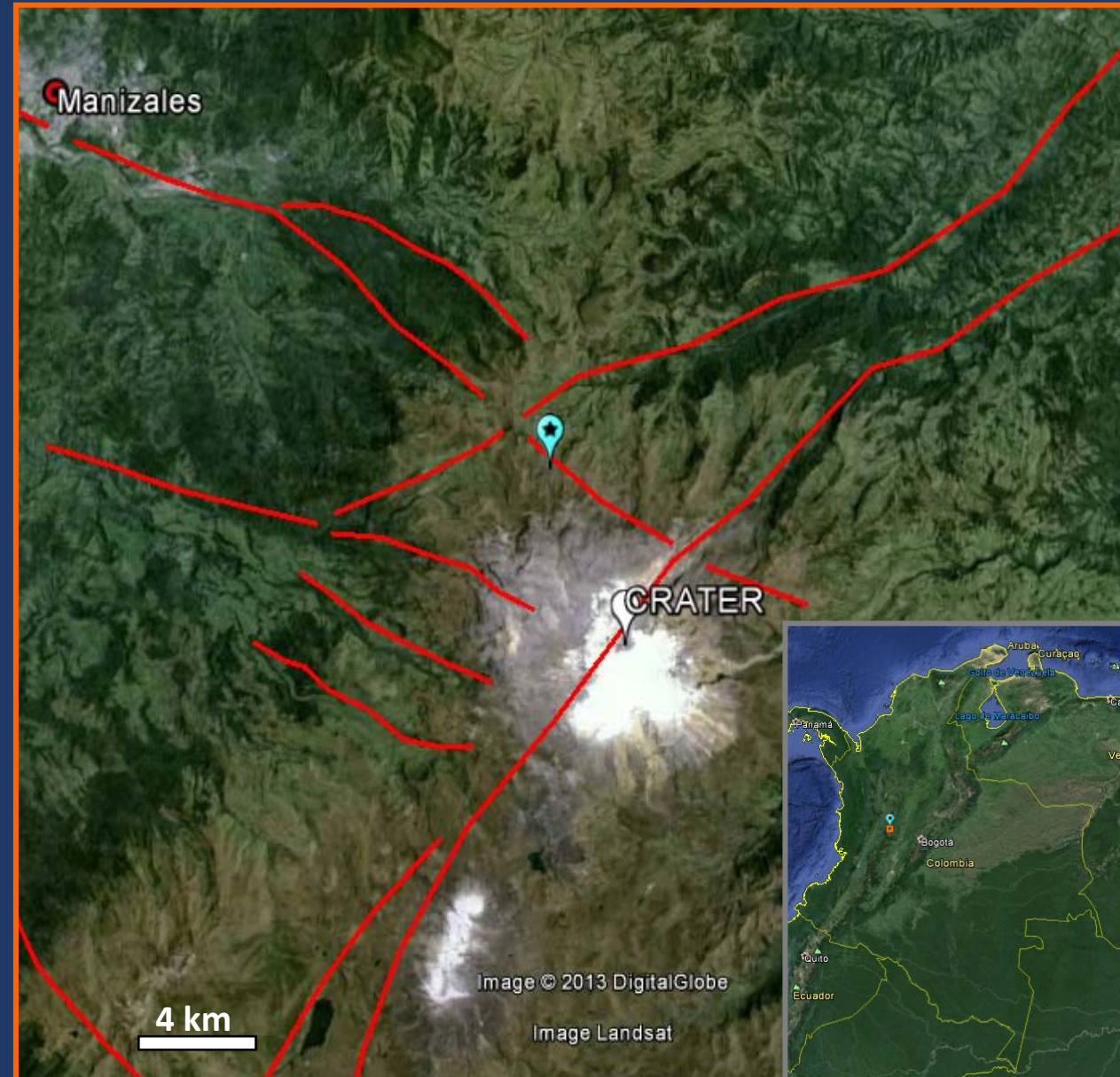


WORKING WITH ISOLA_GUI_2013 (Sep. 30 to Oct. 4 2013)

VOLCANOTECTONIC EARTHWAKE (VT) VOLCÁN NEVADO DEL RUIZ (COLOMBIA)

DATE : 2013/04/21
TIME : 07:41:51.85
LATITUDE : 04°56'35.32"N
LONGITUDE : 75°20'30.12"W
DEPTH : 7.35 km
MAGNITUDE: 3.9



INSPECTING DATA IN SeisGram

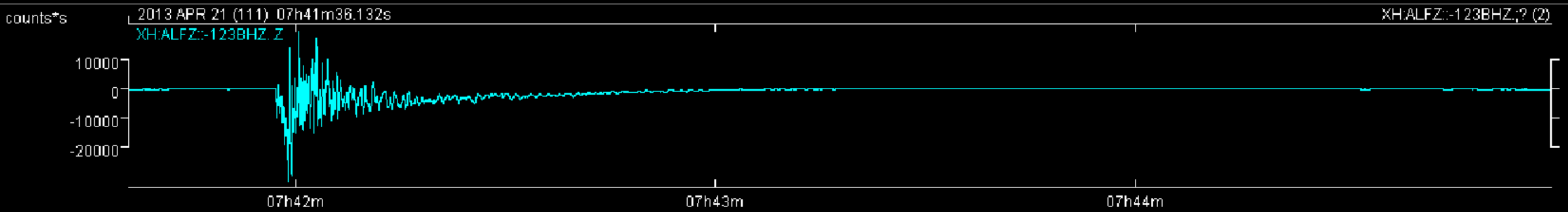
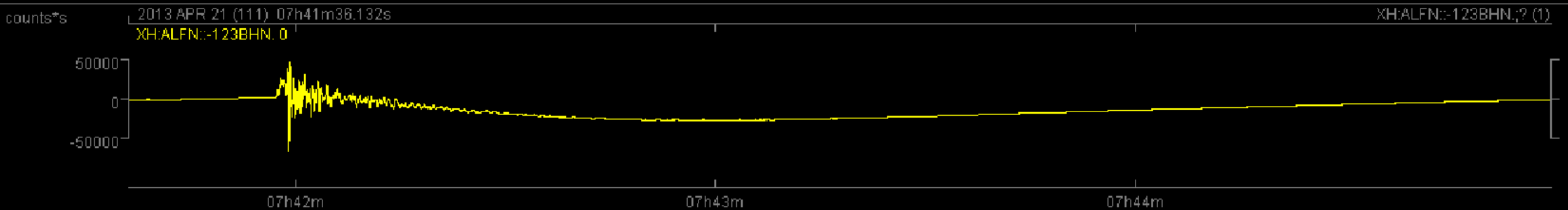
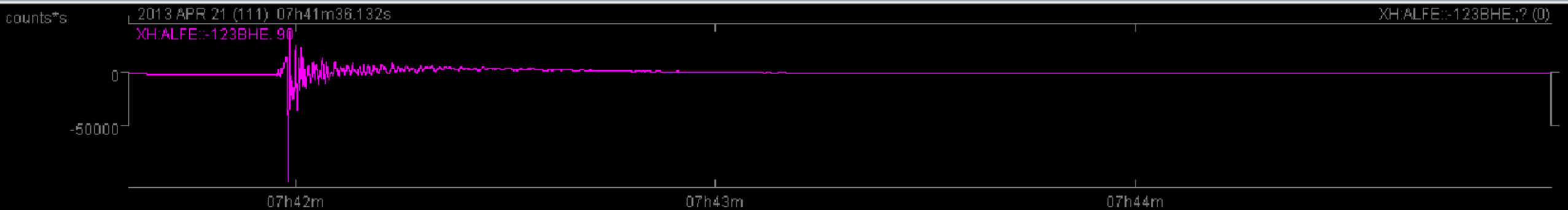
SeisGram2K v6.0.0X01 (BETA) - XH:ALFZ:-123BHZ;? 2013 APR 21 (111) 07h41m36.132s

File View Insert Utilities Presets Help

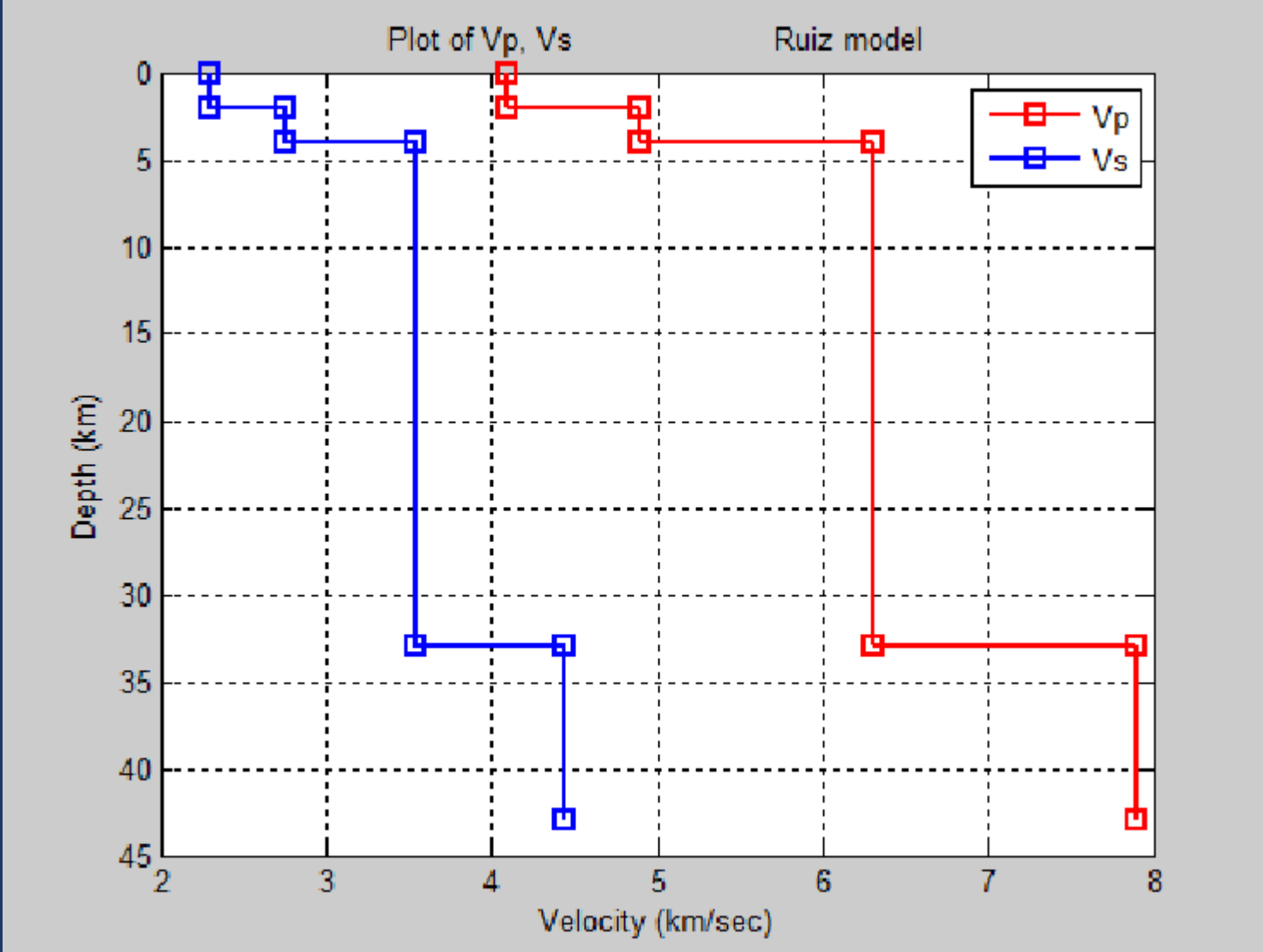
SEISMIC SIGNALS – ALFN STATION

Initial Previous Overlap

Pick... Rotate... Filter... Freq... Phases... Event... Time domain... Multi Comp... RemoveMean Integrate Differentiate PlotSpectral RemoveGain



CRUSTAL MODEL



EVENT INFO

eventinfo

Date
Date (YYYYMMDD)
20130421

Location
Lat (Deg,Min) 38.00 50.00
DDMM-> DDEG
Lat (N) (Dec.Degrees) 4.9432
Depth (km) 7.35
Lon (Deg,Min) 21.00 50.00
Lon (E) (Dec.Degrees) -75.3417

Origin Time
Hour 07
Min 41
Seconds 51.85

Comments
Magnitude 3.9
Location agency SGC_OVSM

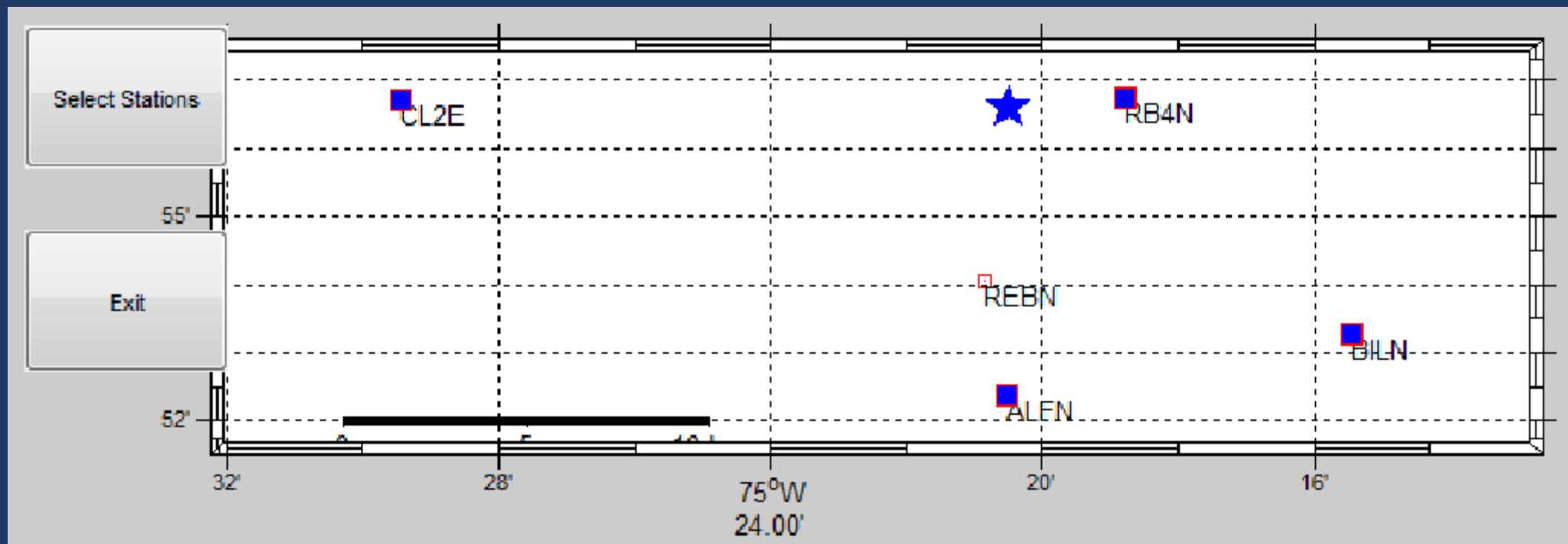
Time Window Length (sec)
16.384
40.96
81.92
163.84
245.76
327.68
409.6
819.2
1638.4

The choosen Time Window Length should be large enough to include the travel time from epicenter to stations plus the seismogram duration

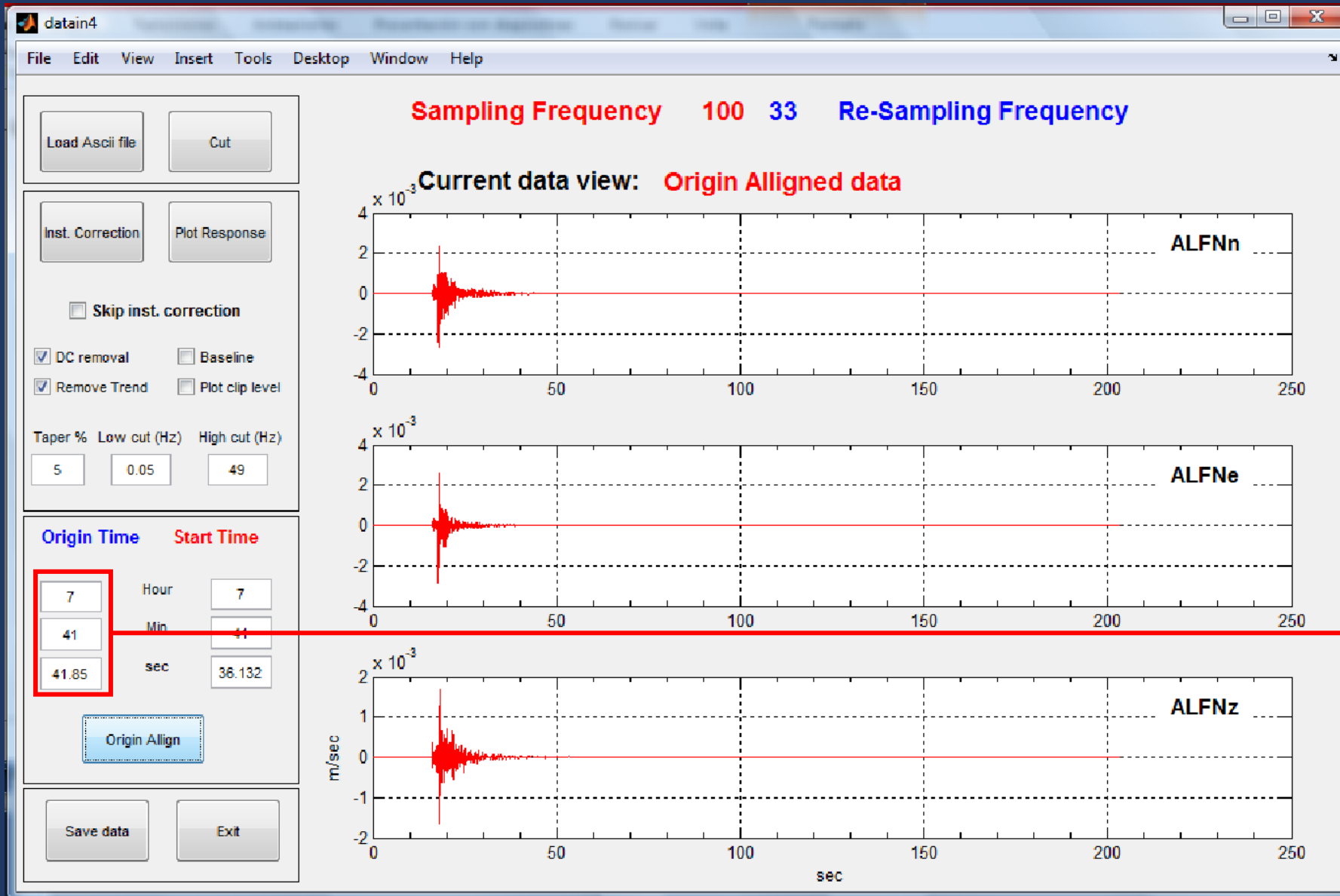
Automatic form fill
e.g. 20100118 1556 8.38 38 25.19 21E55.44 8.29 5.23
Paste your EventInfo here Read

Save
Exit

SELECTED STATIONS

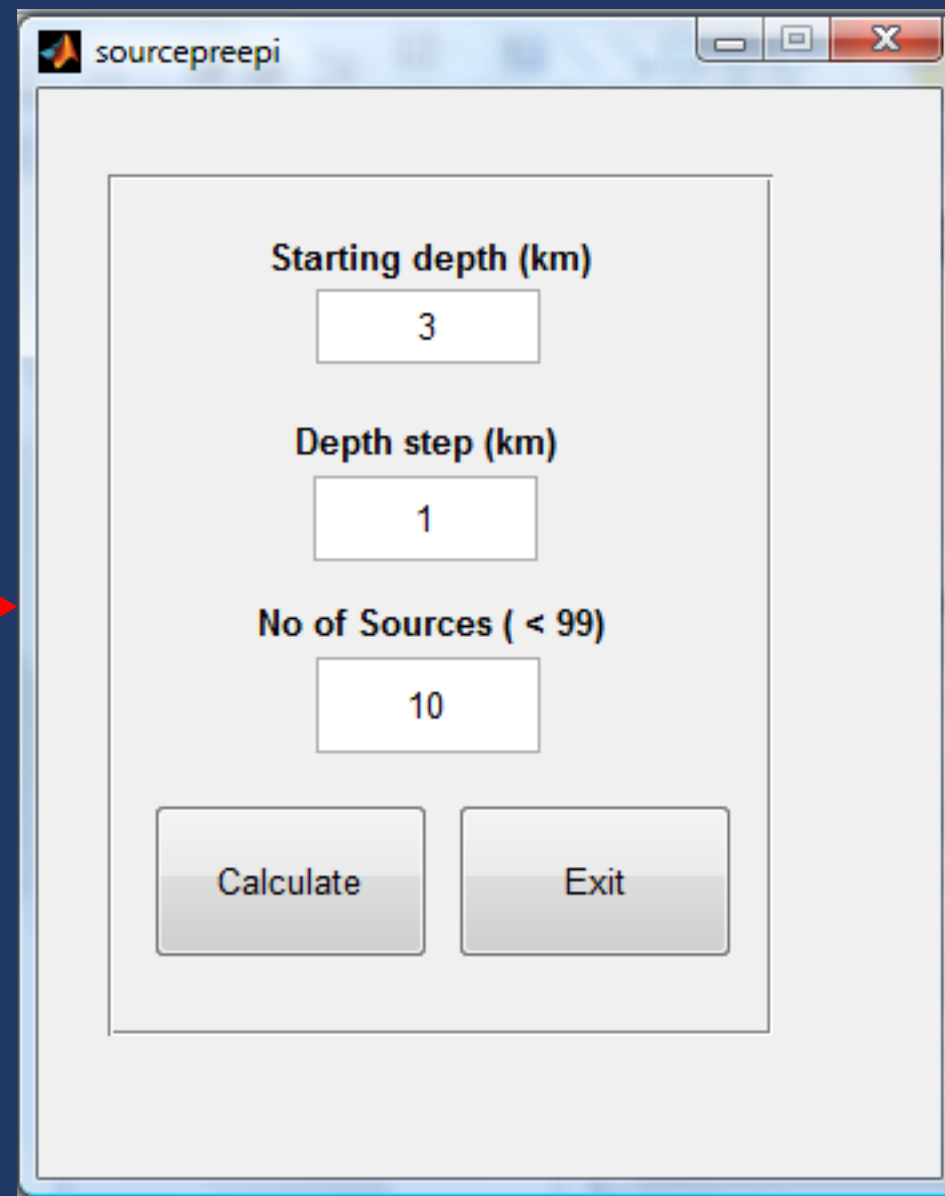
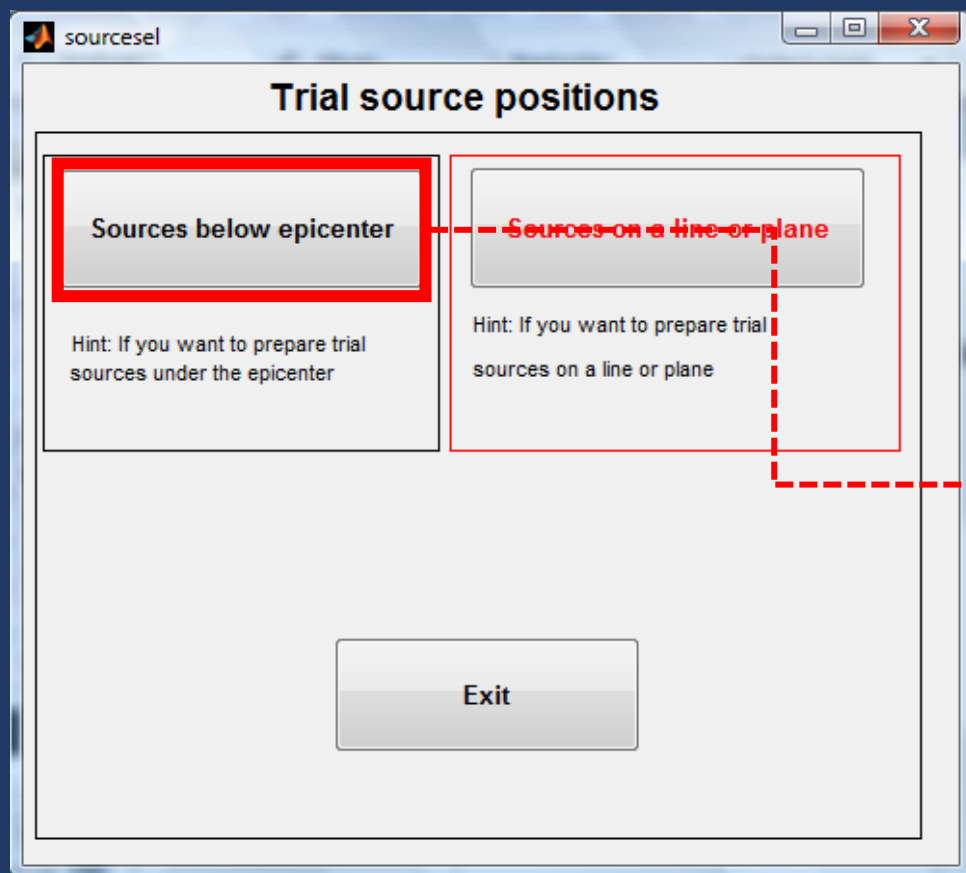


DATA PREPARATION



Origin Time
was changed
10 s

VERTICAL SOURCE



GREEN FUNCTION

The screenshot shows a software window titled 'greenpre'. It contains three main sections: input parameters, a 'Time Function' section, and a results table. The 'Maximum Frequency to compute (Hz)' is set to 1.001. The 'Time Function' is set to 'Delta' with a 'Duration' of 3. The results table shows a 'Time length' of 245.76, 'No of Sources' of 10, and 'No of Stations' of 5. There are 'Run' and 'Exit' buttons on the right side.

Green Function computation parameters	
Time length	245.76
No of Sources	10
No of Stations	5

INVERSION

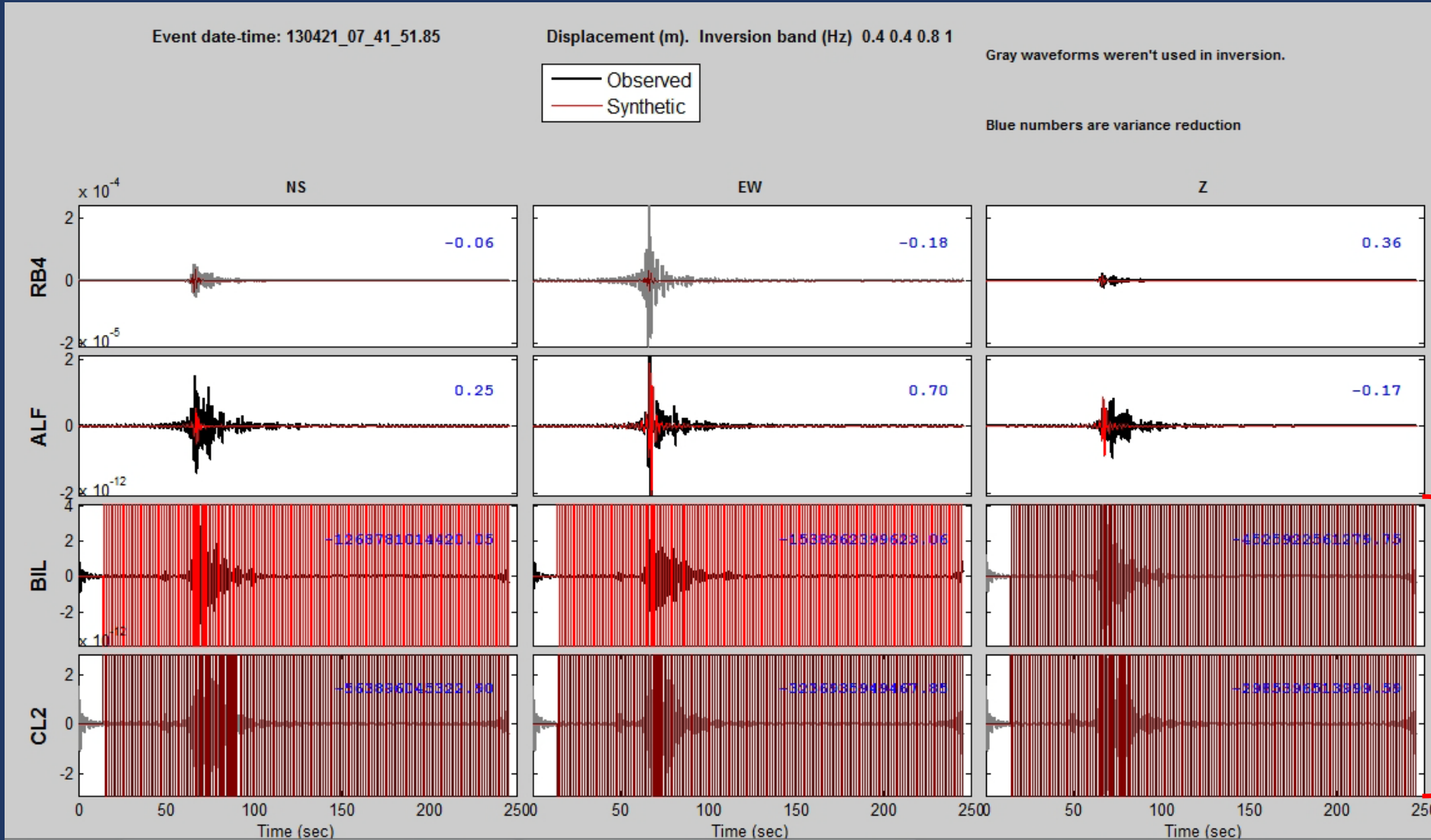
The screenshot shows the 'invert' software interface with several sections highlighted by red boxes:

- Filter (Hz):** A table with columns f1, f2, f3, f4 and values 0.04, 0.04, 0.8, 1. A red box highlights this table and the 'S/N Ratio using f1 f4' label.
- Time Search (sec):** A section with 'Start' (-7.02), 'Time Step' (0.21), and 'End' (13.02) fields. A red box highlights this section.
- Plot options:** A section with various checkboxes and input fields for plotting, including 'Plot Scale X' (21), 'Plot Scale Y' (18), 'Beachball Scale' (0.35), 'Font size' (10), 'Contour interval' (0.1), 'Beachball cut off %' (0), and 'GMT Palette' (cool). A red box highlights this section.

High frequencies

Time scale changed because Origen Time was changed

WAVEFORMS: PLOT REAL VS SYNTHETICS



Problem:
instrumental
response error,
A0
(normalization
constant) is
wrong

WAVEFORMS: PLOT REAL VS SYNTHETICS

Isola_inversion results

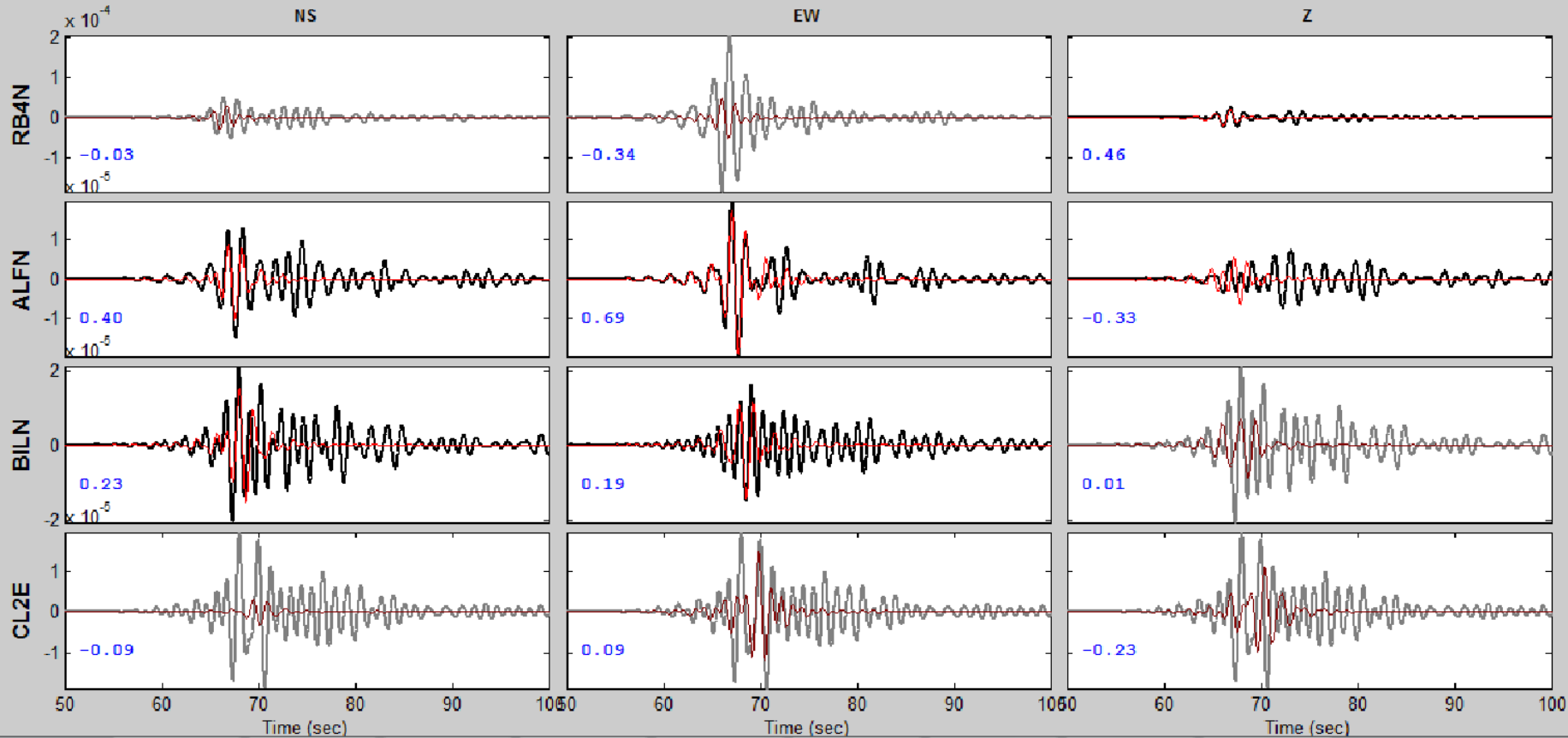
Event date-time: 130421_07_41_51.85

Displacement (m). Inversion band (Hz) 0.4 0.5 0.9 1

Gray waveforms weren't used in inversion.

— Observed
— Synthetic

Blue numbers are variance reduction

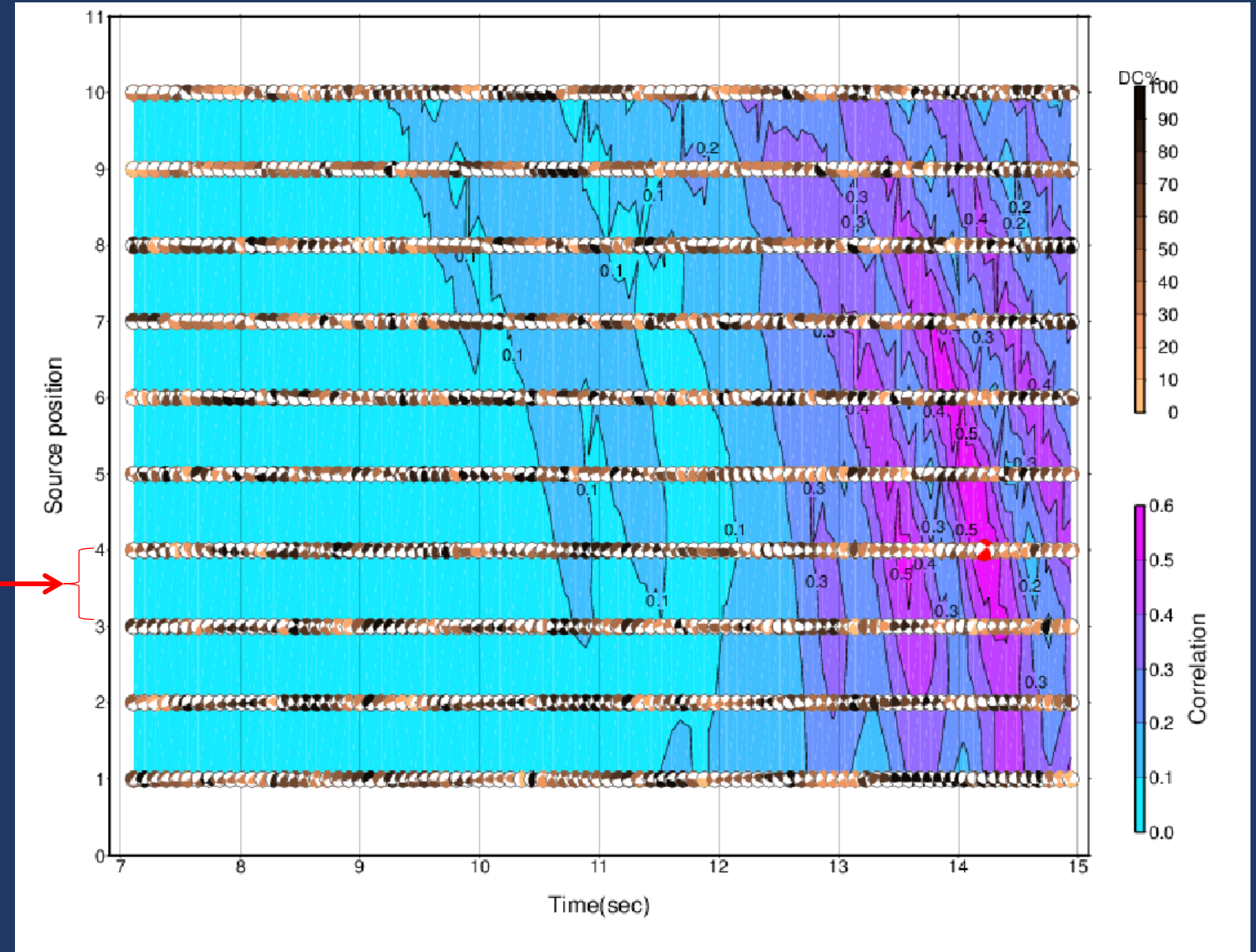


High frequencies

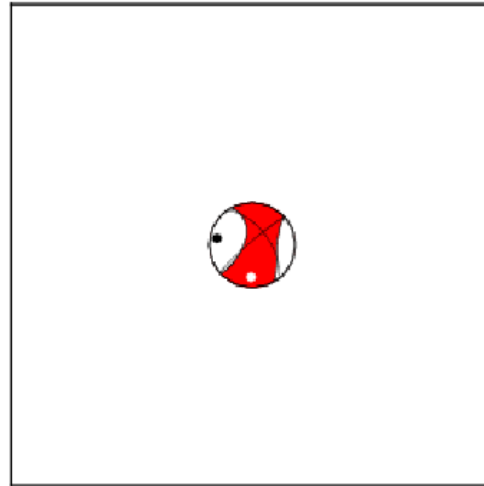
Problem solved!

CENTROID: correlation diagram

Vertical grid search step at 1 km



MOMENT TENSOR



MOMENT TENSOR SOLUTION

HYPOCENTER LOCATION (SGC OVSM)

Origin time 20130421 07:41:51.85
Lat 4.9432 Lon -75.3417 Depth 7.35

CENTROID

Trial source number : 4 (Fixed Epicenter inversion)
Centroid Lat (N)4.9432 Lon (E)-75.3417
Centroid Depth (km) : 6
Centroid time : +14.22 (sec) relative to origin time

Moment (Nm) : 2.856e+014

Mw : 3.6

VOL% : 0

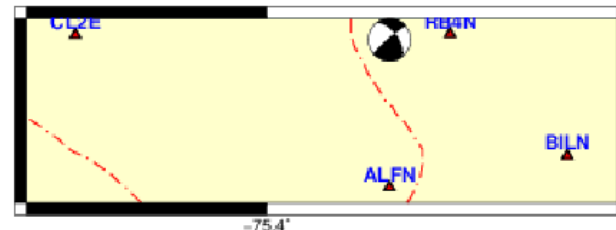
DC% : 33.5

CLVD% : 66.5

Var.red.: (for stations used in inversion): -0.27 SNR CN FMVAR STVAR
NaN 2.7 9±7 0.01

Var.red. (for all stations) : -0.26

Strike	Dip	Rake	Frequency band used in inversion (Hz)
323	59	7	0.4 - 0.5 -- 0.9 - 1
229	84	149	

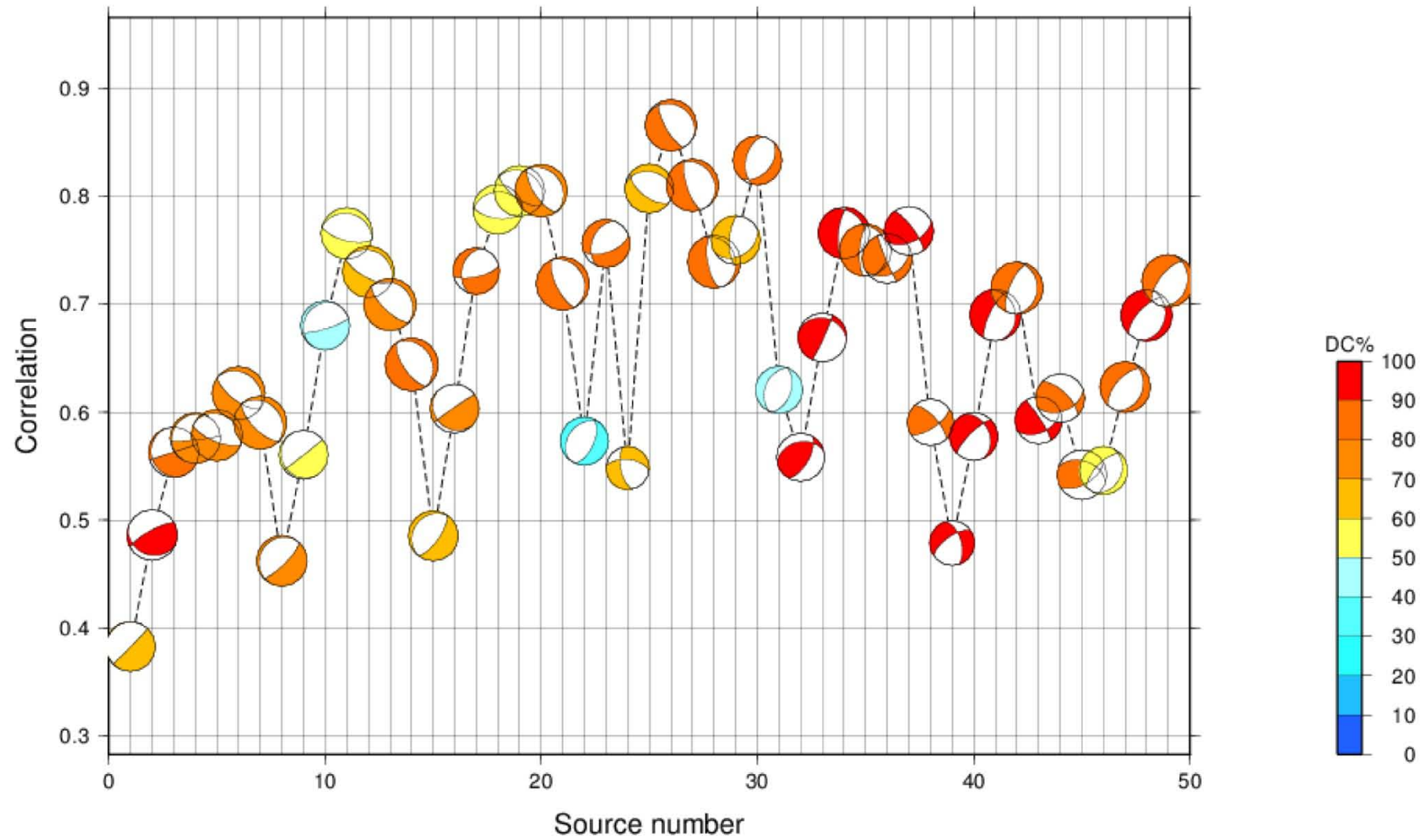


Strike	Dip	Rake	Frequency band used in inversion (Hz)
323	59	7	0.4 - 0.5 -- 0.9 - 1
229	84	149	

	NS	EW	Z	D(km)
P-axis Azimuth Plunge	RB4N	-	-	+ 3
		280		17
T-axis Azimuth Plunge	ALFN	+	+	+ 8
	BILN	+	+	- 11
	CL2E	-	-	- 17

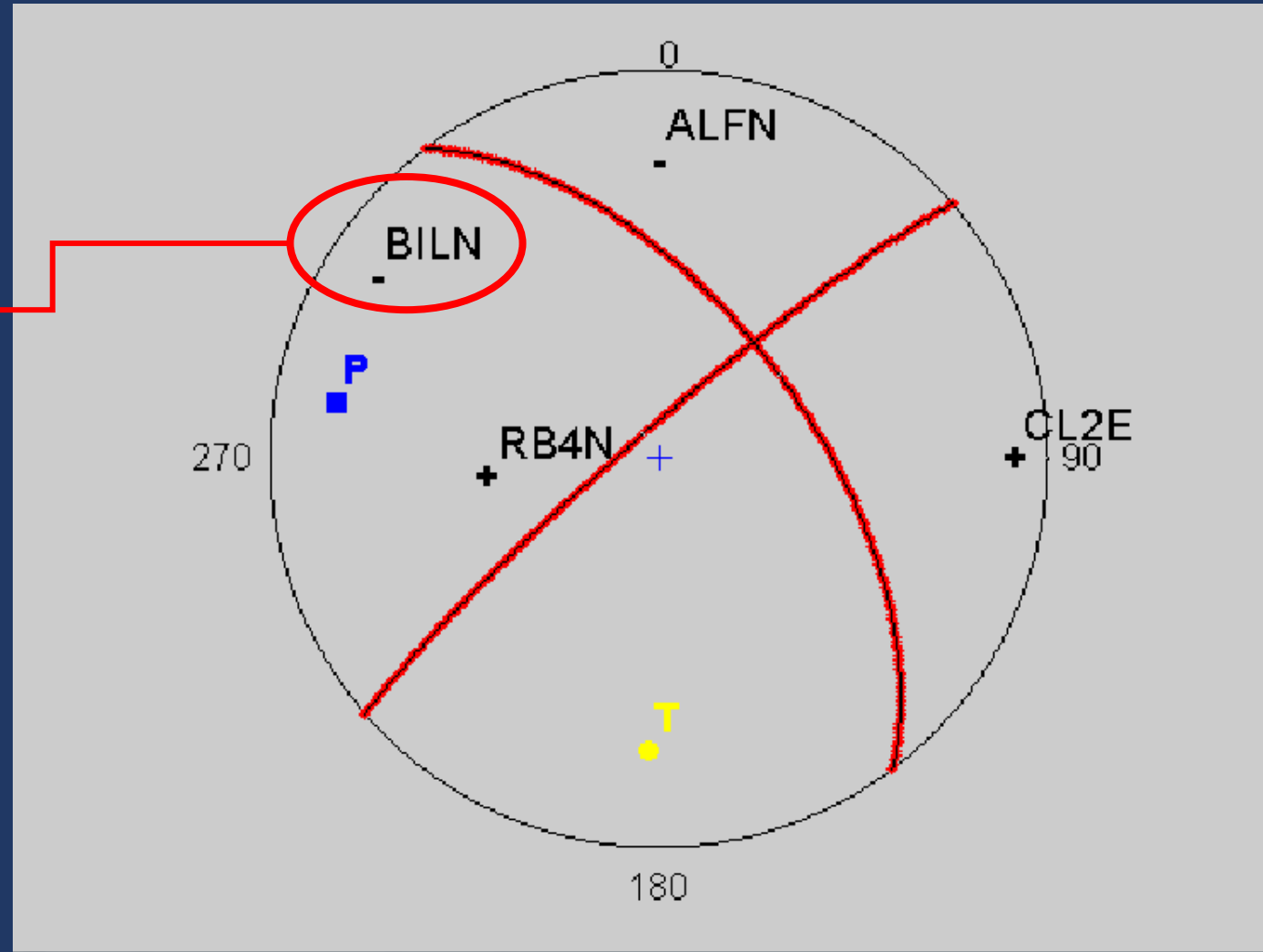
Mrr	Mtt	Mpp
0.922	1.832	-2.753
Mrt	Mrp	Mtp
-0.635	-1.160	-0.716
Exponent (Nm): 14		

Correlation vs Source number Plot



FOCAL MECHANISMS POLARITIES

Incompatible
polarity
Why?



UNCERTAINTY ESTIMATION

comp_uncert

Select an option

Prescribe Data Variance

Estimate Data Variance

Select C value

C

Parameters

Source no

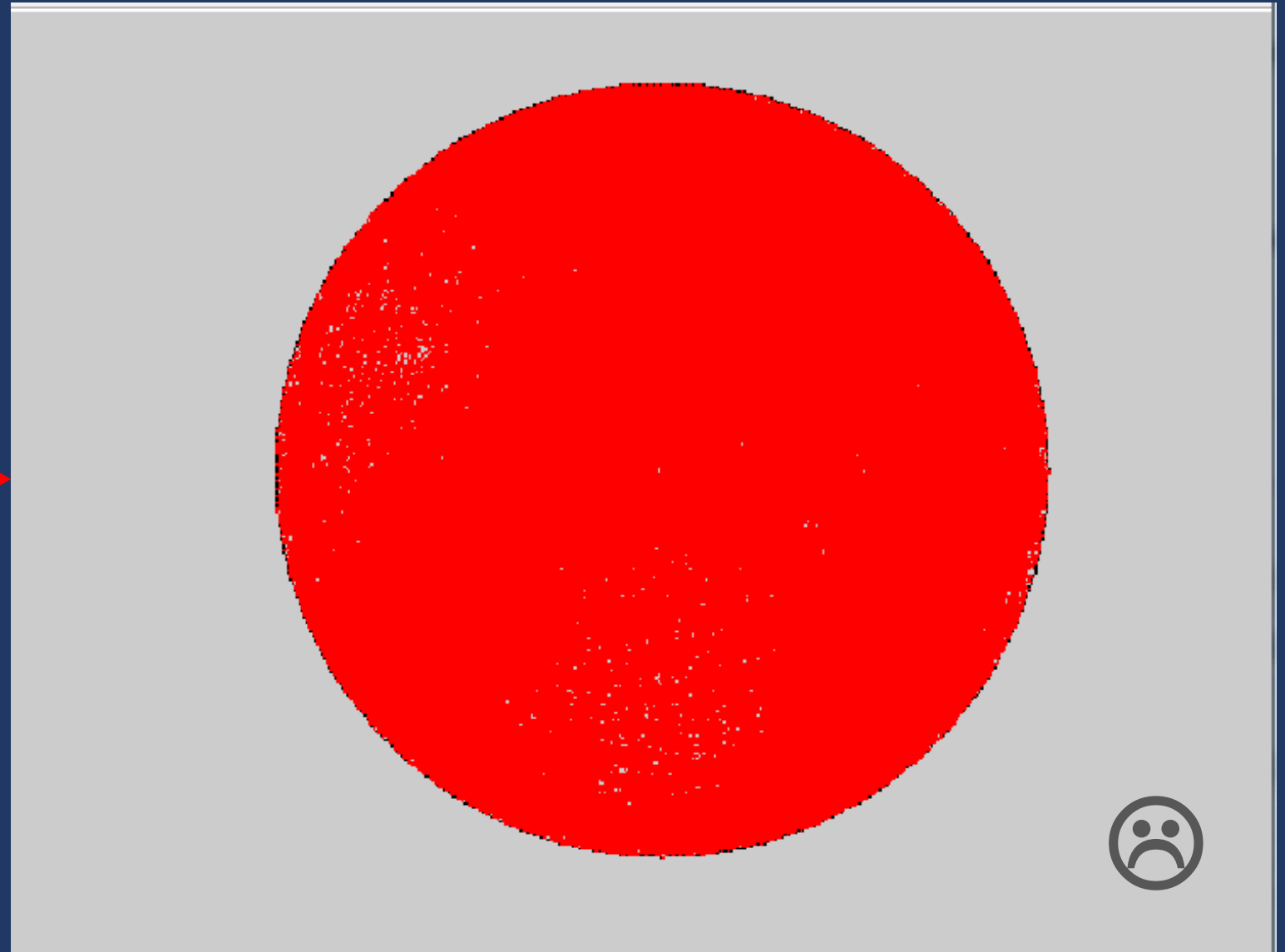
Current frequency range is:

f1	f2	f3	f4
<input type="text" value="0.4"/>	<input type="text" value="0.4"/>	<input type="text" value="0.8"/>	<input type="text" value="1"/>

Strike	Dip	Rake	Moment
<input type="text" value="230"/>	<input type="text" value="76"/>	<input type="text" value="137"/>	<input type="text" value="2.6e+014"/>

1

2



HORIZONTAL SOURCE

sourcecel

Trial source positions

Sources below epicenter

Hint: If you want to prepare trial sources under the epicenter

Sources on a line or plane

Hint: If you want to prepare trial sources on a line or plane

Exit

sourcepre

Event parameters

Magnitude	Date	Lat	Lon
3.9	20130421	4.9432	-75.3417

New Reference point position

Depth (km)	Shift to North (km)	Shift to East (km)
7.35	0	0

Trial Sources Plane Orientation

Strike

Dip

Hint: Specify the Strike and Dip of the trial sources Plane. For a horizontal plane choose Strike=0 and Dip=0.

Total number of trial sources

49

Calculate

Exit

No of Sources (along strike)

Spacing along Strike (km)

Length (km)

30

No of Sources (along dip)

Spacing along Dip (km)

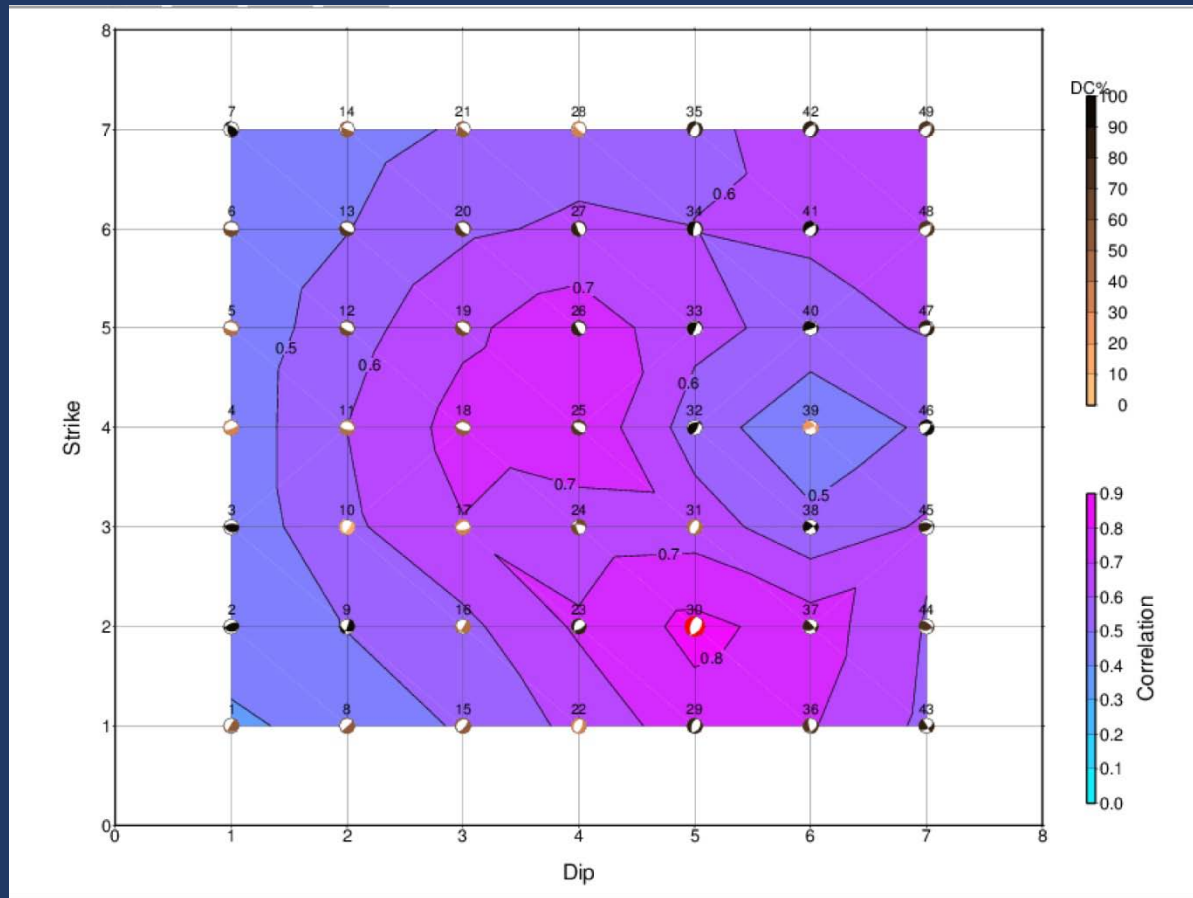
Width (km)

30

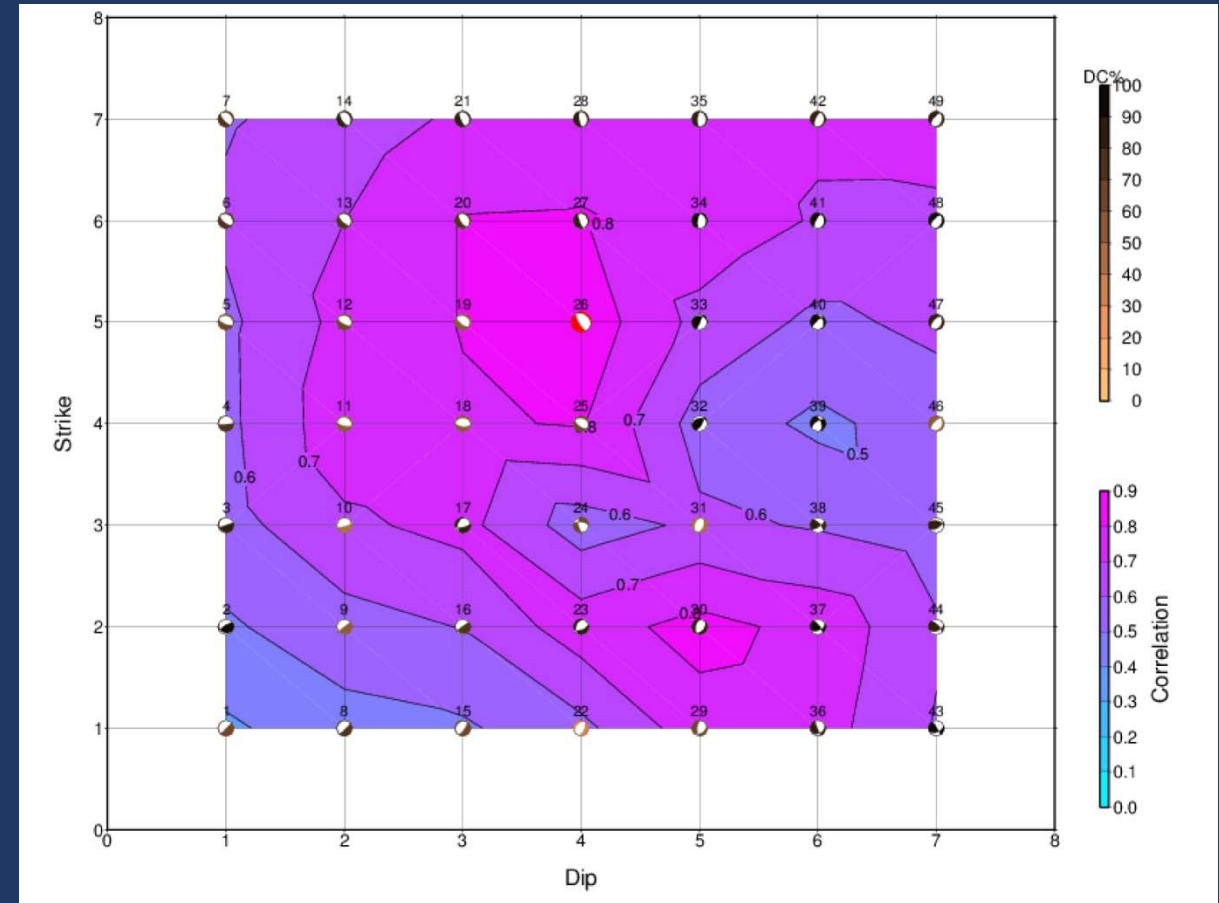
Reference point at Strike source number:

Reference point at Dip source number:

CENTROID: correlation diagram (horizontal search)



Low frequencies



high frequencies



THANK YOU 😊