

20251113更新

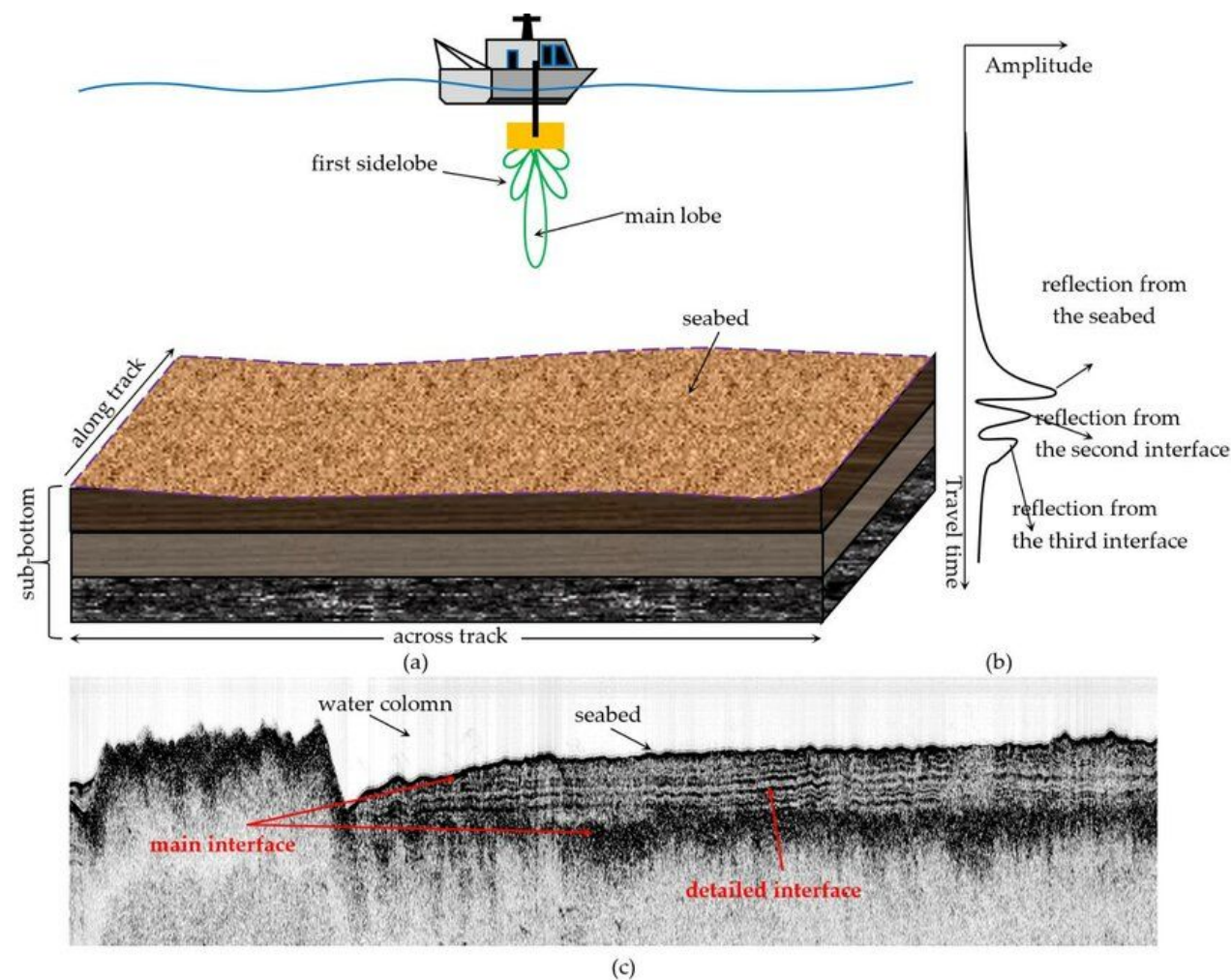
底質剖面儀基礎操作介紹 與資料展示

簡報製作：李品蓁

geophystech@nsysunor3.com

SBP原理

地層剖面顯像的原理係利用聲波在海床下岩層中傳遞時，因介質不同產生的聲波阻抗，使得部分能量產生振幅及相位變化再反射回來，經由受波器、轉換器接收並轉換成電子訊號，最終成像並展示。



3300: Hull Mount Sub-Bottom Profiler

TRANSDUCER ARRAY	BEAMWIDTH	MAX. RECOMMENDED OPERATING DEPTH	RESOLUTION	PENETRATION
4 of 2-16 kHz (2x2)	40° at 4.5 kHz	300 m	6 to 10 cm	6 m in coarse sand 80 m in clay
9 of 2-16 kHz (3x3)	30° at 4.5 kHz	1500 m		
16 of 2-16 kHz (4x4)	24° at 4.5 kHz	3000 m		
25 of 2-16 kHz (5x5)	20° at 4.5 kHz	5000 m		
3 of 1-10 kHz (triangle)	30° at 4 kHz	1500 m	15 -25 cm	15 m in coarse sand 150 m in clay
5 of 1-10 kHz ("dice 5")	20° at 4 kHz	3000 m		
7 of 1-10 kHz (hexagonal)	16° at 4 kHz	5000 m		

探測期間參數調整

Parameter adjust when surveying



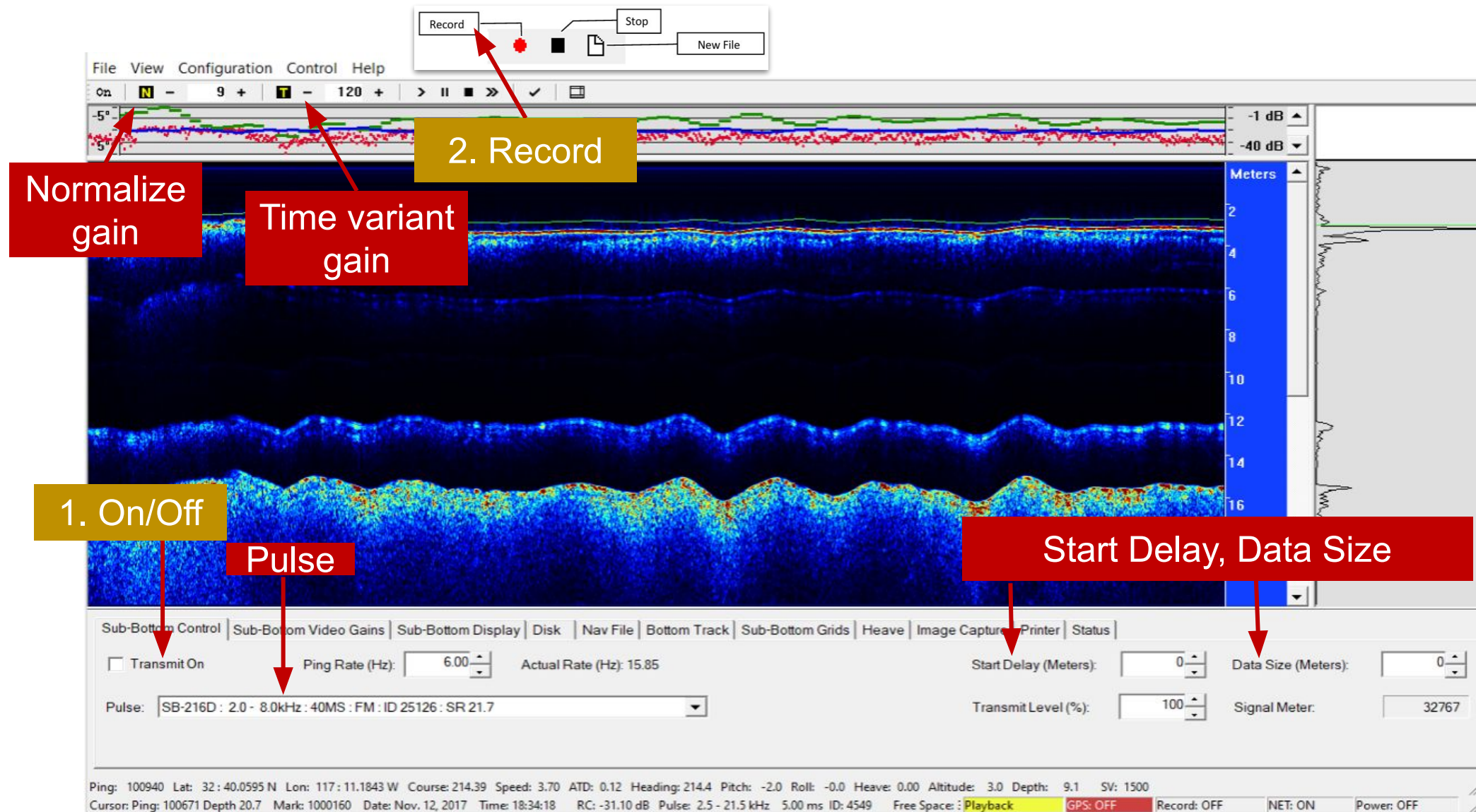
WARNING

調整參數前先知會探測!!!!

Tell technician before changing any
parameter!!!!!!!!

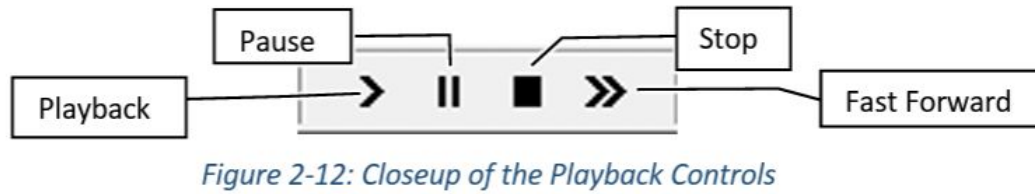
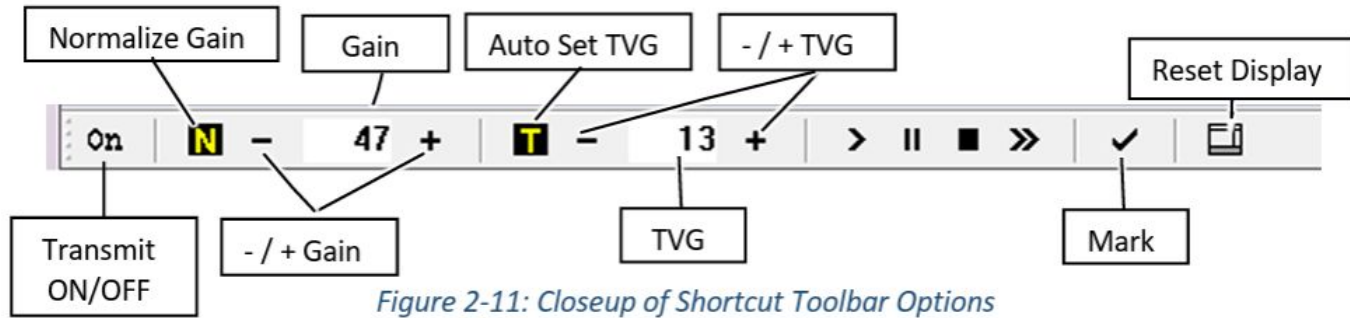


常用功能 Functions that use frequently



功能介紹(上半部)

Function introduction (upper part)



功能介紹(下半部)

Function introduction (lower part)

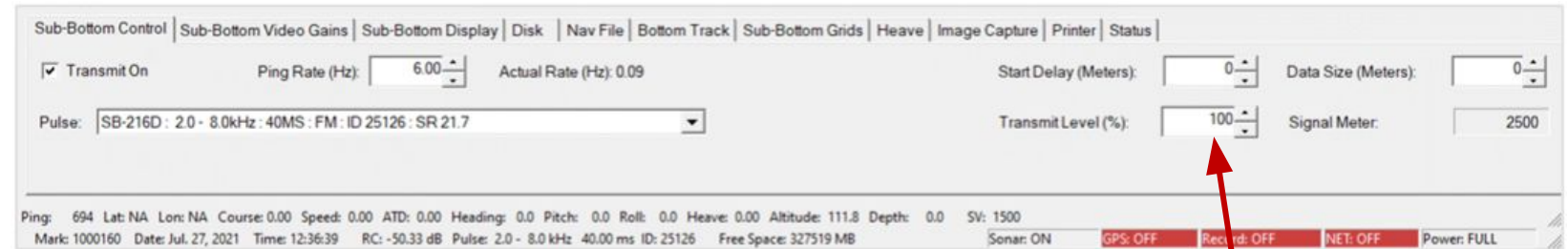
Sub-Bottom Control | Sub-Bottom Video Gains | Sub-Bottom Display | Disk | Nav File | Bottom Track | Sub-Bottom Grids | Heave | Image Capture | Printer | Status |

☒ Transmit On Ping Rate (Hz): Actual Rate (Hz): 0.09 Start Delay (Meters): Data Size (Meters):

Pulse: Transmit Level (%): Signal Meter:

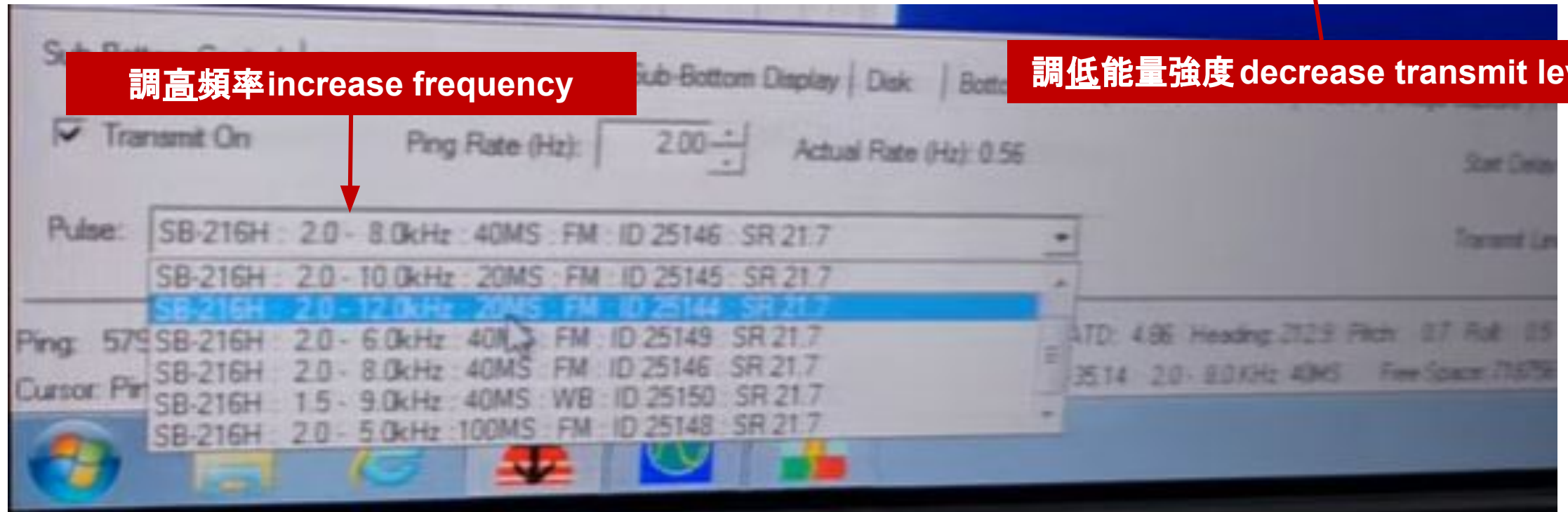
Ping: 694 Lat: NA Lon: NA Course: 0.00 Speed: 0.00 ATD: 0.00 Heading: 0.0 Pitch: 0.0 Roll: 0.0 Heave: 0.00 Altitude: 111.8 Depth: 0.0 SV: 1500
Mark: 1000160 Date: Jul. 27, 2021 Time: 12:36:39 RC: -50.33 dB Pulse: 2.0 - 8.0 kHz 40.00 ms ID: 25126 Free Space: 327519 MB Sonar: ON GPS: OFF Record: OFF NET: OFF Power: FULL

當你想看淺一點的地層，你可以...
When you want to see shallower, you can...

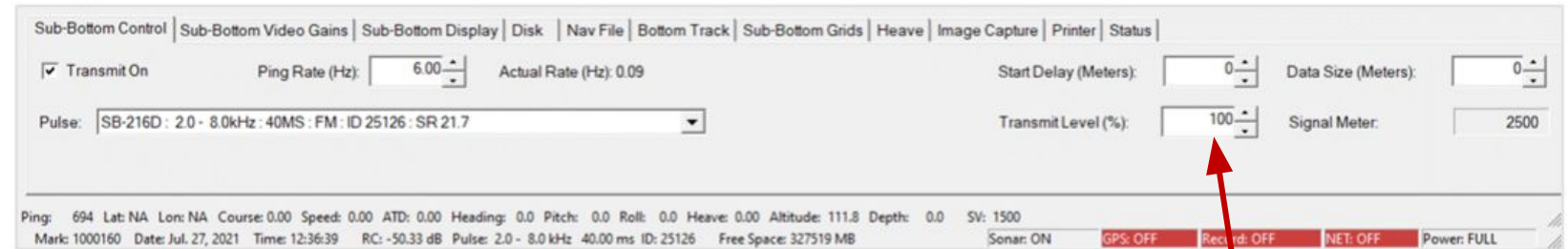


調高頻率 increase frequency

調低能量強度 decrease transmit level

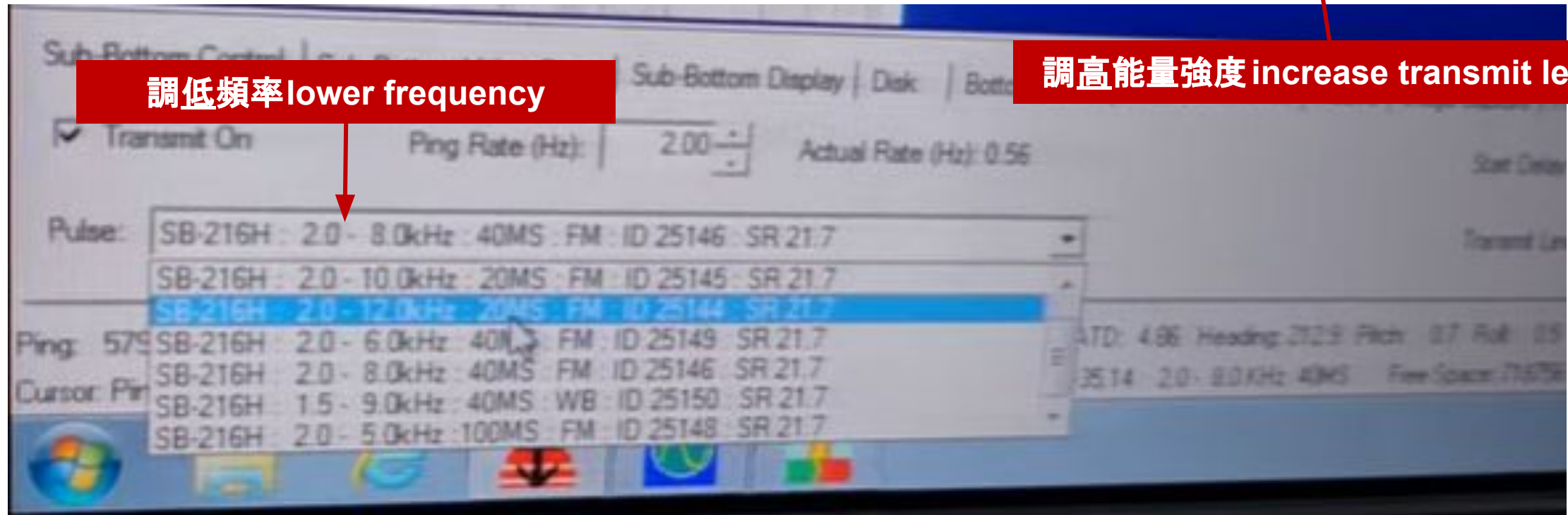


當你想看深一點的地層，你可以...
When you want to see deeper, you can...



調低頻率 lower frequency

調高能量強度 increase transmit level



改變一些參數會造成切檔

Changing some parameters may create new file

- 改變一些參數會造成切檔。Changing some parameters will create new data file。
- 造成切檔的參數如下。The parameters that caused the file splitting are as follows.

Parameter	Yes/No
Normalize Gain	N
Time variant Gain	N
Ping rate	N
Pulse	N
Start delay	Y
Data size	Y
Transmit level	N

} 盡量一次設定到位
It's recommended to
make adjustment all at
once.

若頻繁調整，你會獲得...

If you change them frequently, you will get...

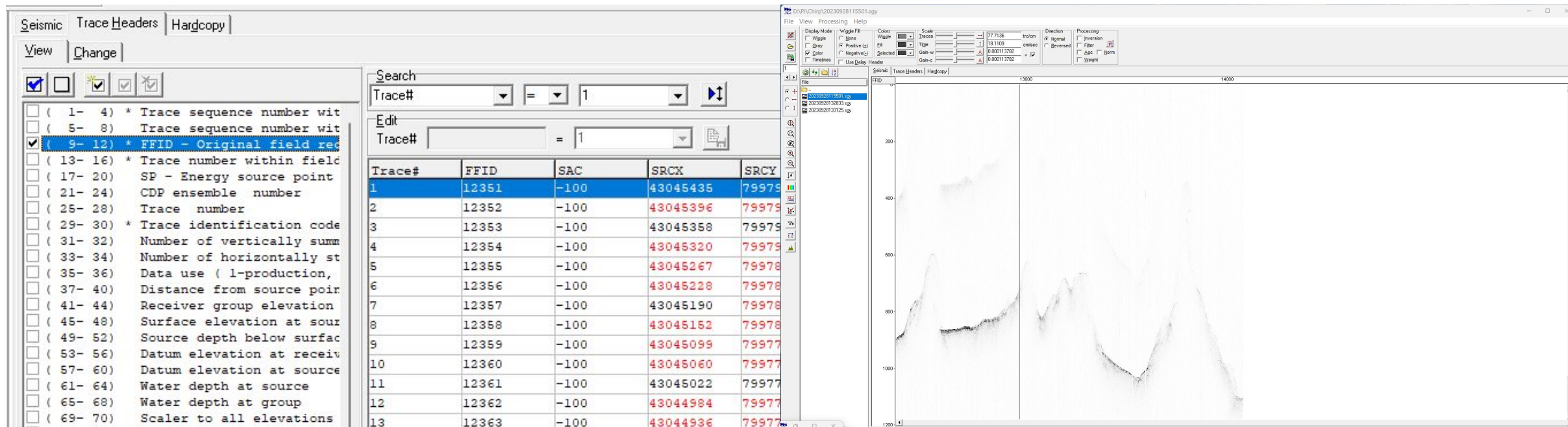
- 一堆很短又斷斷續續的檔案。

20250329022257.jsf	2025/3/29 上午 10...	JSF 檔案	4,894 KB
20250329022257.sgy	2025/3/29 上午 10...	SGY 檔案	3,288 KB
20250329022656.jsf	2025/3/29 上午 10...	JSF 檔案	25 KB
20250329022656.sgy	2025/3/29 上午 10...	SGY 檔案	18 KB
20250329022657.jsf	2025/3/29 上午 10...	JSF 檔案	23 KB
20250329022657.sgy	2025/3/29 上午 10...	SGY 檔案	19 KB
20250329022658.jsf	2025/3/29 上午 10...	JSF 檔案	24 KB
20250329022658.sgy	2025/3/29 上午 10...	SGY 檔案	20 KB
20250329022659.jsf	2025/3/29 上午 10...	JSF 檔案	25 KB
20250329022659.sgy	2025/3/29 上午 10...	SGY 檔案	20 KB
20250329022700.jsf	2025/3/29 上午 10...	JSF 檔案	25 KB

SBP展示與輸出

SBP presentation & export

segy檔的組成 Formation of segy file



檔頭Header

數據體Data

讀取segy檔可以使用...

Reading segy file, you can use...

- matlab: segymat module
- python: obspy module
- seisee

Example: python

```
import obspy
import numpy as np
import matplotlib.pyplot as plt
from matplotlib.colors import LinearSegmentedColormap
from matplotlib import colormaps
import struct
import os
```

```
title = "Line1-E_1"
#segy_file = title + ".sgy"
folder = r"D:\PJ\Folder"
```

```
segy_file = os.path.join(folder, title + ".sgy")
stream = obspy.read(segy_file, format="SEG-Y")
data = np.array([tr.data for tr in stream.traces])
```

```
trace_header_bytes = stream.traces[0].stats.segy.trace_header.unpacked_header
delay_recording_time = struct.unpack('>h', trace_header_bytes[108:110])[0]
print(f"Delay Recording Time: {delay_recording_time} ms")
```

```
gain = 12
vmin = 0
vmax = np.max(data) / gain
colors = [
    (1.0, 1.0, 1.0),
    (0.5, 0.5, 0.5),
    (0.0, 0.0, 0.0)
]
positions = [0.0, 0.5, 1.0]
n_bins = 256
cmap_name = 'custom_segy'
custom_cmap = LinearSegmentedColormap.from_list(cmap_name, list(zip(positions, colors)), N=n_bins)
colormaps.register(custom_cmap)
```

```
display = np.clip(data, 0, None)
```

```
plt.figure(figsize=(20, 6))
plt.imshow(display.T, aspect='auto', cmap=cmap_name, extent=[0, data.shape[0], data.shape[1], 0],
           vmin=vmin, vmax=vmax)
plt.colorbar(label="Amplitude")
```

```
pdf_f = title + ".pdf"
plt.savefig(pdf_f, format="pdf", dpi=300, bbox_inches="tight")
#plt.show()
```

title = "填不含副檔名的剖面名稱Profile name without file extension"
#segy_file = title + ".sgy"
folder = r"填剖面的檔案路徑path of the profile"

Example: Seisee



SeiSee 2.22 FREE

Views and examines files with seismic data

4.6 
75 votes

Your vote: 

Latest version:
2.22.6 [See all](#)

Developer:
Sergey I. Pavlukhin

Advertisement

現正支援 Windows、macOS

雙向批次轉檔、多功能編輯、註解、合併、簽署、表格、保護PDF檔案及OCR • Right PDF

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Review

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Questions & Answers (7)

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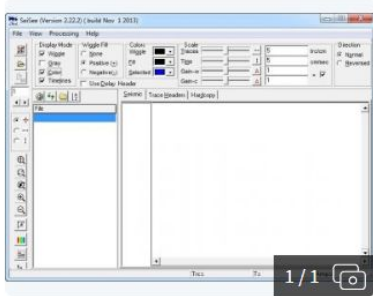
Your work here. Start now.

communications earth & environment

Learn More

Visualize seismic data encased in SEG-Y and CST files by opening them with the application supporting integer (2,4 bytes) and IBM float (4 bytes) samples. It also provides the option to write your own SEG-Y files and browse data based on trace index or a header value.

The SeiSee program shows seismic data in SEG-Y, CWP/SU, CGG CST format on screen of your personal computer. The program supports standard an integer (2,4 bytes) and IBM float (4 bytes) sample formats. It can also write the whole SEG-Y file or part of it to disk in the SEG-Y (IBM-32) format with the ability to select data on the base of trace index or trace a header value and given time interval.



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nature portfolio

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Trusted Download

Free 6.3 MB

Download **Seisee** & install it

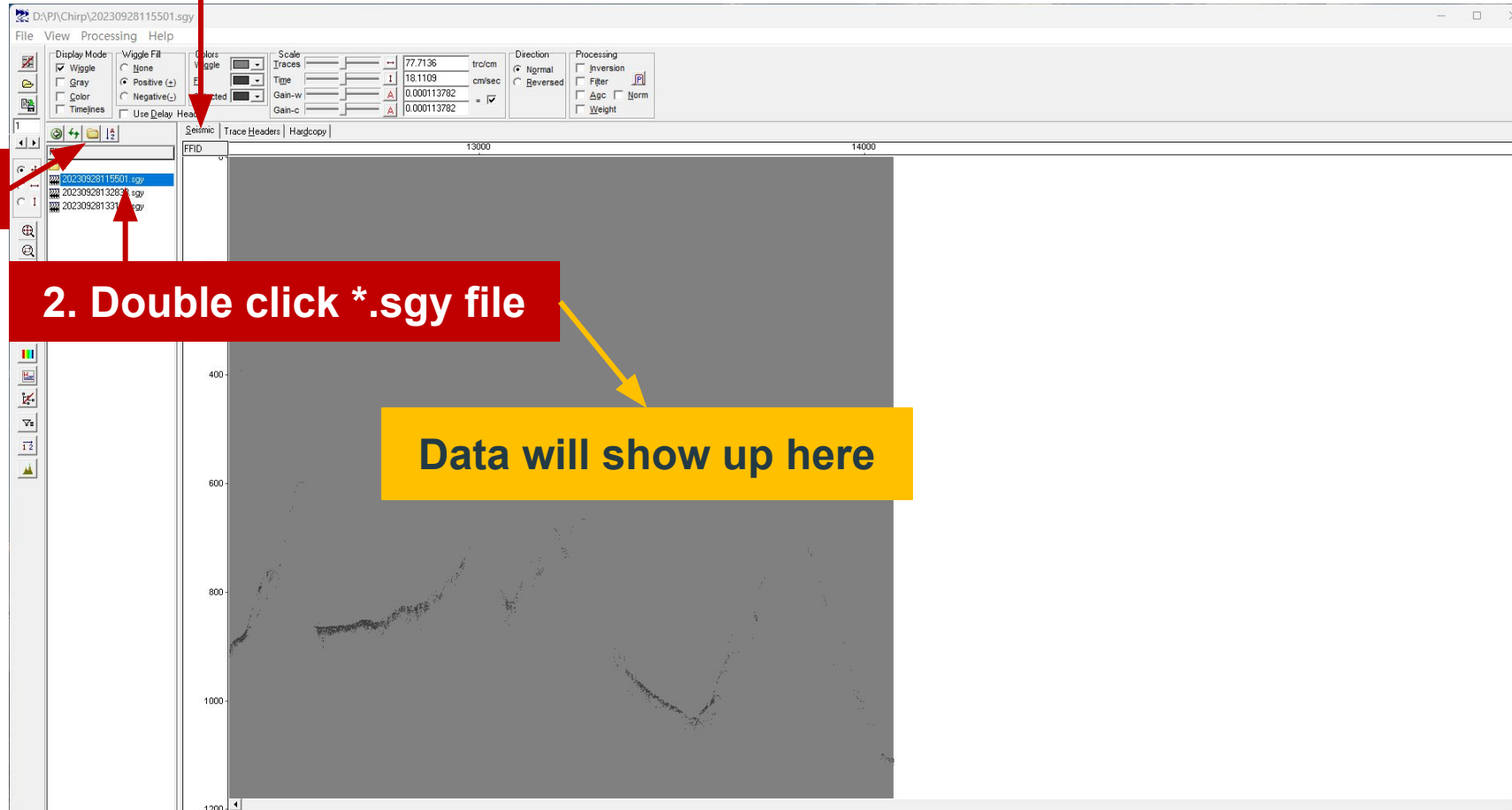
Profile presentation: Data input

3. Seismic

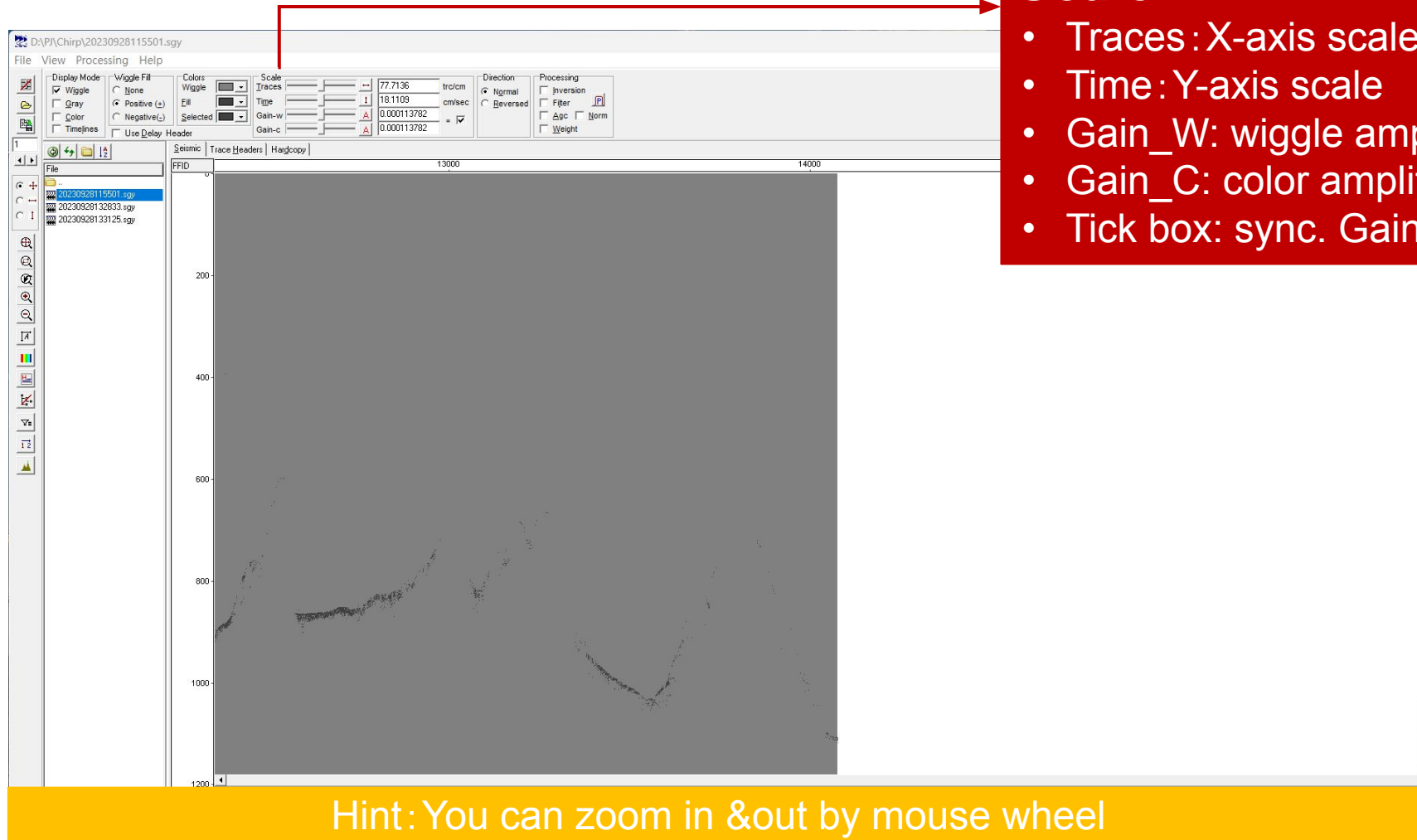
1. Choose folder

2. Double click *.sgy file

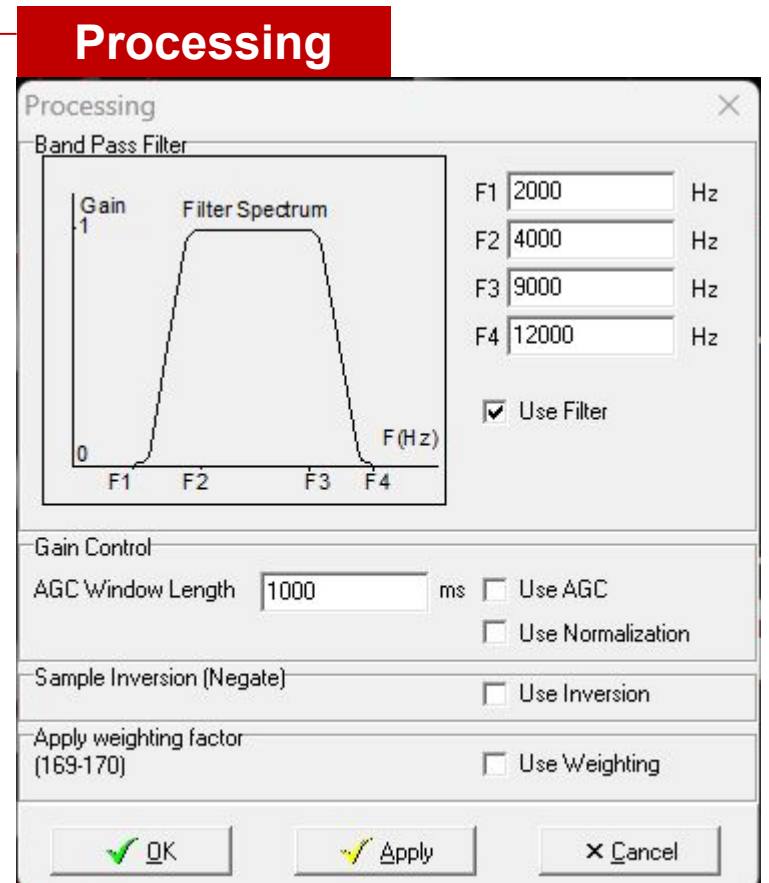
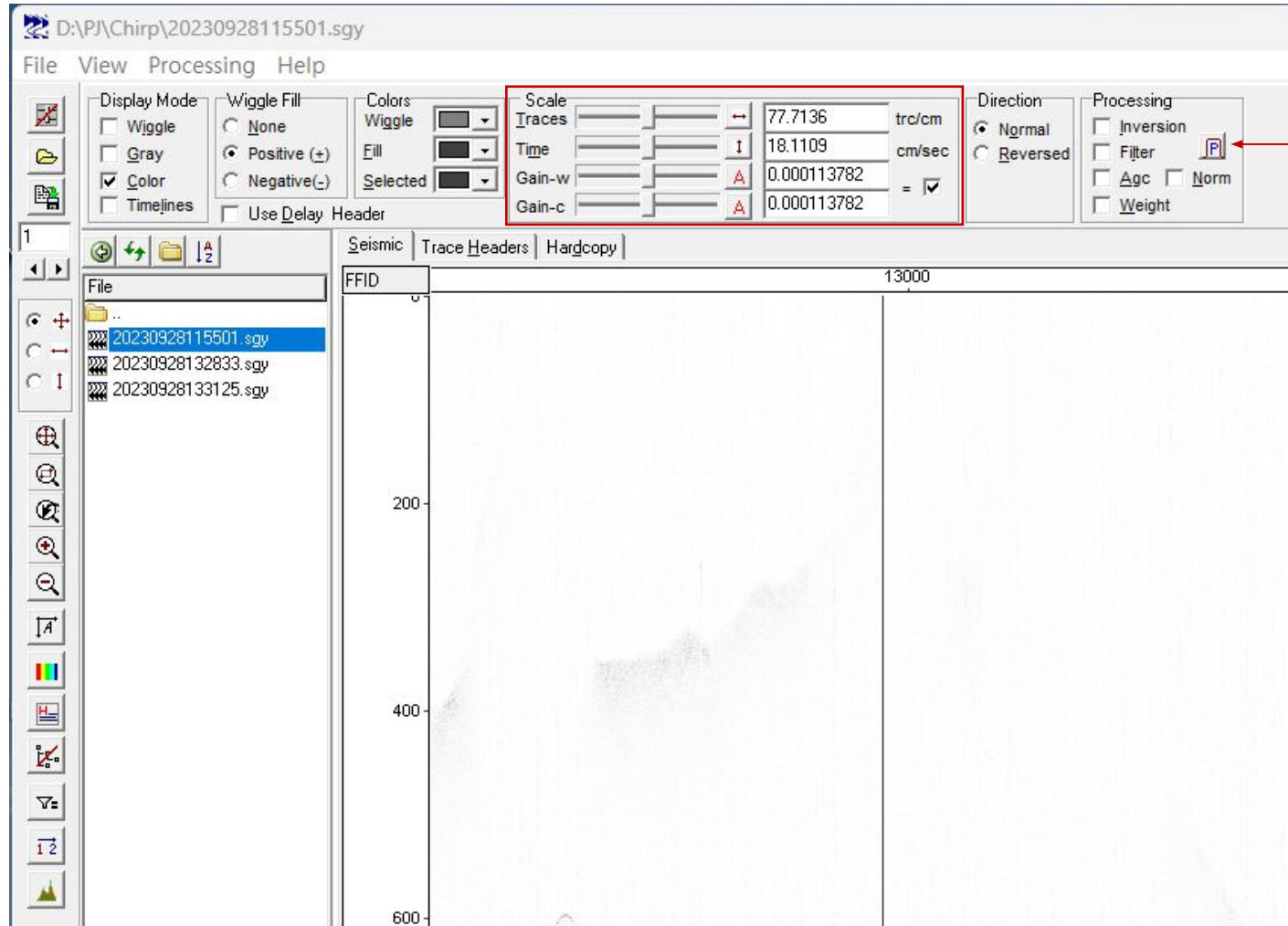
Data will show up here



Profile presentation: scale adjust



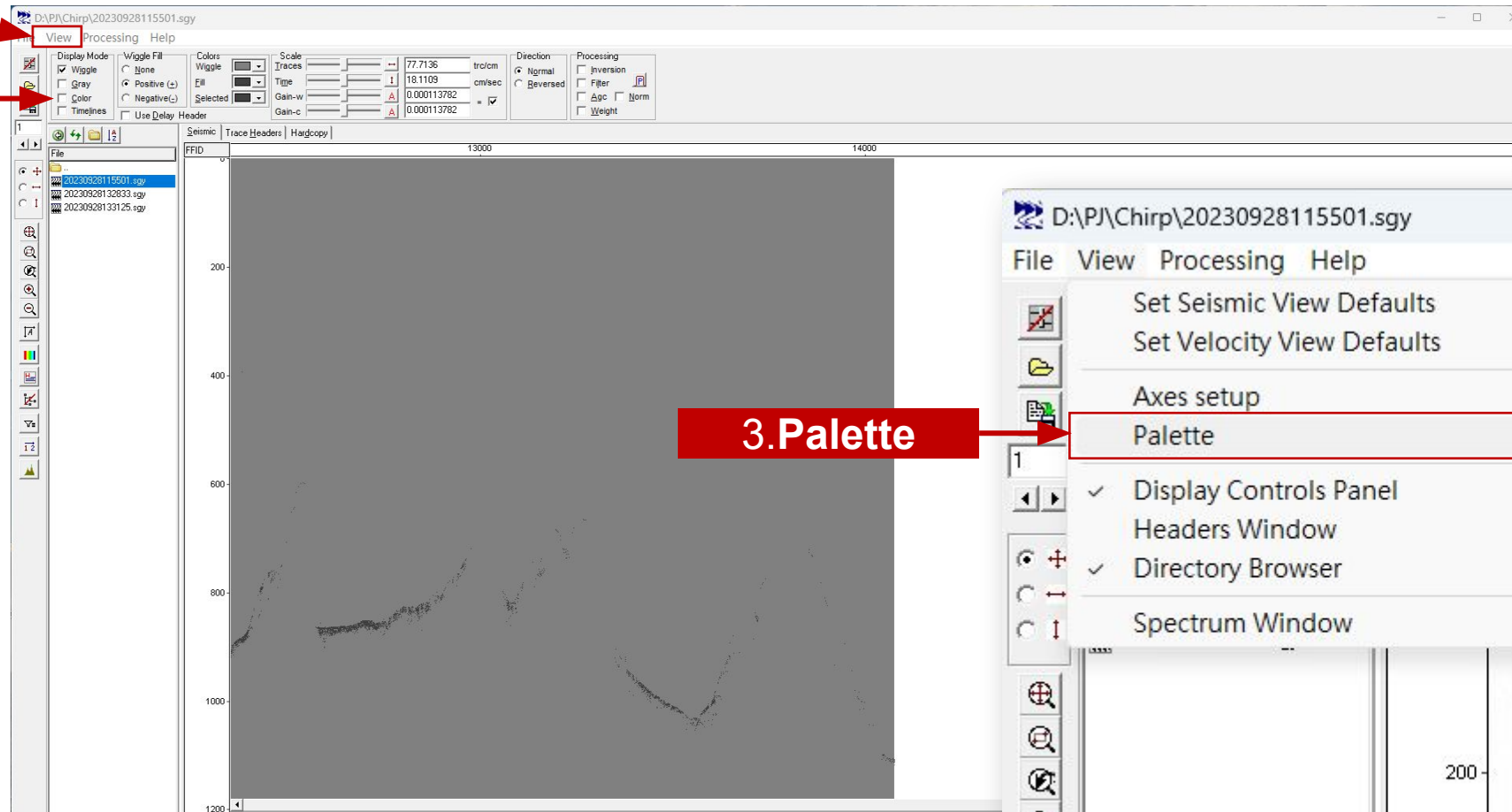
Profile presentation: bandpass filter



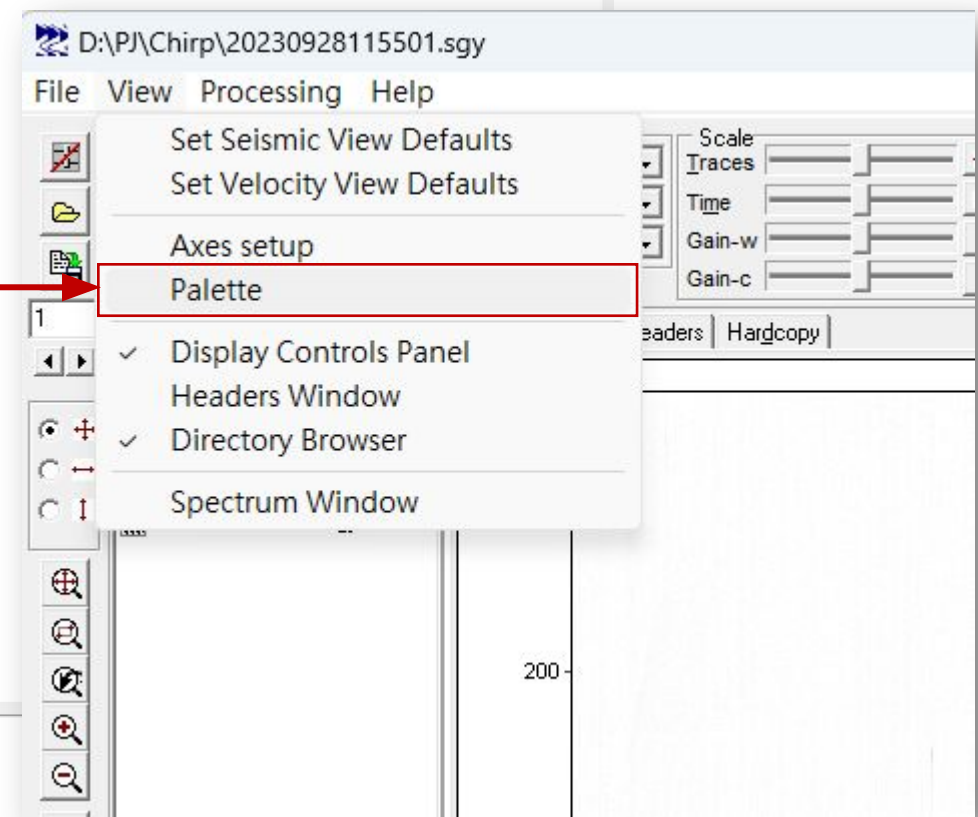
Profile presentation: color setting

2.View

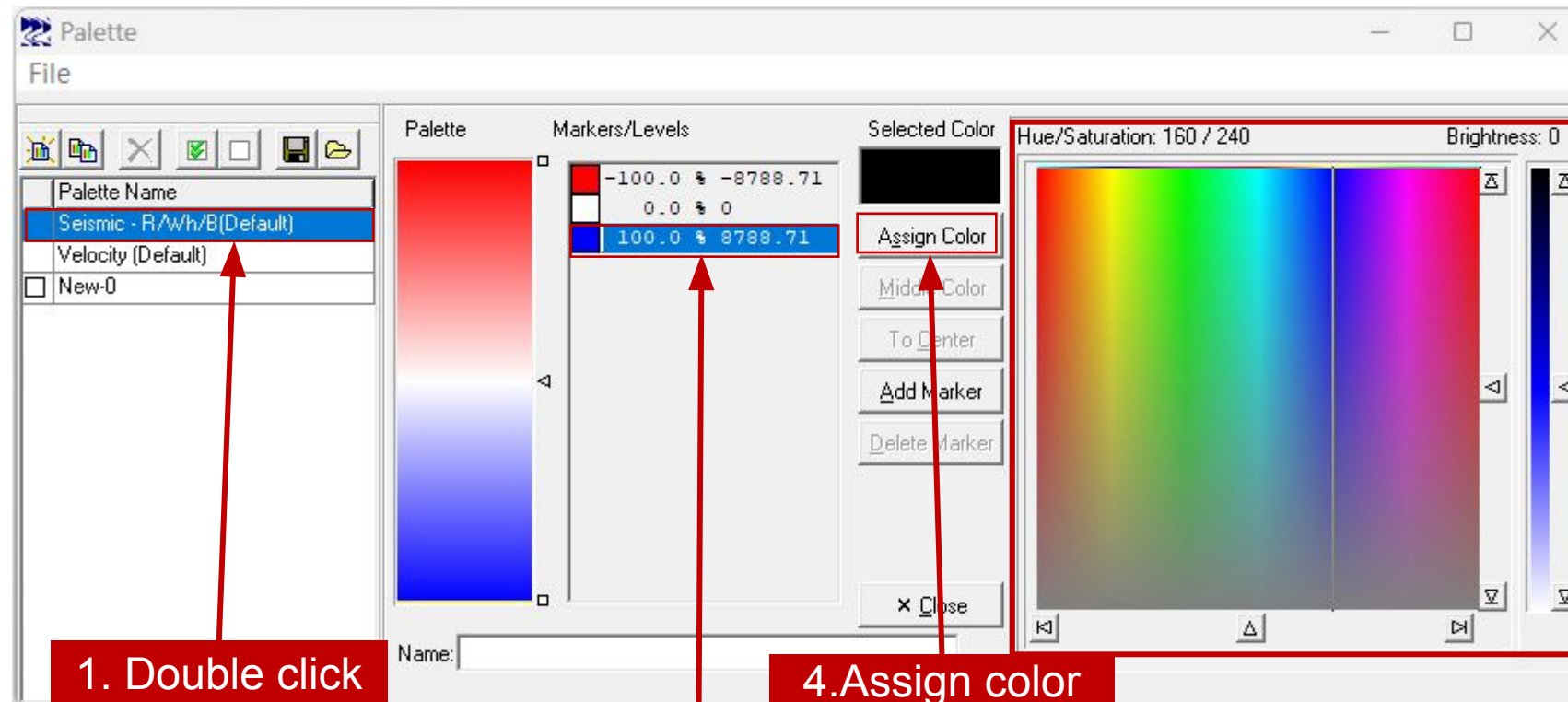
1.Color
mode



3.Palette



Profile presentation: color setting



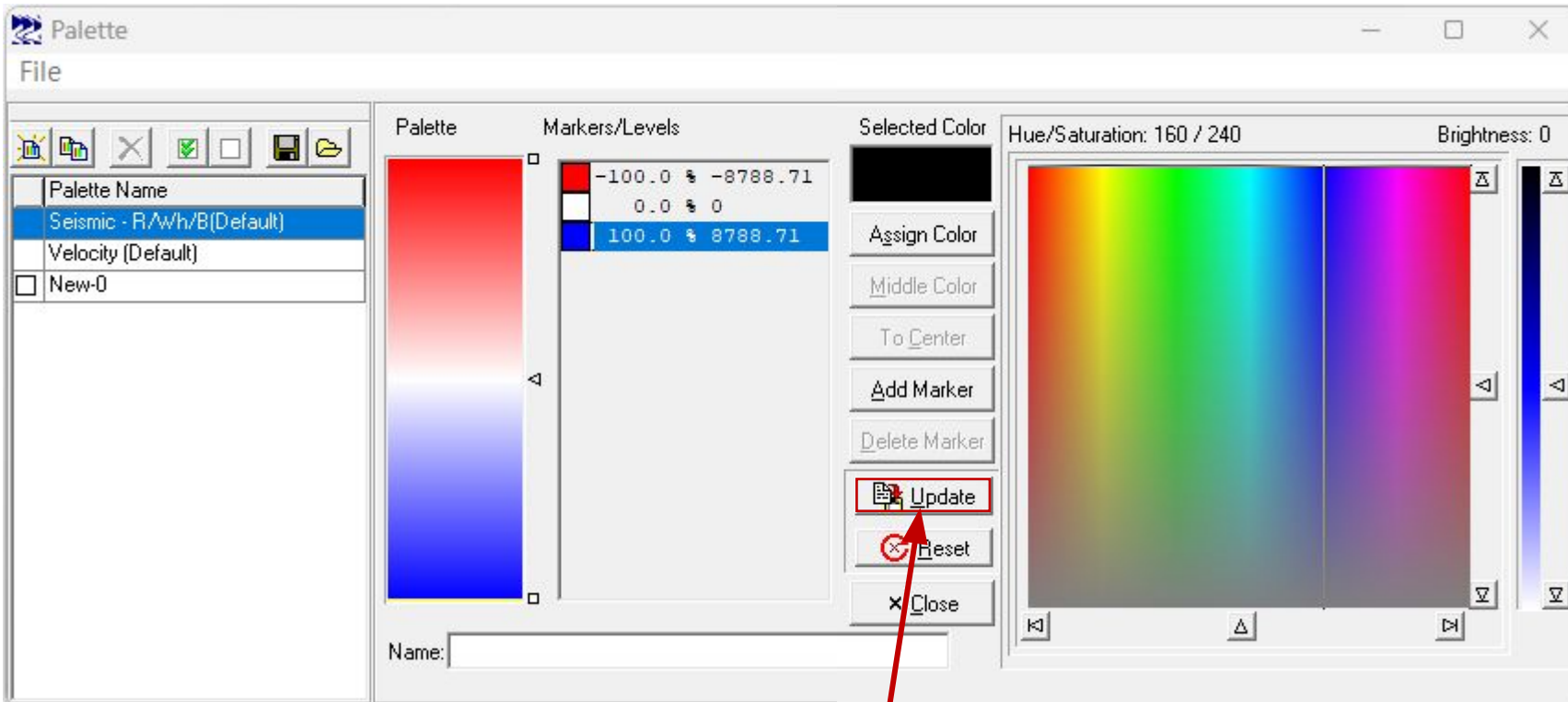
1. Double click

4. Assign color

3. Choose color box of positive amplitude

2. Choose the color you want
(I choose black)

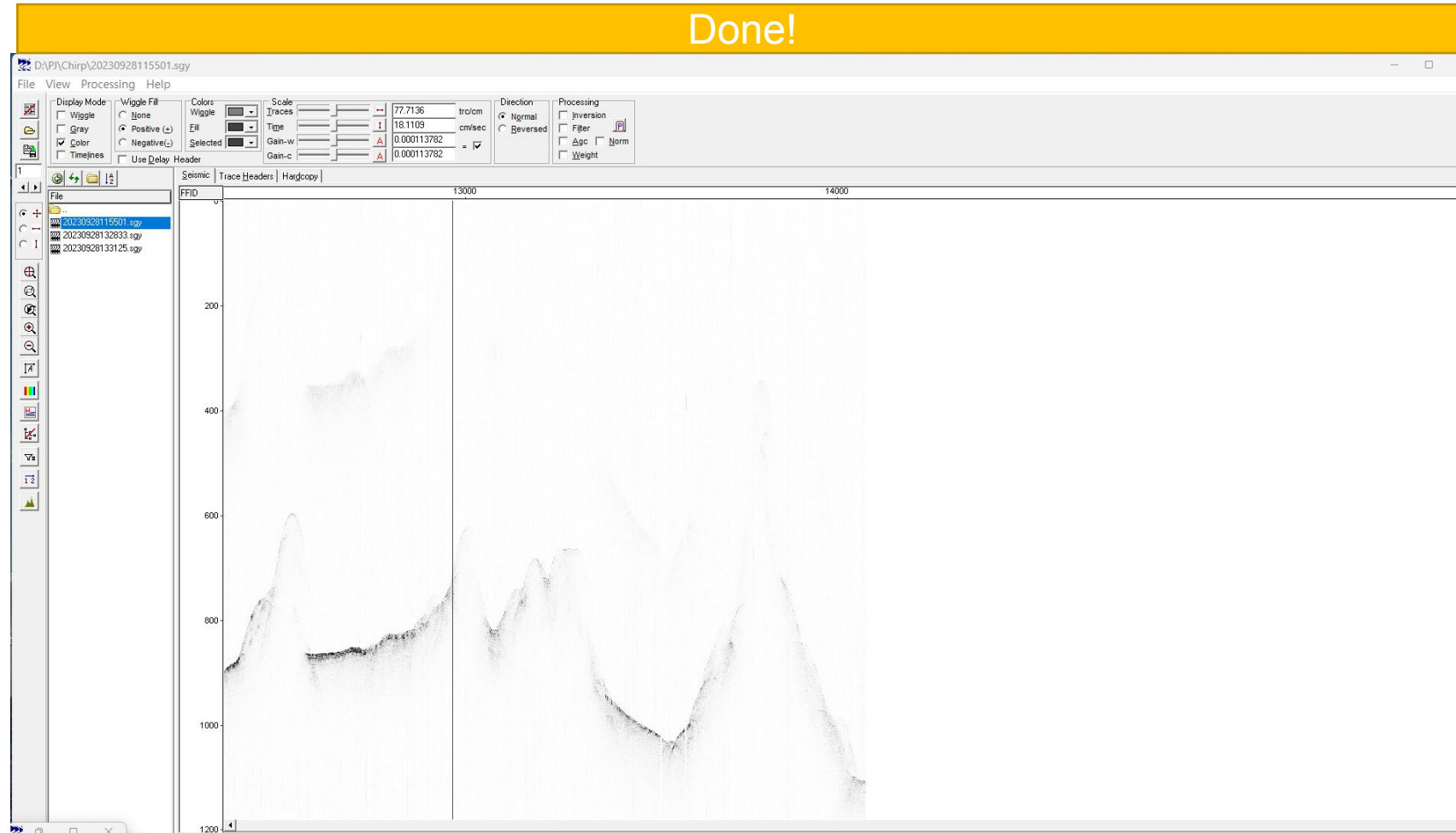
Profile presentation: color setting



5. Update

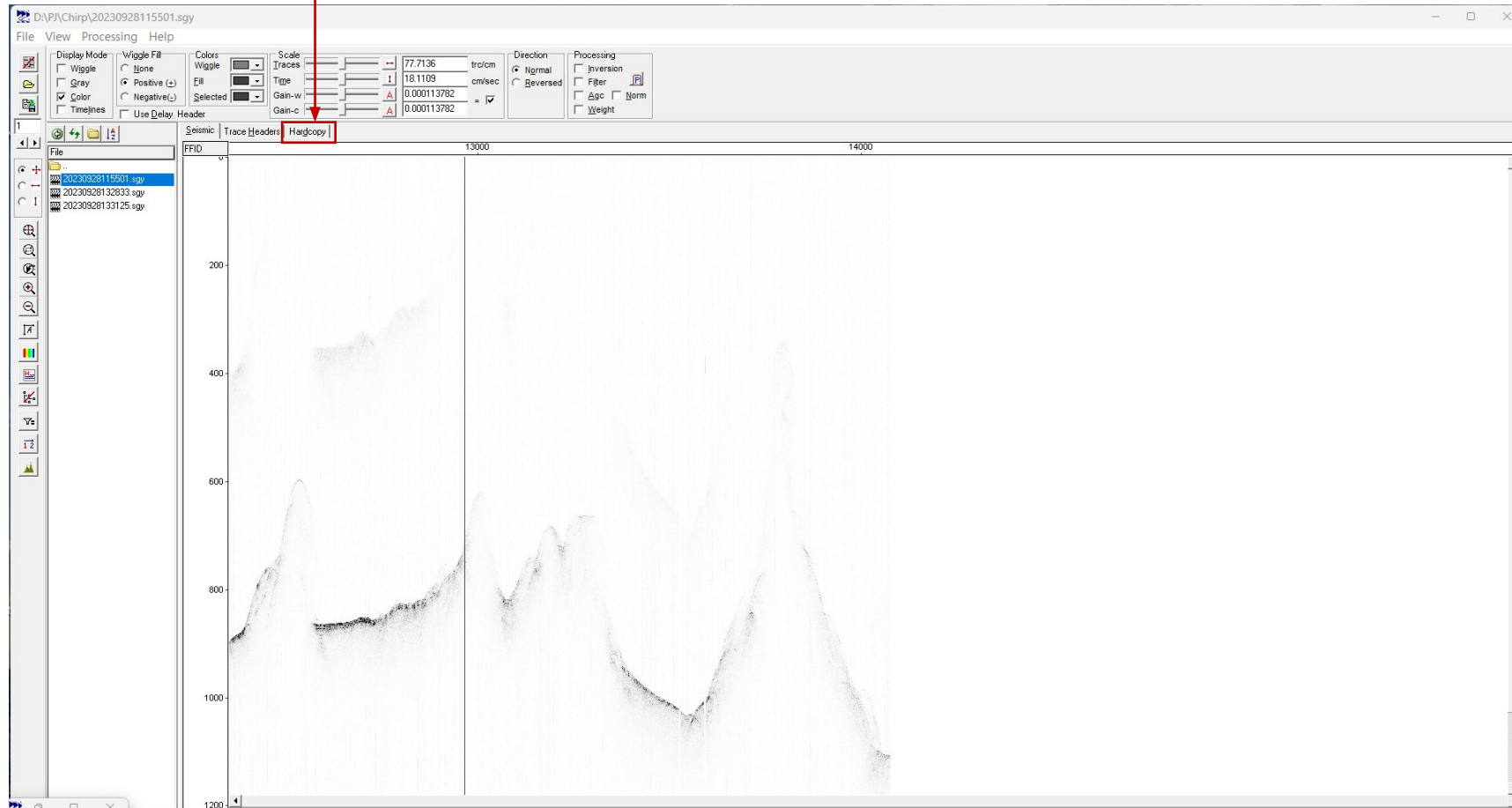
Profile presentation: color setting

Done!



Profile export

Hardcopy



Profile export: page size setting

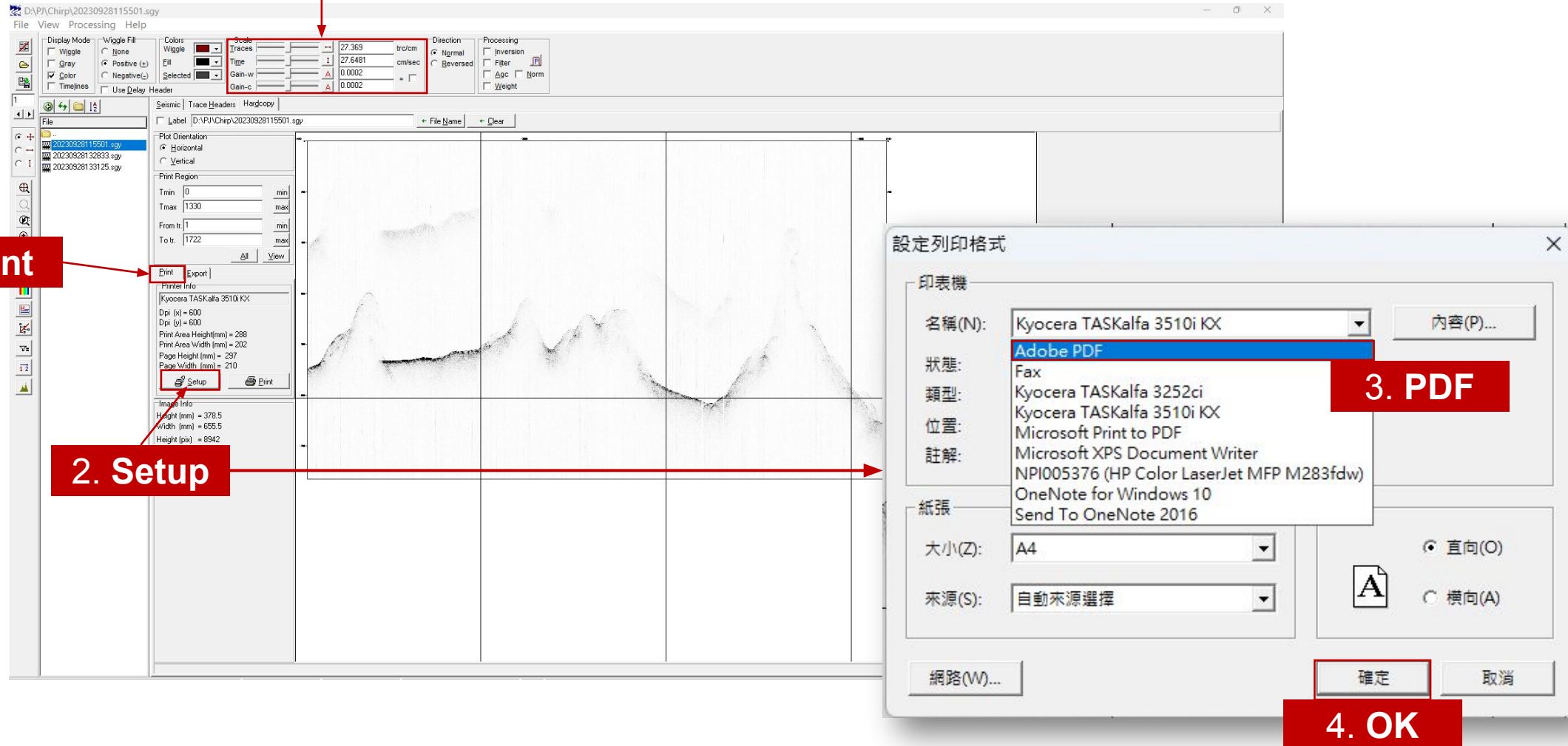
5. Adjust **scale** until profile fits 1 A4-page (now is 8)

1. Print

2. Setup

3. PDF

4. OK

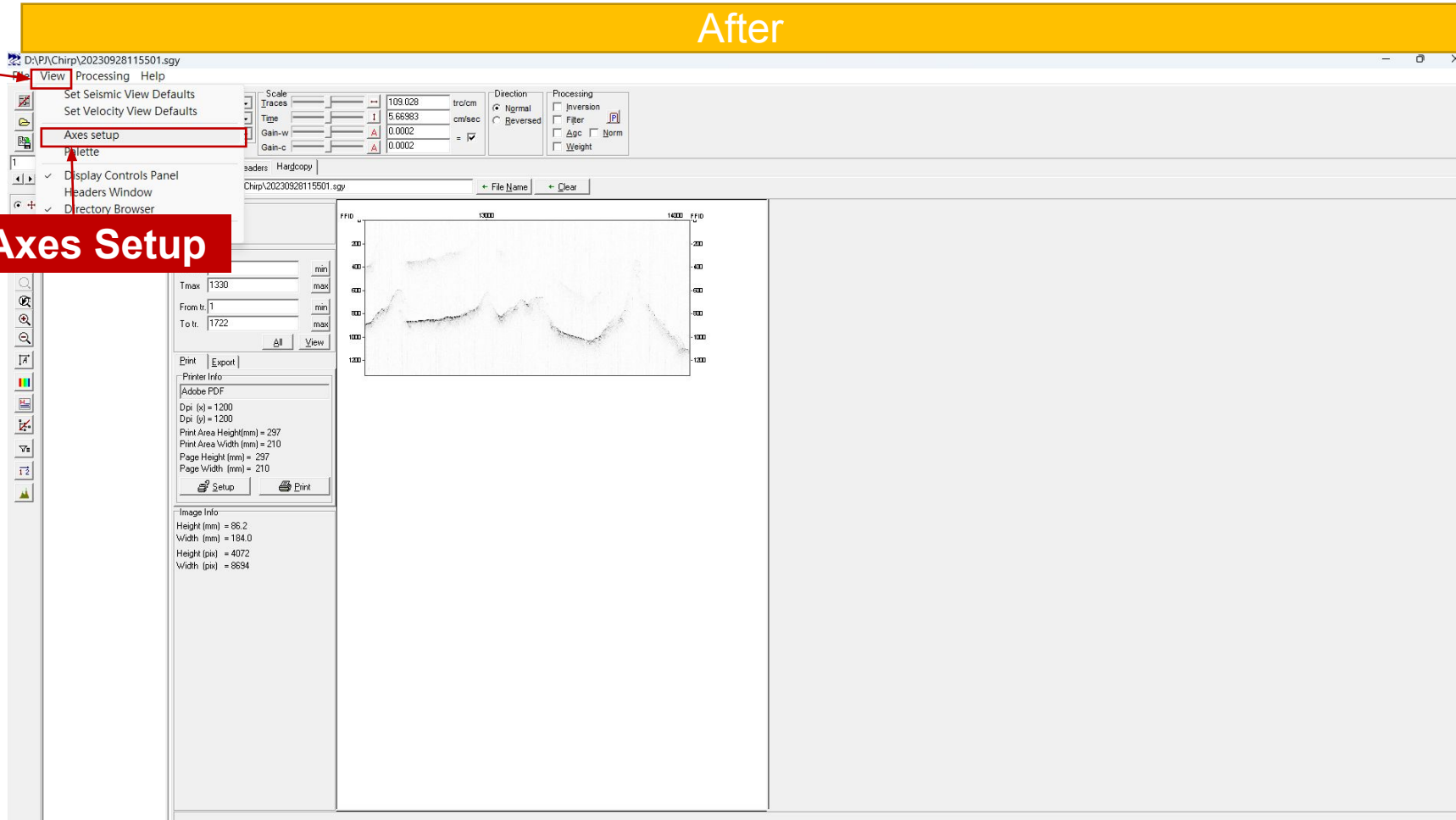


Profile export: XY-axis setting

After

1. View

2. Axes Setup



Profile export: XY-axis setting

4. Press L-arrow

3. Choose parameter (multiple OK)

6. OK

5. Choose step size

Label	Step	Start
FFID	0	0

Available Headers:

- * Trace index
- * Trace sequence number within line
- * Trace sequence number within reel
- * FFID -> Original field record number
- * Trace number within field record
- SP - Energy source point number
- CDP ensemble number
- Trace number
- * Trace identification code
- Number of vertically summed traces
- Number of horizontally stacked traces
- Data use (1-production, 2-test)
- Distance from source point to receiv grp
- Receiver group elevation
- Surface elevation at source
- Source depth below surface
- Datum elevation at receiver group
- Datum elevation at source
- Water depth at source
- Water depth at group

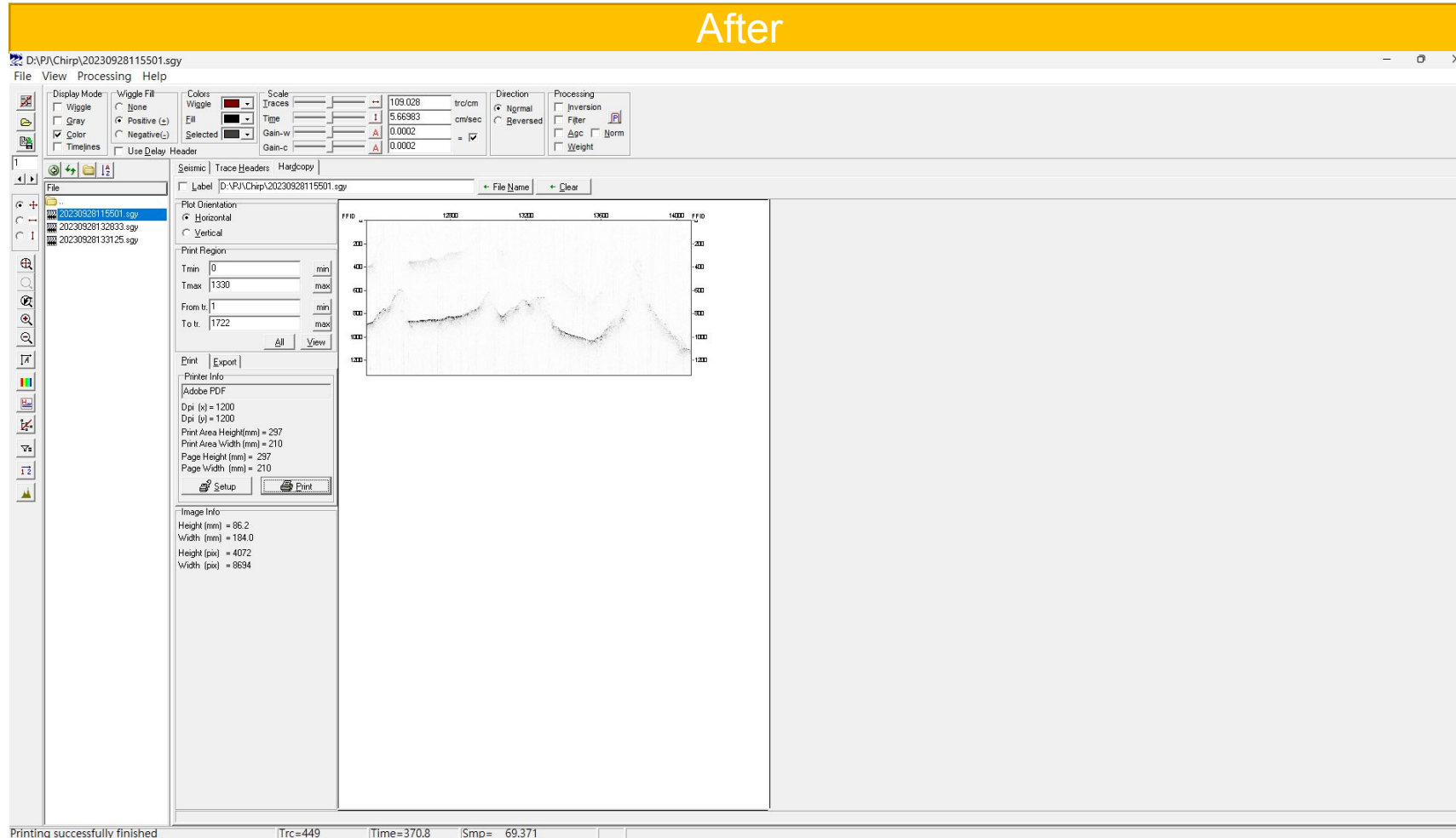
Step: 400 Start: 0

25
50
100
250
300
400
500
1000

OK Apply Close

Profile export: XY-axis setting

After



Profile export: notice

Attention! Don't press Tmax & All, ALERT! will occur
(Try go back to seismic page and decrease Tmax)

The screenshot shows the Seismic software interface. The main window displays a profile plot with a y-axis labeled 'FFID' ranging from -1200 to 200. The plot shows a seismic profile with several peaks and troughs. The x-axis represents time in milliseconds, with labels at 1300, 1350, 1400, and 1450. The status bar at the bottom indicates 'Parameter error : Tmax should be >= 0 and <= 1330.6 ms', 'Time=370.8', and 'Smo= 69.371'.

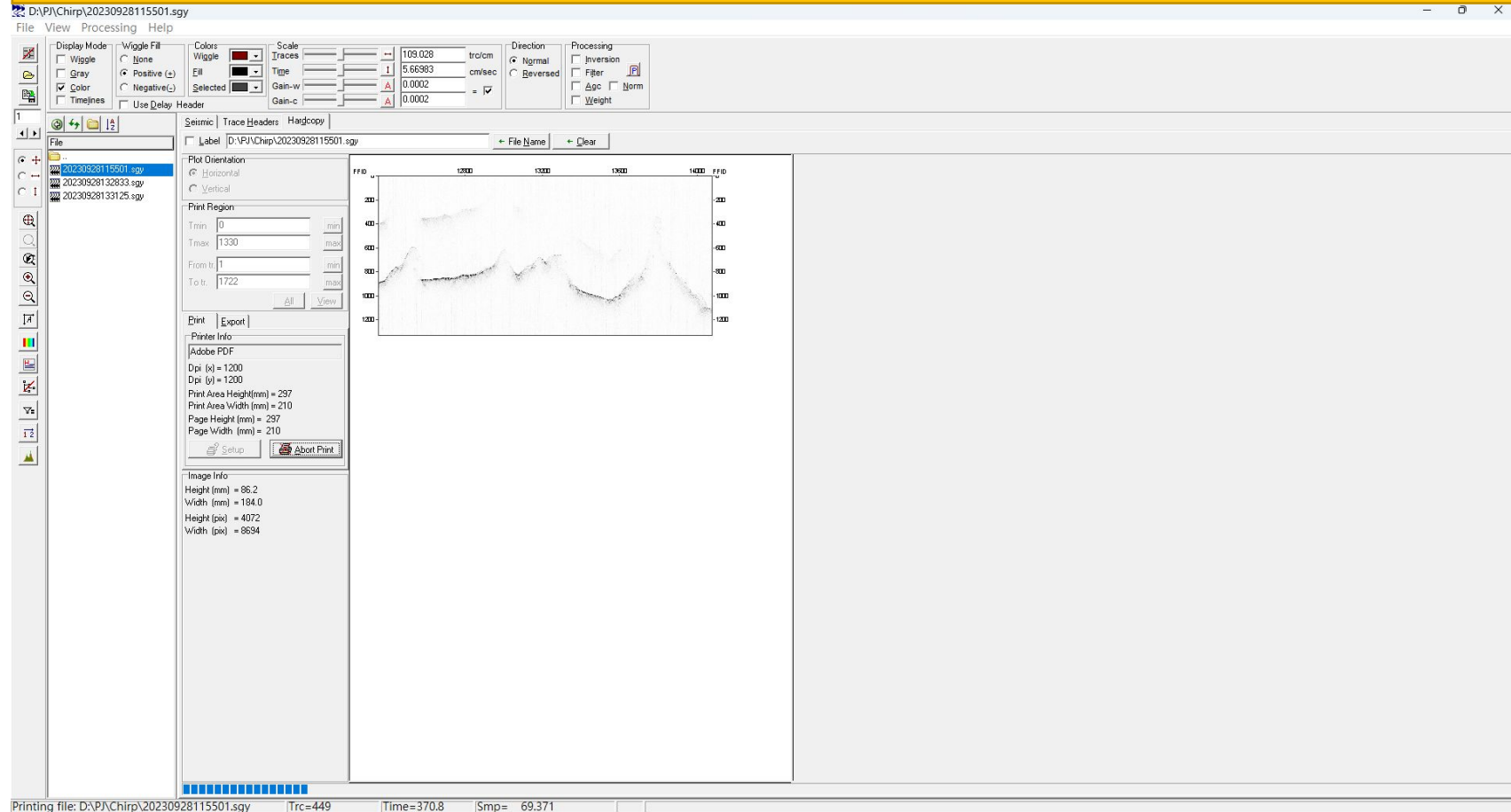
On the left side, there is a 'Print' button with a printer icon, which is highlighted by a red box and a red arrow pointing to it. A red text box on the left says 'Press Print after the profile is ok'.

An 'ALERT!' dialog box is displayed in the center, with the text 'Parameter error : Tmax should be >= 0 and <= 1330.6 ms' and an 'OK' button.

The software interface includes various settings and controls. At the top, there are tabs for 'Seismic', 'Trace Headers', and 'Hardcopy'. The 'Seismic' tab is active, showing a 'Label' field with the path 'D:\VP\Chirp\20230928115501.sgy'. Below this, there are 'Print Region' settings: 'Tmin' is 0, 'Tmax' is 1330.6, 'From tr' is 1, and 'To tr' is 1722. There are also 'Print' and 'Export' buttons. The 'Print' button is highlighted with a red box and a red arrow. The 'Export' button is also visible. The 'Printer Info' section shows 'Adobe PDF' as the selected printer, with 'Dpi (x)' and 'Dpi (y)' both set to 1200. The 'Print Area Height (mm)' is 297, 'Print Area Width (mm)' is 210, 'Page Height (mm)' is 297, and 'Page Width (mm)' is 210. The 'Image Info' section shows 'Height (mm)' as 86.2, 'Width (mm)' as 184.0, 'Height (pix)' as 4072, and 'Width (pix)' as 8634.

Profile export

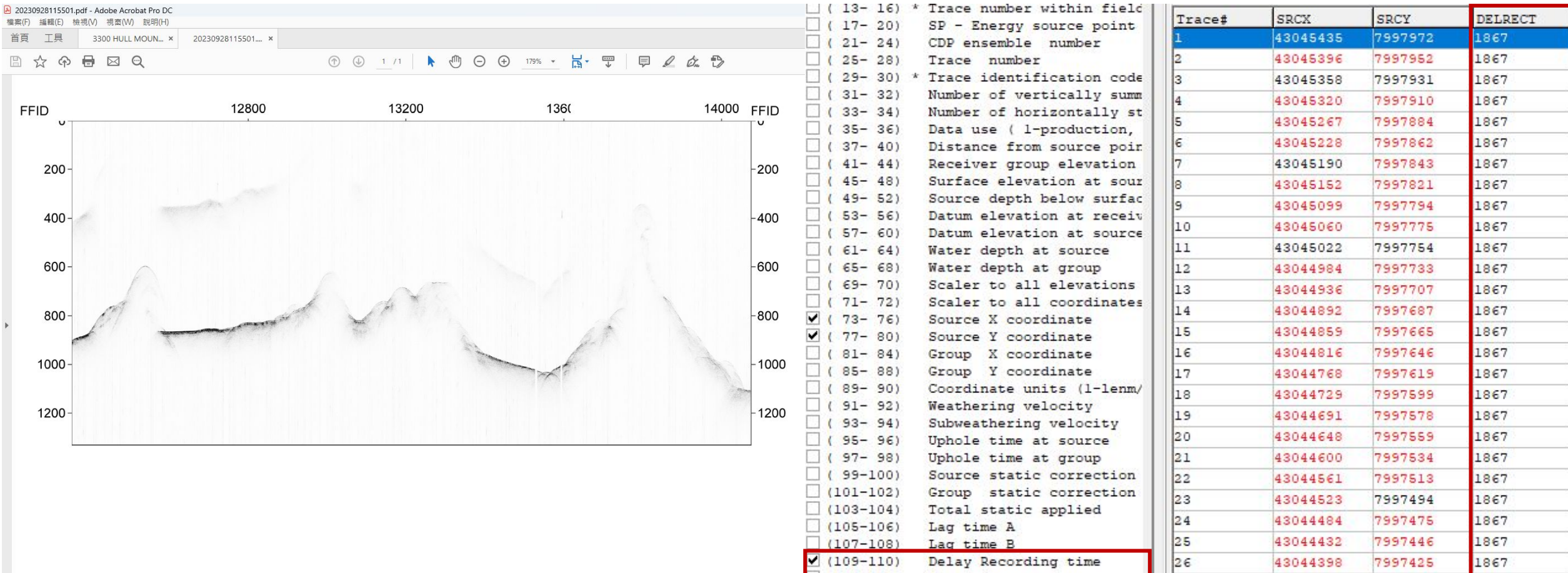
Loading...



Profile export

Done! Your Y-axis is Time in millisecond(ms), two-way travel time. You need to multiply it with delay time (See Header 109-110).

To edit PDF file, you can load it into CorelDraw, AI, etc.



Export XY coordinate of profile

The unit of X,Y coordinates are **arc-second**. To convert them to geographic location (Lon, Lat), please divide them with 3600 and plus with scale (-100 means 0.01)

D:\PJ\Chirp\20230928115501.sgy

File View Processing Help

Display Mode: ☐ Wiggle ☐ Gray ☒ Color ☐ TimeLines
Wiggle Fill: ☐ None ☒ Positive (+) ☐ Negative (-)
Colors: Wiggle: Fill: Selected:
Scale: Traces: trc/cm Time: cm/sec Gain-w: Gain-c:
Direction: ☒ Normal ☐ Reversed
Processing: ☐ Inversion ☐ Filter ☐ Agc ☐ Norm ☐ Weight

Summary | Text Header | Bin Header | Trace Header | Trace Data

Summary information

File : D:\PJ\Chirp\20230928115501.sgy

SEG-Y File

EBCDIC Text Header Encoding

Big Endian byte order

Traces : 1722
Trace Samples : 28927
Sample Format : 1
IBM Float (32 bit)
Sample Interval (uS) : 46
Time Length : 1330.596

Header First trace Last trace

SP	0	0
CDP	0	0
FFID	12351	14074

See information of this SEG-Y file

9- 12) * FFID - Original field rec

(13- 16) *	Trace number within field
(17- 20)	SP - Energy source point
(21- 24)	CDP ensemble number
(25- 28)	Trace number
(29- 30) *	Trace identification code
(31- 32)	Number of vertically summ
(33- 34)	Number of horizontally st
(35- 36)	Data use (1-production,
(37- 40)	Distance from source poi
(41- 44)	Receiver group elevation
(45- 48)	Surface elevation at sour
(49- 52)	Source depth below surfac
(53- 56)	Datum elevation at receiv
(57- 60)	Datum elevation at source
(61- 64)	Water depth at source
(65- 68)	Water depth at group
(69- 70)	Scaler to all elevations
(71- 72)	Scaler to all coordinates
(73- 76)	Source X coordinate
(77- 80)	Source Y coordinate
(81- 84)	Group X coordinate
(85- 88)	Group Y coordinate
(89- 90)	Coordinate units (1-lenm/
(91- 92)	Weathering velocity
(93- 94)	Subweathering velocity
(95- 96)	Uphole time at source
(97- 98)	Uphole time at group

Trace#	FFID	SAC	SRCX	SRCY
1	12351	-100	43045435	7997972
2	12352	-100	43045396	7997952
3	12353	-100	43045358	7997931
4	12354	-100	43045320	7997910
5	12355	-100	43045267	7997884
6	12356	-100	43045228	7997862
7	12357	-100	43045190	7997843
8	12358	-100	43045152	7997821
9	12359	-100	43045099	7997794
10	12360	-100	43045060	7997775
11	12361	-100	43045022	7997754
12	12362	-100	43044984	7997733
13	12363	-100	43044936	7997707
14	12364	-100	43044892	7997687
15	12365	-100	43044859	7997665
16	12366	-100	43044816	7997646
17	12367	-100	43044768	7997619
18	12368	-100	43044729	7997599
19	12369	-100	43044691	7997578
20	12370	-100	43044648	7997559
21	12371	-100	43044600	7997534

Export XY coordinate of profile

D:\PJ\Chirp\20230928115501.sgy

File View Processing Help

Display Mode: ☐ Wiggle ☐ Gray ☒ Color ☐ TimeLines
Wiggle Fill: ☐ None ☒ Positive (+) ☐ Negative (-)
Colors: Wiggle: Fill: Selected:
Scale: Traces: trc/cm Time: cm/sec Gain-w: Gain-c:
Direction: ☒ Normal ☐ Reversed
Processing: ☐ Inversion ☐ Filter ☐ Agc ☐ Norm ☐ Weight

Summary Text Header Bin Header Trace Header Trace Data

Summary information

File : D:\PJ\Chirp\20230928115501.sgy

SEG-Y File

EBCDIC Text Header Encoding

Big Endian byte order

Traces : 1722
Trace Samples : 28927
Sample Format : 1
IBM Float (32 bit)
Sample Interval (uS) : 46
Time Length : 1330.596

Header First trace Last trace

Seismic Trace Headers Hardcopy

View Change

☒ (1- 4) * Trace sequence number within field
☐ (5- 8) * Trace sequence number within field
☒ (9-12) * FFID - Original field record
☐ (13-16) * Trace number within field
☐ (17-20) SP - Energy source point
☐ (21-24) CDP ensemble number
☐ (25-28) Trace number
☐ (29-30) * Trace identification code
☐ (31-32) Number of vertically summed traces
☐ (33-34) Number of horizontally summed traces
☐ (35-36) Data use (1-production, 2-research)
☐ (37-40) Distance from source point
☐ (41-44) Receiver group elevation
☐ (45-48) Surface elevation at source
☐ (49-52) Source depth below surface
☐ (53-56) Datum elevation at receiver
☐ (57-60) Datum elevation at source
☐ (61-64) Water depth at source
☐ (65-68) Water depth at group
☐ (69-70) Scaler to all elevations
☒ (71-72) Scaler to all coordinates
☒ (73-76) Source X coordinate
☒ (77-80) Source Y coordinate
☐ (81-84) Group X coordinate
☐ (85-88) Group Y coordinate
☐ (89-90) Coordinate units (1-lenm, 2-m, 3-ft)
☐ (91-92) Weathering velocity
☐ (93-94) Subweathering velocity
☐ (95-96) Uphole time at source
☐ (97-98) Uphole time at group

Search

Trace# =

Edit

Trace# =

Trace#	FFID	SAC	SRCX	SRCY
1	12351	-100	43045435	7997972
2	12352	-100	43045396	7997952
3	12353	-100	43045358	7997931
4	12354	-100	43045320	7997910
5	12355	-100	43045267	7997884
6	12356	-100	43045228	7997862
7	12357	-100	43045190	7997843
8	12358	-100	43045152	7997821
9	12359	-100	43045099	7997794
10	12360	-100	43045060	7997775
11	12361	-100	43045022	7997754
12	12362	-100	43044984	7997733
13	12363	-100	43044936	7997707
14	12364	-100	43044892	7997687
15	12365	-100	43044859	7997665
16	12366	-100	43044816	7997646
17	12367	-100	43044768	7997619
18	12368	-100	43044729	7997599
19	12369	-100	43044691	7997578
20	12370	-100	43044648	7997559
21	12371	-100	43044600	7997534

1. Tick
X coordinate: header 73-76
Y coordinate: header 77-80
Scale: header 71-72

Export XY coordinate of profile

2. File

3. Export Trace Header to ASCII file

File View Processing Help

Open
Reopen
Open Directory
Save As
Trace Selection
Trace Sort
Load Text Header from File
Save Text Header to File
Export Trace Headers to ASCII file
Import Trace Headers from ASCII file
Header Encoding
Exit

Scale
Traces 14.1047 trc/cm
Time 108.844 cm/sec
Gain-w 0.000108
Gain-c 0.000108

Direction
Normal
Reversed

Processing
Inversion
Filter
Agc
Norm
Weight

Bin Header Trace Header Trace Data

Seismic Trace Headers Hardcopy

View Change

Search

Trace# FFID SAC SRCX SRCY

1	12351	-100	43045435	7997972
2	12352	-100	43045396	7997952
3	12353	-100	43045358	7997931
4	12354	-100	43045320	7997910
5	12355	-100	43045267	7997884
6	12356	-100	43045228	7997862
7	12357	-100	43045190	7997843
8	12358	-100	43045152	7997821
9	12359	-100	43045099	7997794
10	12360	-100	43045060	7997775
11	12361	-100	43045022	7997754
12	12362	-100	43044984	7997733
13	12363	-100	43044936	7997707
14	12364	-100	43044892	7997687
15	12365	-100	43044859	7997665
16	12366	-100	43044816	7997646
17	12367	-100	43044768	7997619
18	12368	-100	43044729	7997599
19	12369	-100	43044691	7997578
20	12370	-100	43044648	7997559
21	12371	-100	43044600	7997534

Traces : 1722
Trace Samples : 28927
Sample Format : 1
Sample Interval (uS) : 46
Time Length : 1330.596

Header First trace Last trace
SP 0 0
CDP 0 0
FFID 12351 14074

Trace number
SP - Energy source point
CDP ensemble number
Trace number
Trace identification code
Number of vertically summ
Number of horizontally st
Data use (1-production,
Distance from source poir
Receiver group elevation
Surface elevation at sour
Source depth below surfac
Datum elevation at receiv
Datum elevation at source
Water depth at source
Water depth at group
Scaler to all elevations
Scaler to all coordinates
Source X coordinate
Source Y coordinate
Group X coordinate
Group Y coordinate
Coordinate units (1-lenm/
Weathering velocity
Subweathering velocity
Uphole time at source
Uphole time at group

Export XY coordinate of profile

Notice! Origin X,Y coordinates are in arc-second. To get degree, please divide them by 3600 then multiply by scale (100 means 100, -100 means 0.01). You can calculate the file with Excel, Gawk, ...

For example: SRCX(1)=43045435 (arc-second)
 $43045435/3600*0.01=119.57$ (degree)

The screenshot displays a seismic data processing software interface. The 'Summary' tab is active, showing file information for 'D:\PJ\Chirp\20230928\115501.sgy'. The file is a SEG-Y File with EBCDIC Text Header Encoding and Big Endian byte order. It contains 1722 traces, 28927 samples, and has a sample interval of 46 uS and a time length of 1330.596. The 'Trace Headers' tab is also visible, showing a list of traces with their coordinates. A red box highlights the first trace (Trace# 1) with SRCX=43045435 and SRCY=7997972. A red arrow points from the text in the previous block to this trace.

Trace#	FFID	SAC	SRCX	SRCY
1	12351	-100	43045435	7997972
2	12352	-100	43045396	7997952
3	12353	-100	43045358	7997931
4	12354	-100	43045320	7997910
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21	12371	-100	43044600	7997534