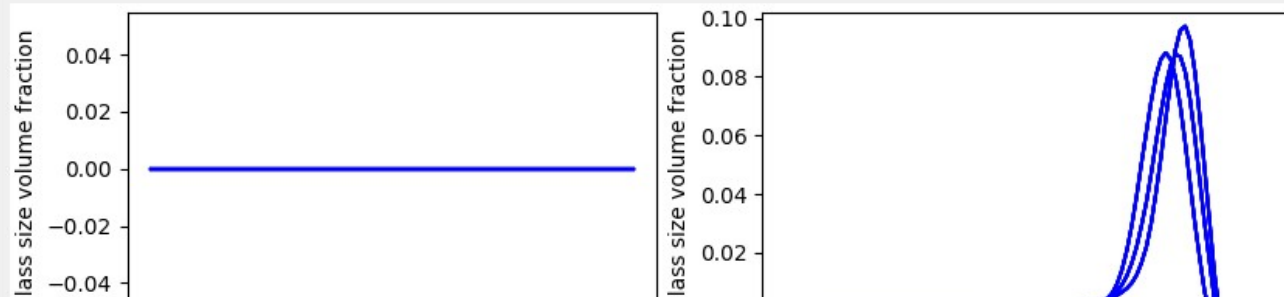
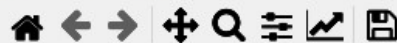
Particle Size Distribution plot

Class PSD

Plot total concentration



Plot particle size distribution



→ Step 1

Click on *Plot Acoustic data* button

→ Step 2

Click on folder button and select file *fine\_sample.ods*

→ Step 3

Click on folder button and select file *sand\_sample.ods*

Open



Acoustic data Signal preprocessing Sample data Sediment Calibration Acoustic inversion Note

## Step 1 : acoustic and sample data choice

1

Acoustic data 20240703111

2

Frequency 0.3 MHz

Frequency 2 1.0 MHz

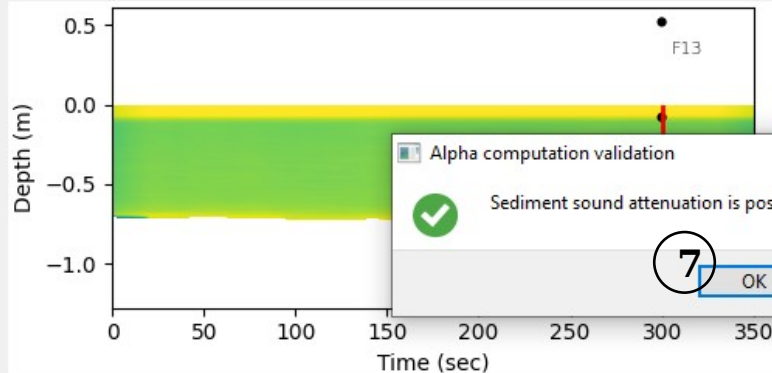
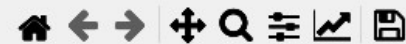
3

Fine profile F11, F12, F...

Sand target S11

4

Plot sample



## Step 2 : profile of the fine sediment concentration

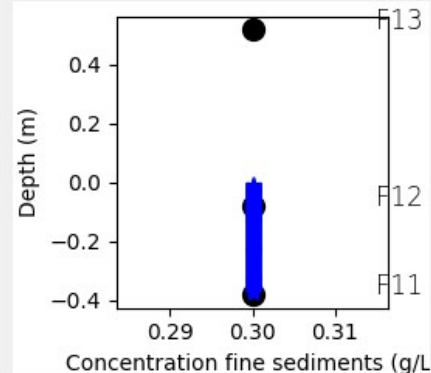
5 Interpolate

Sample Depth (m) time Cfine (g/L)

|     |       |     |     |
|-----|-------|-----|-----|
| F11 | -0.42 | 100 | 0.3 |
| F12 | -0.22 | 100 | 0.3 |
| F13 | 0.43  | 100 | 0.3 |

Sample Depth (m) time Csand (g/L)

|     |       |     |        |
|-----|-------|-----|--------|
| S11 | -0.38 | 300 | 0.7976 |
|-----|-------|-----|--------|



## Step 3 : Compute Calibration

☐ Import sediment calibration file

Import calibration

☒ Compute sediment calibration

Compute Calibration

T = 10.0 °C

0.3 MHz 1.0 MHz

kt 0.2802 V.m<sup>1.5</sup> 0.2288 V.m<sup>1.5</sup>

ks 0.05555 m.kg<sup>-0.5</sup> 0.46489 m.kg<sup>-0.5</sup>

sv 0.00015 m<sup>-1</sup> 0.01029 m<sup>-1</sup>

X 3.53

as 2.01999 m<sup>-1</sup> 1.17210 m<sup>-1</sup>

ζ 0.00 m<sup>-1</sup> 0.00 m<sup>-1</sup>

8

☐ Step 3 (for information) : Fluid Corrected Backscatter

When fine sediments concentration is constant and effect on sound attenuation on sand is negligible, this sediment attenuation alphas can be compared to the obtained by the sediment calibration computation.

- ☒  $\alpha_{sFCB} > 0$  : comparison with calibration
- ☒  $\alpha_{sFCB} < 0$  : do not compare with calibration

Frequency

0.3 MHz

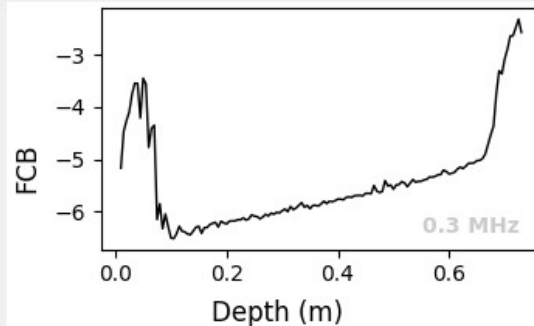
From

m

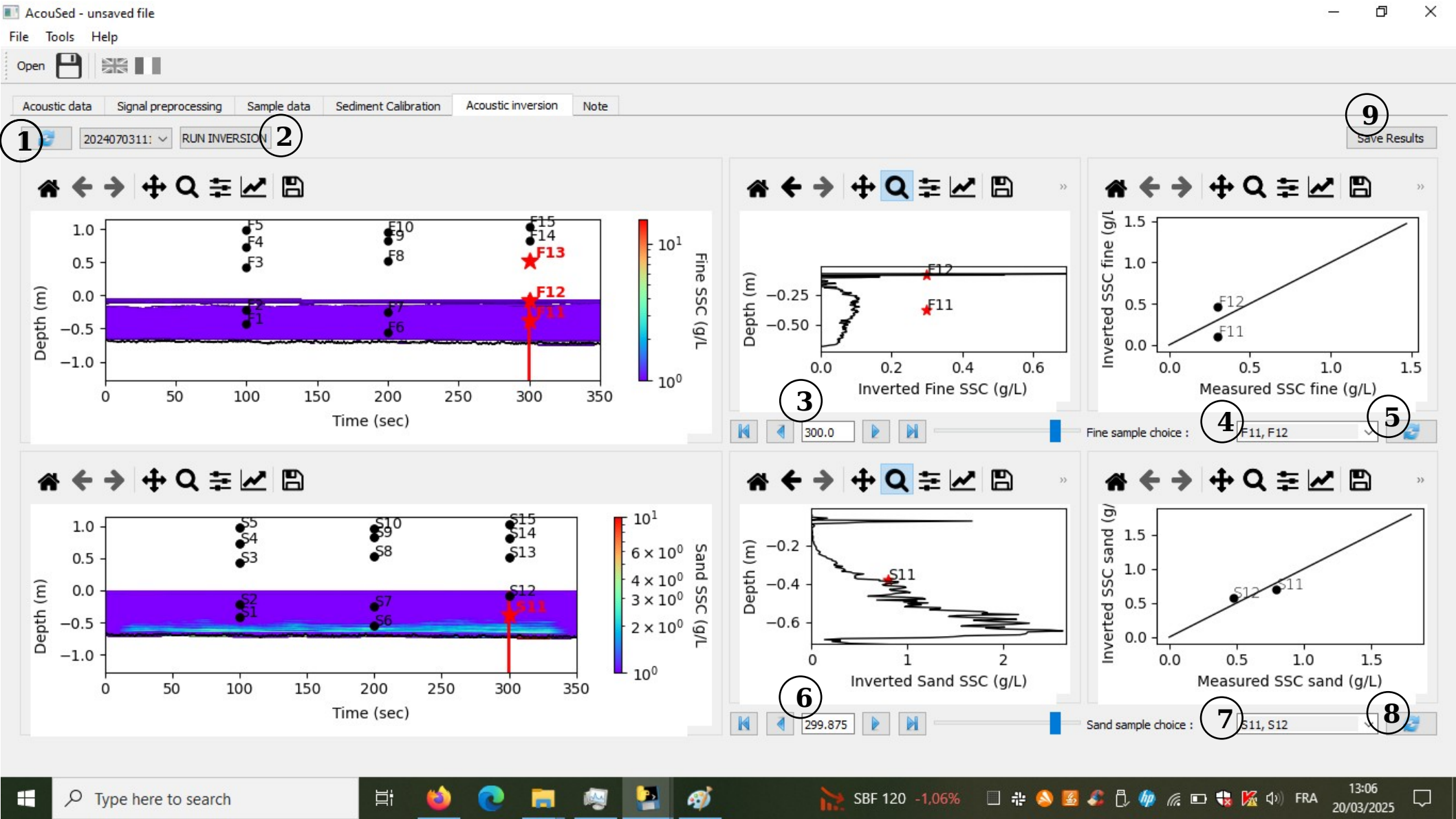
to

m

Compute and Plot Linear regression

 $\alpha_c = 0.0\text{dB/m}$ 

- Step 1  
Click on blue refresh button
- Step 2  
Select 0,3MHz for the *Frequency 1* and 1MHz for the *Frequency 2*
- Step 3  
Select *F11*, *F12* and *F13* for *Fine profile*  
Select *S11* for *Sand target*
- Step 4  
Click on *Plot sample* button to plot the samples concentrations profile
- Step 5  
Click on *Interpolate* button to interpolate the profile
- Step 6  
Select *Compute sediment calibration* and click on *Compute Calibration*
- Step 7  
Click on *OK* to close the validation window
- Step 8  
Click on *Save Calibration* and select the folder. The calibration data is record in a file with tha default name *Sediment\_calibration\_20240703111300.csv*  
(Sediment\_calibration\_\*acoustic file name\*.csv)



- Step 1  
Click on blue refresh button
- Step 2  
Click on *RUN INVERSION* button
- Step 3  
Set profile to 300 and press Enter to plot the fine concentration profile at the sample position  
(you can use the figure toolbar to adjust plot limits)
- Step 4  
Select *F11* and *F12*
- Step 5  
Click on blue refresh button to refresh the plot Measured SSC fine vs Inverted SSC fine
- Step 6  
Set profile to 300 and press Enter to plot the sand concentration profile at the sample position  
(you can use the figure toolbar to adjust plot limits)
- Step 7  
Select *S11* and *S12*
- Step 8  
Click on blue refresh button to refresh the plot Measured SSC sand vs Inverted SSC sand
- Step 9  
Click on *Save results* button. Choose the directory and set filename of the csv or xlsx file.