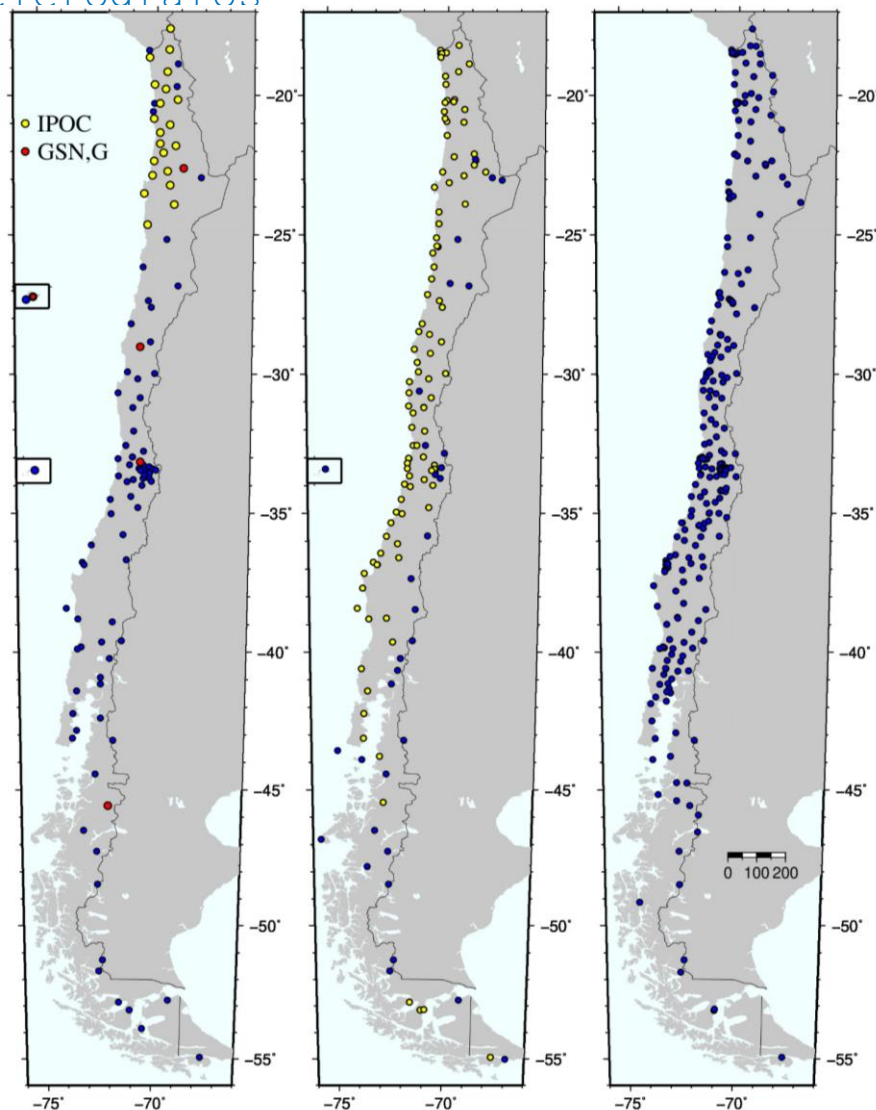


Sistema de Observación

Banda ancha
acelerógrafos 118

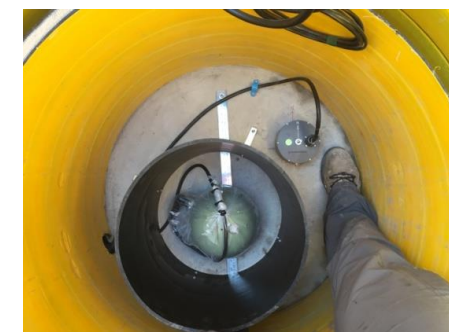
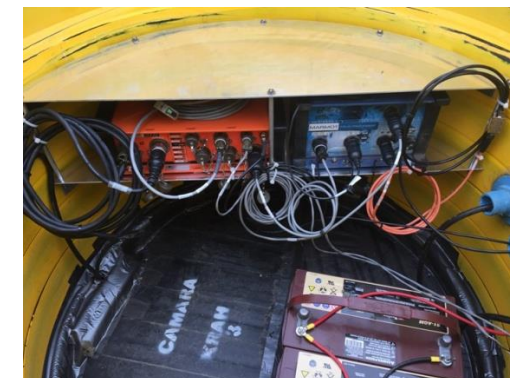


118 Estaciones mult.
BB + acelerómetro
(IPOC, G, GSN)

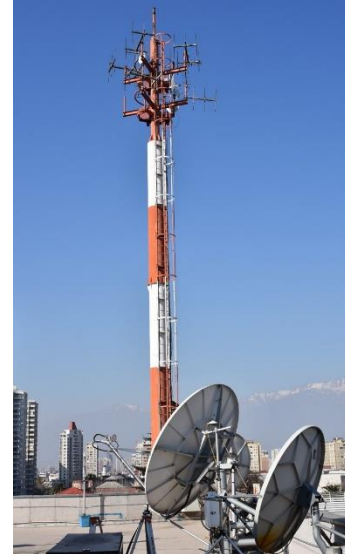
128 GNSS

Estimación de
desplaz.
291 acelerógrafos para
Ingeniería

(Minvu-Onemi)



Data Center



Sistemas espejo instalados en
ONEMI y SHOA
Puestos de trabajo en Onemi

CSN CENTRO SISMOLÓGICO NACIONAL
UNIVERSIDAD DE CHILE

fcfm FACULTAD DE CIENCIAS FÍSICAS Y MATEMÁTICAS
UNIVERSIDAD DE CHILE

Sismicidad Educación Novedades

Últimos Sismos *

Fecha Local	Lugar	Magnitud
2019/05/28 08:00:30	164 km al SO de Puerto Williams	3.2 MI
2019/05/28 03:47:16	43 km al SE de Pica	3.1 MI
2019/05/28 02:36:46	34 km al NO de La Higuera	3.2 MI
2019/05/28 00:29:25	77 km al SE de Socaire	3.6 MI
2019/05/27 23:59:28	142 km al O de Constitución	3.4 MI
2019/05/27 21:52:45	104 km al NE de Socaire	3.2 MI
2019/05/27 20:53:06	41 km al E de Pica	3.6 MI
2019/05/27 20:30:04	112 km al SE de Socaire	3.7 MI
2019/05/27 19:41:03	122 km al E de Socaire	3.6 MI
2019/05/27 18:44:26	9 km al O de Alto del Carmen	4.6 Mw
2019/05/27 17:56:14	50 km al O de Punitaqui	4.2 MI
2019/05/27 16:30:53	29 km al NO de La Ligua	3.4 MI
2019/05/27 12:33:19	75 km al NE de San Pedro de Atacama	3.3 MI
2019/05/27 11:25:26	26 km al O de Valparaíso	4.3 MI
2019/05/27 11:09:51	141 km al NE de Socaire	3.9 MI

Sismicidad

Conoce el registro sísmico más reciente y explora los eventos de un día o mes específico.

Catálogo

Visita el registro de movimiento fuerte, donde podrás revisar la información instrumental de eventos significativos del catálogo.

Visitar

Te invitamos a contestar una encuesta de satisfacción para conocer tu opinión sobre el Centro Sismológico Nacional.

Encuesta

Educación

¿Te apasiona la ciencia? ¿Te interesa conocer el mundo de la Geofísica? Da el primer paso familiarizándote con material científico que exponemos para ti.

Ver más...

Novedades

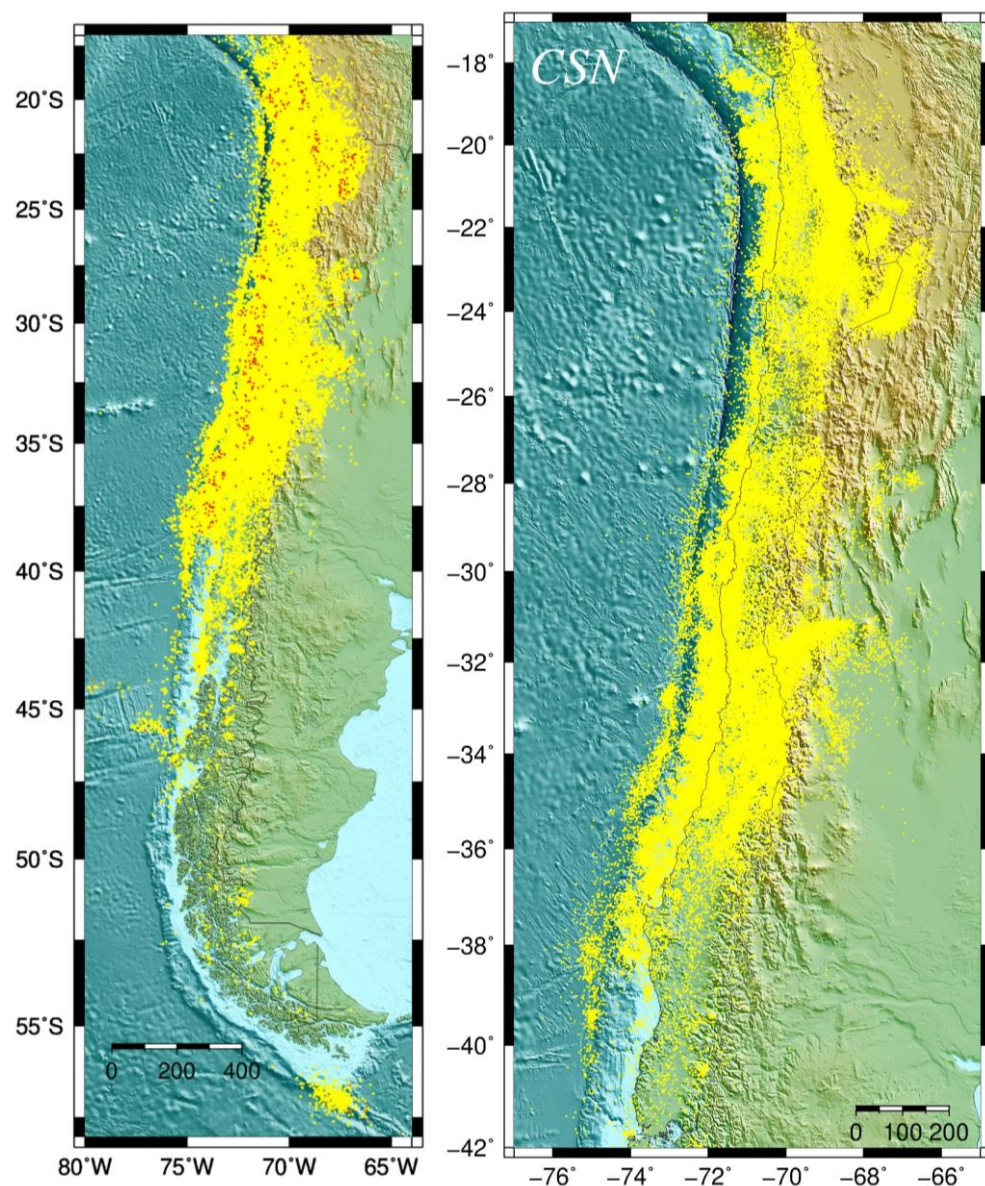
Visita el sitio institucional del Centro Sismológico Nacional, conoce más sobre la red sísmológica y entérate de las novedades que tenemos para ti.

Ver más...

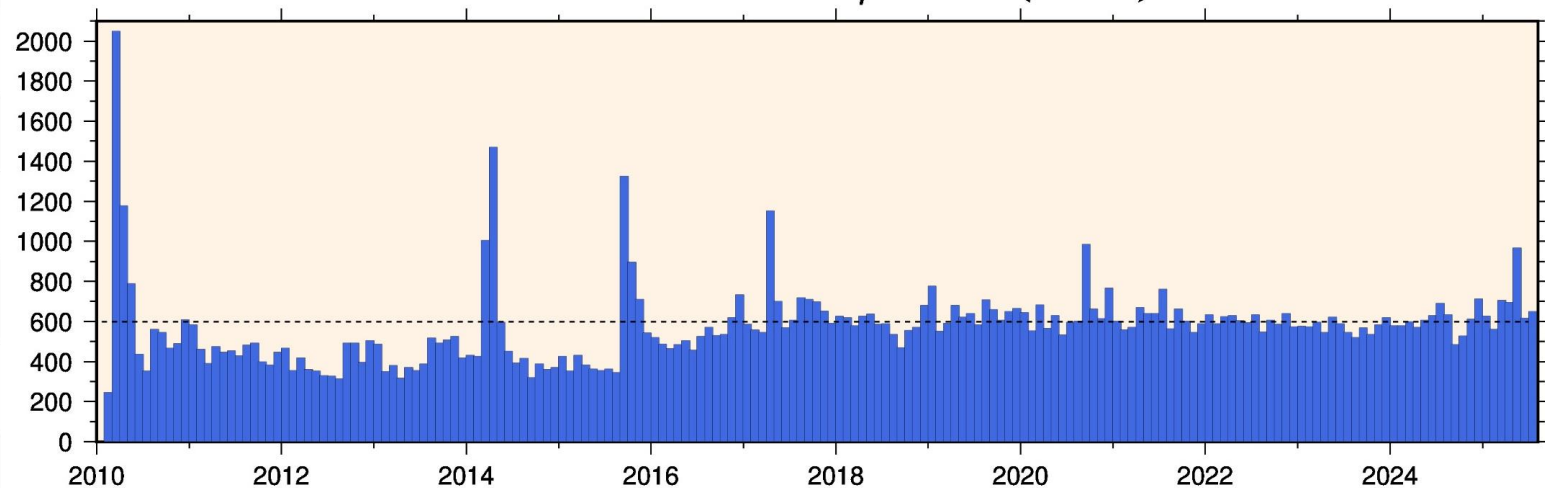


Sismicidad de Chile

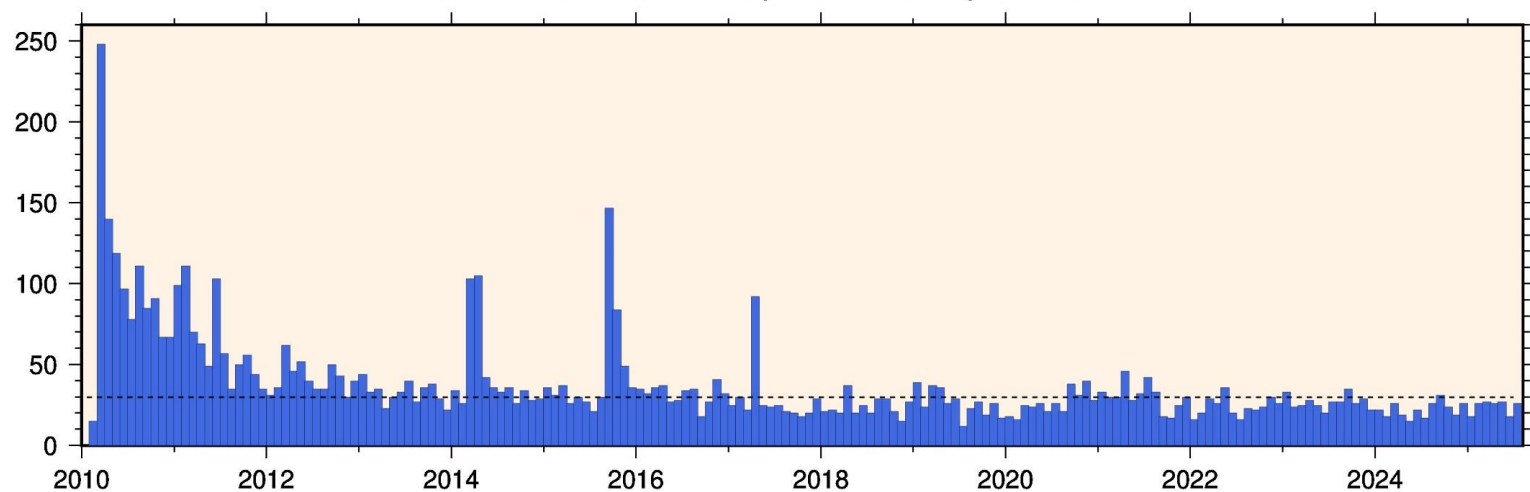
Feb 2010 - Jul
2025



Número total de eventos por mes ($M \geq 3$)

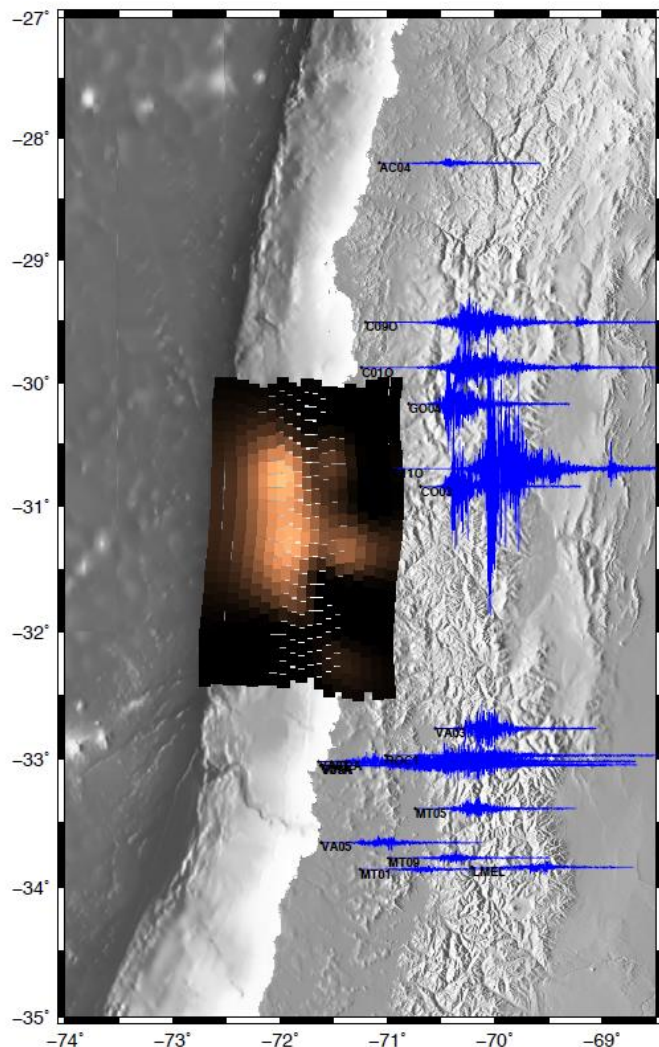


Número de eventos percibidos por mes

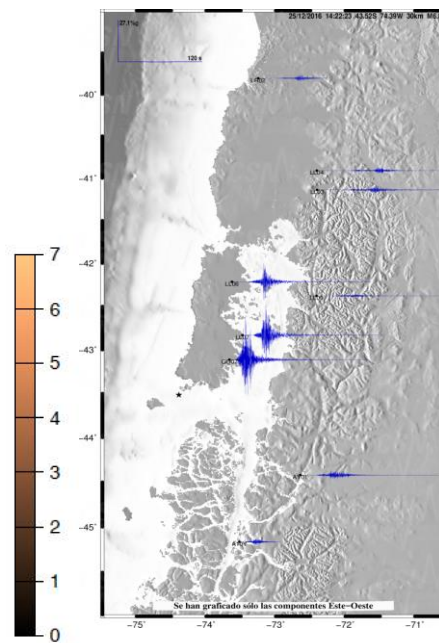


Acelerograma

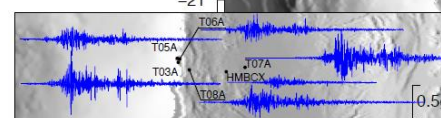
Illapel, 2015



Chiloé, 2016

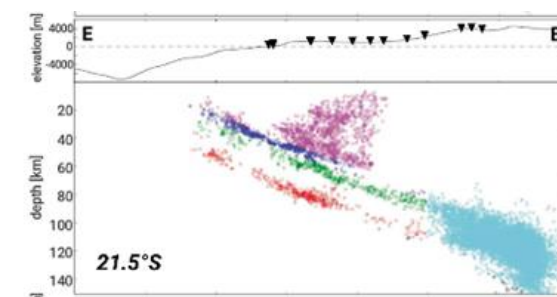
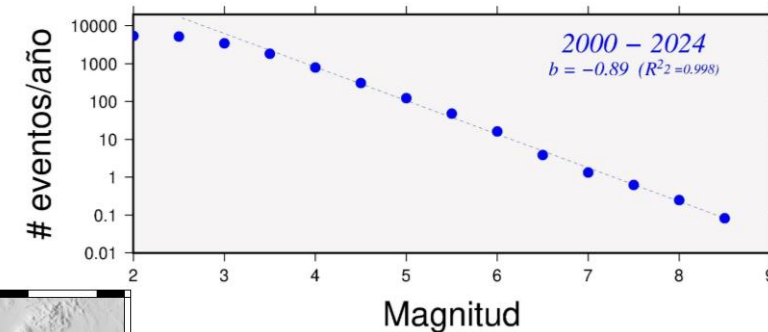
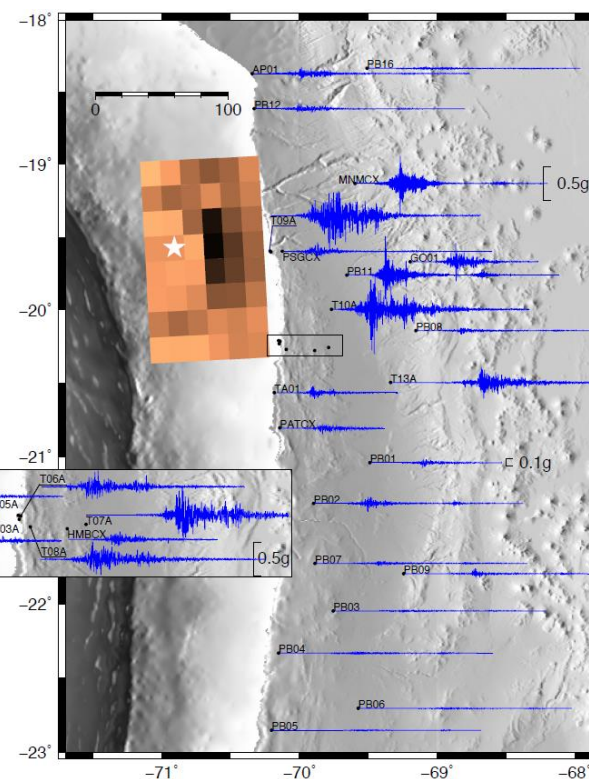


Leyton, 2016



12 698 registros
2 760 eventos desde
Marzo, 2012

Iquique, 2014

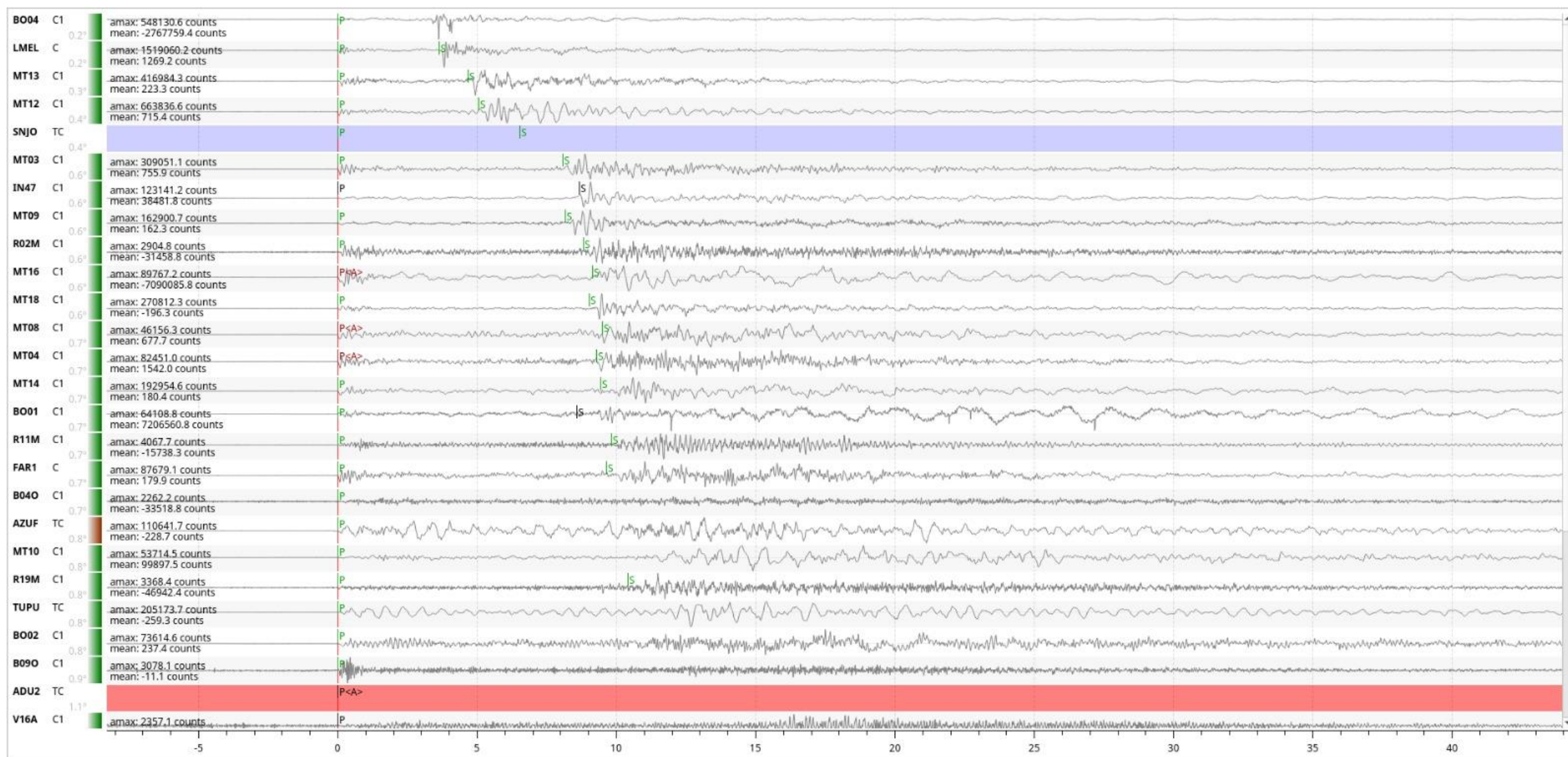


Sipplé et al. (2018)

Datos disponible para todo
interesado en
<http://evtdb.csn.uchile.cl/>

Registros durante el evento

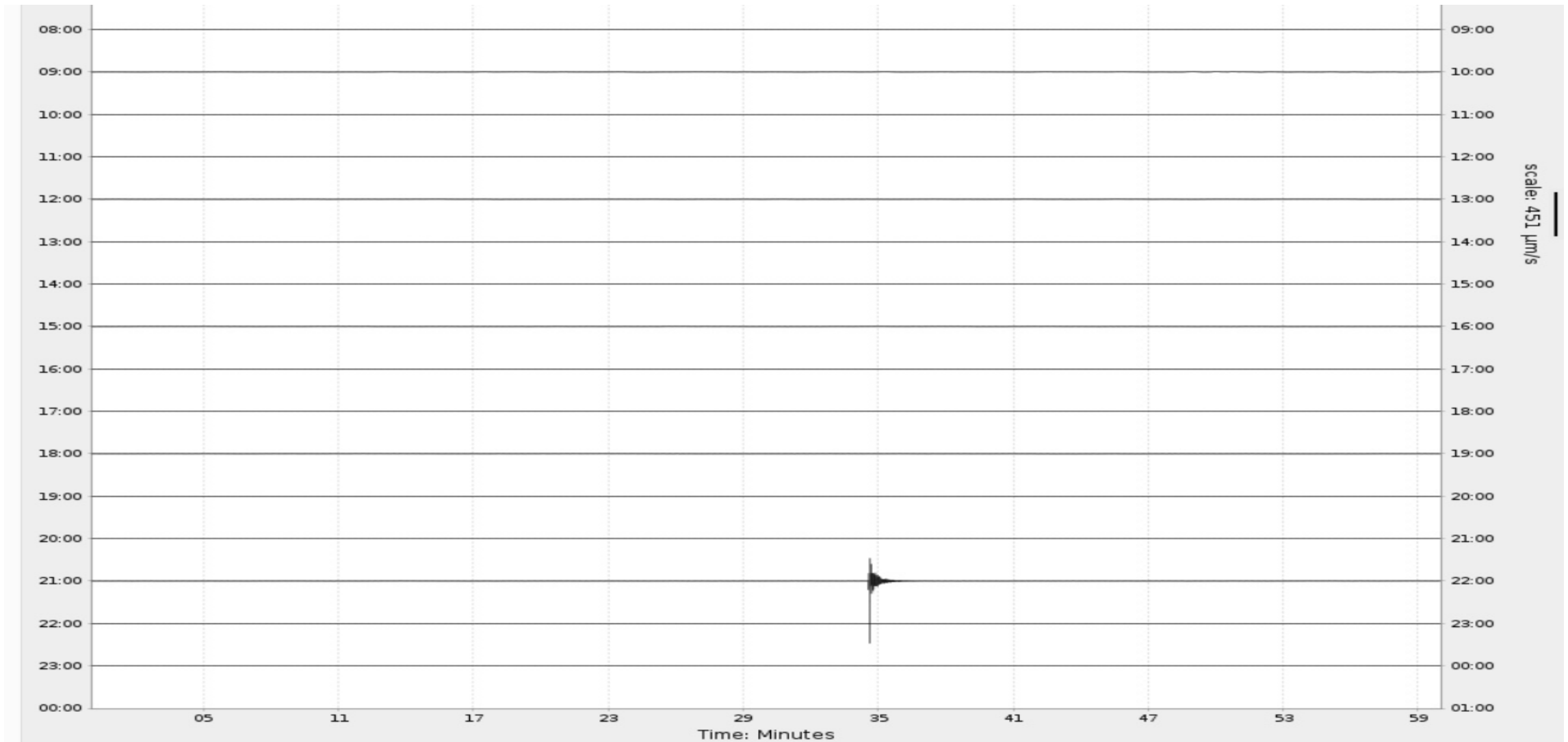
Registros del 31 de julio de 2025 en zona central de Chile



LMEL (z)

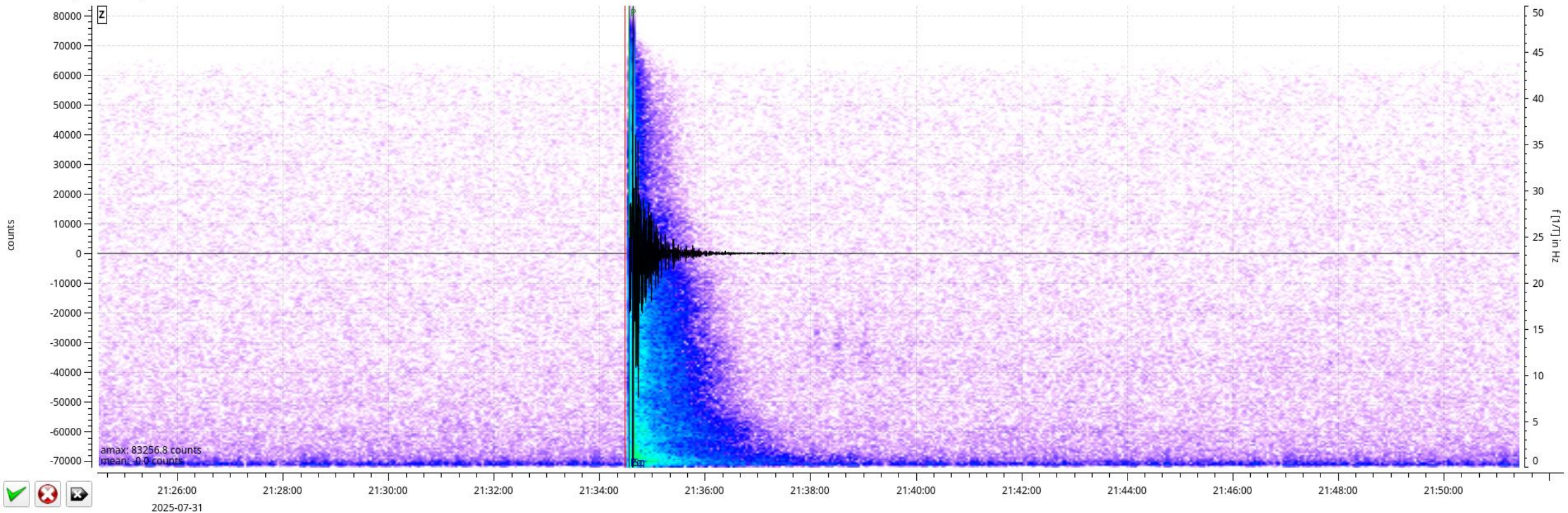


B004 (z)



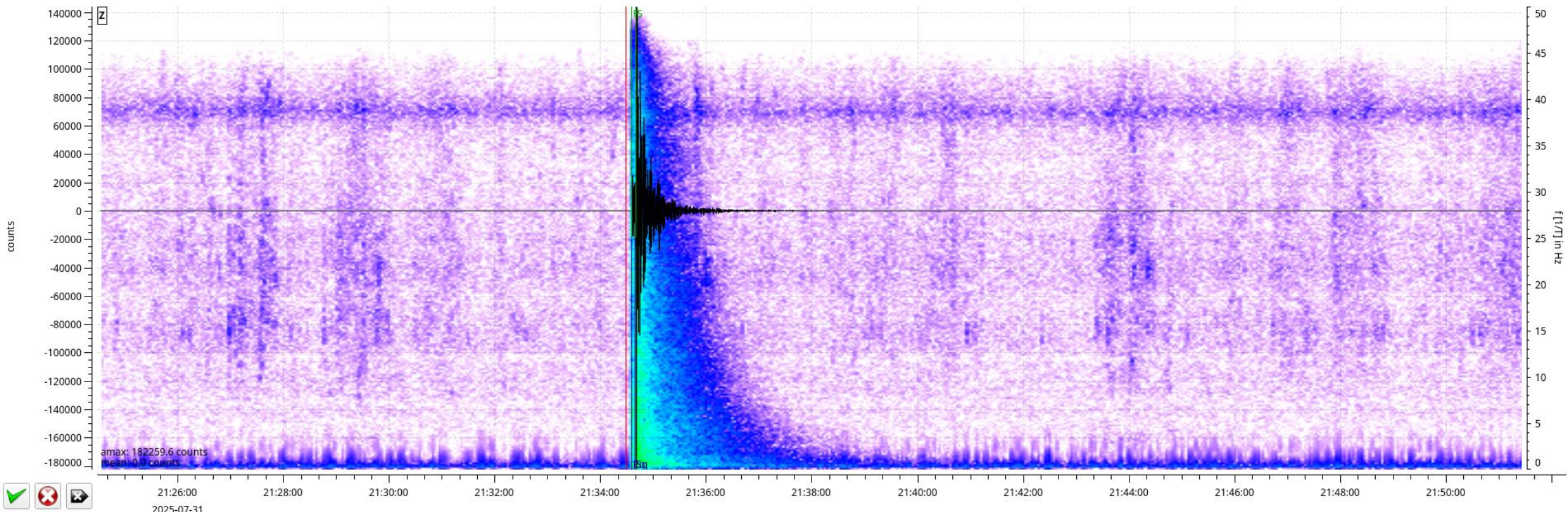
B004 (z)

B004 C1 HHZ, distance: 0.2°, azimuth: 286.3°



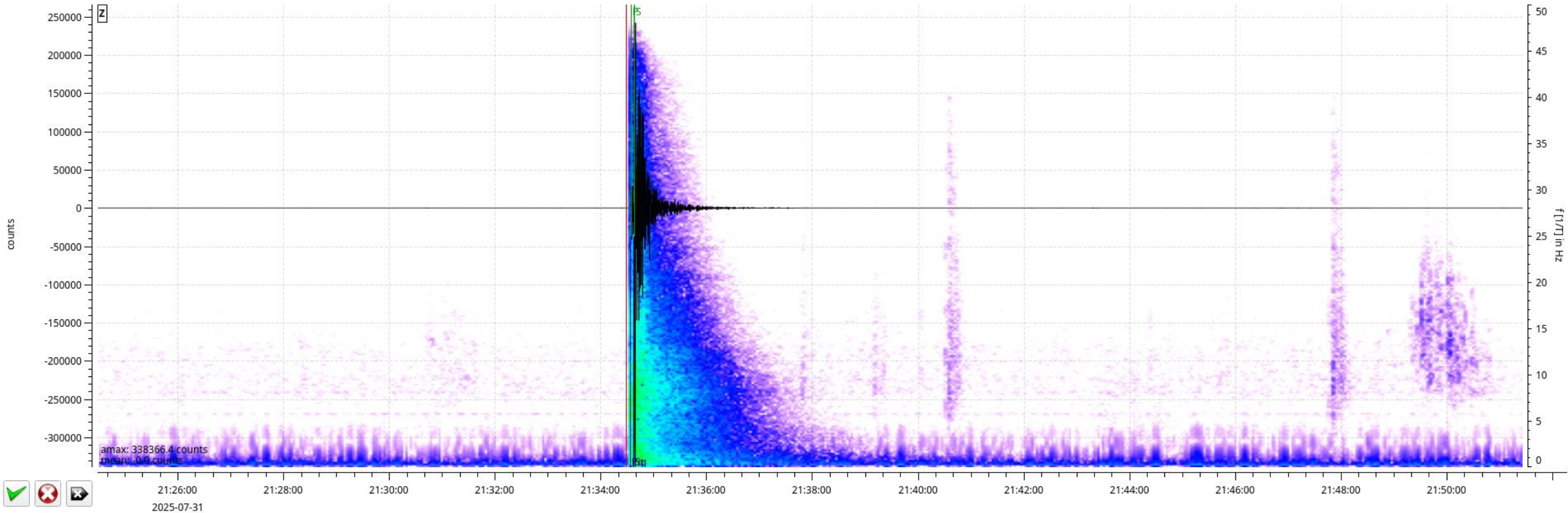
MT13 (z)

MT13 C1 HHZ, distance: 0.3°, azimuth: 8.5°

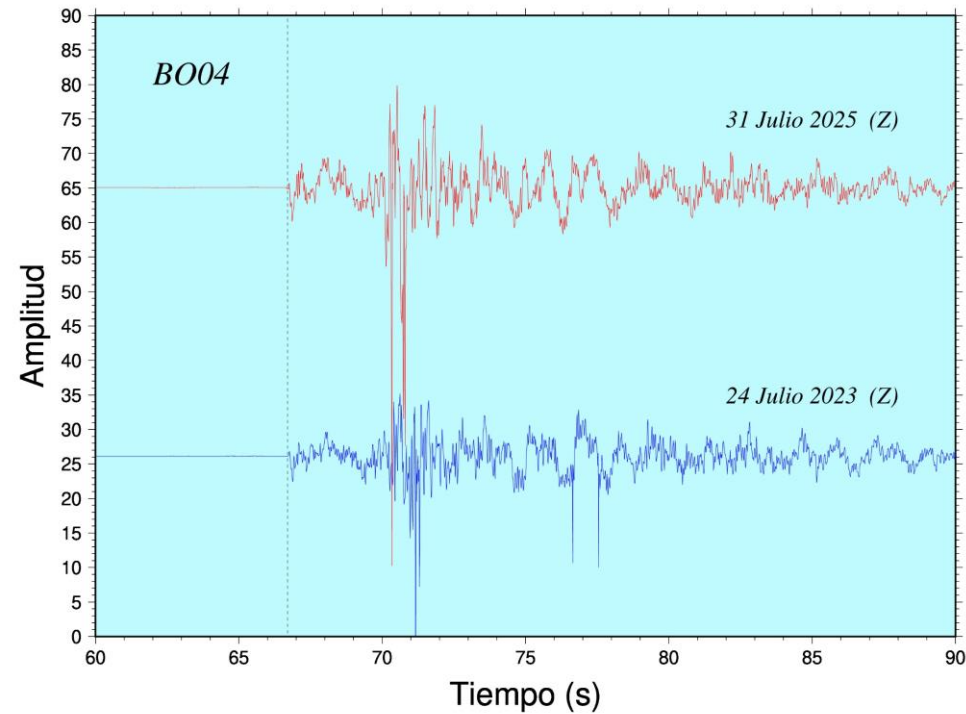
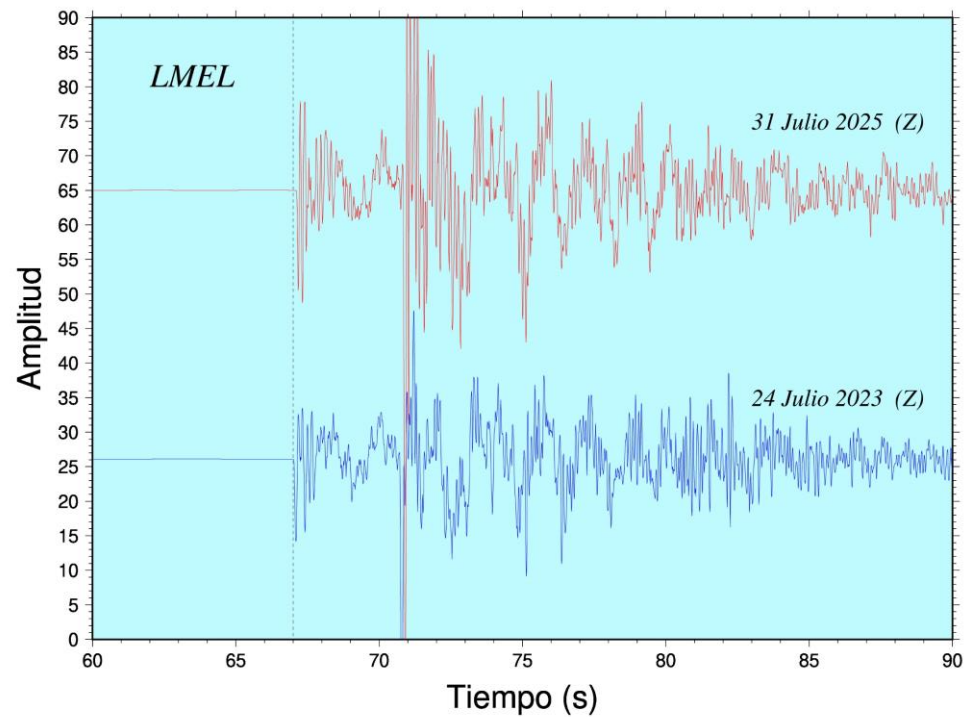


LMEL (z)

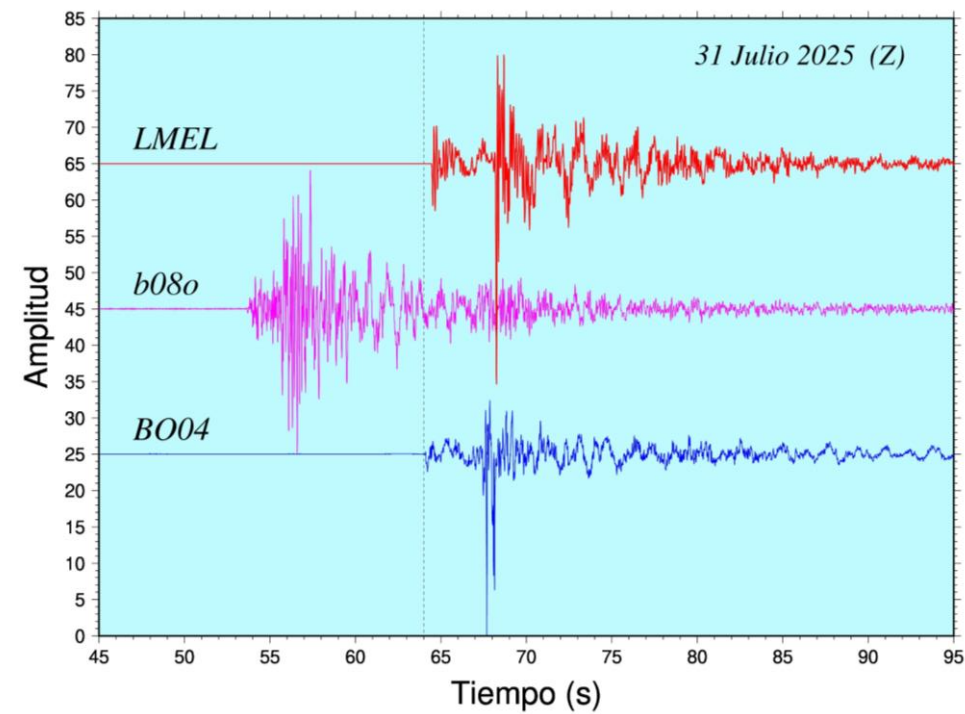
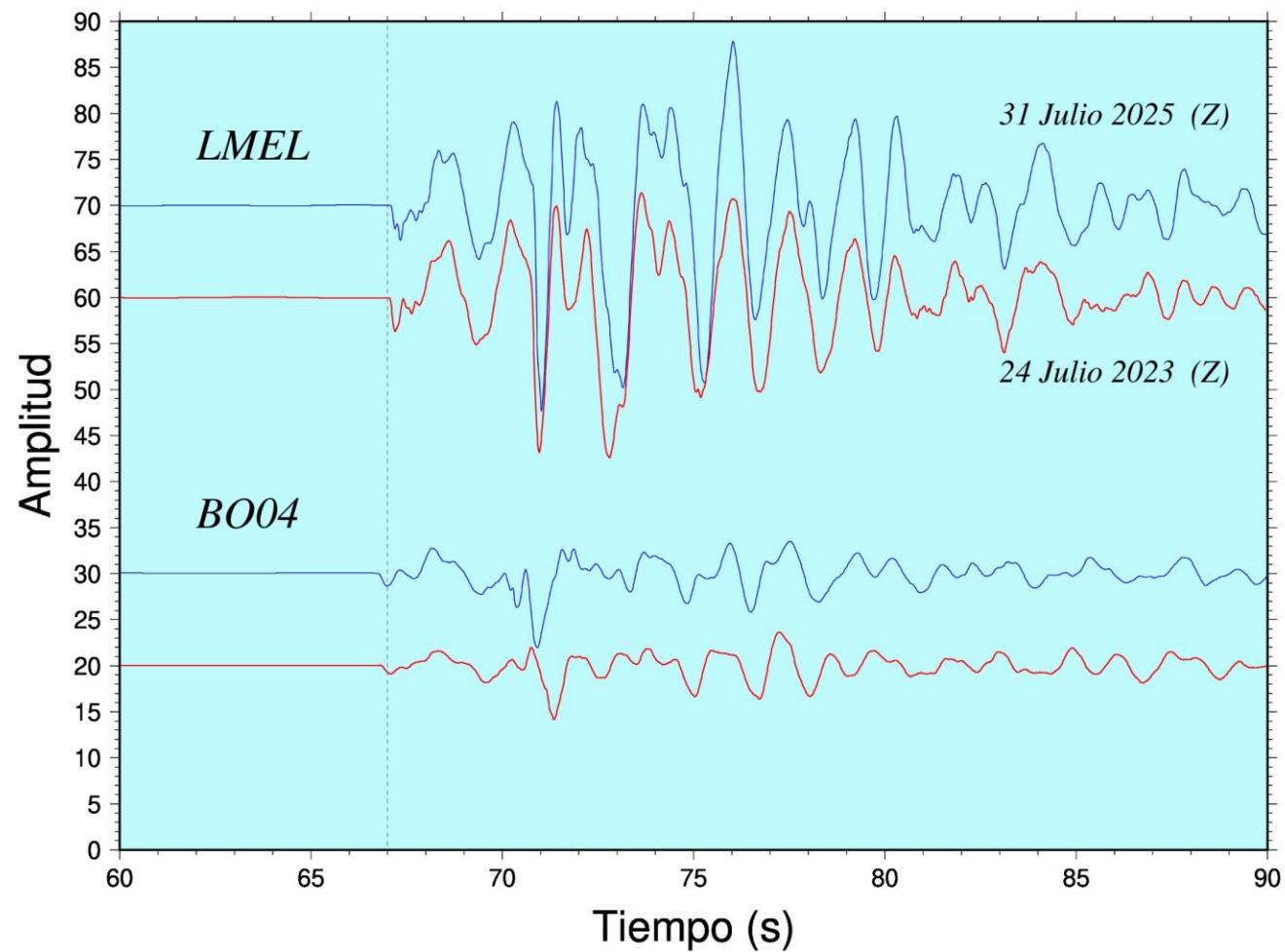
LMEL C HHZ, distance: 0.2°, azimuth: 28.4°



Sismogramas

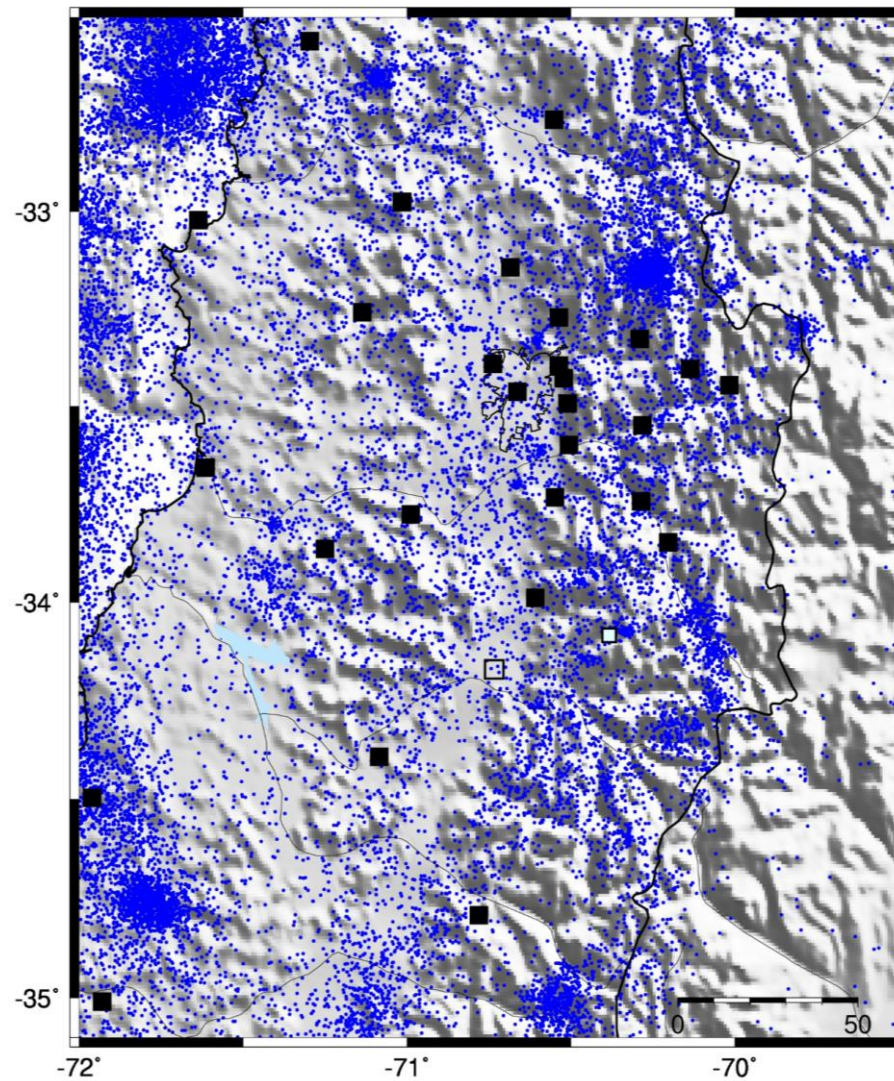
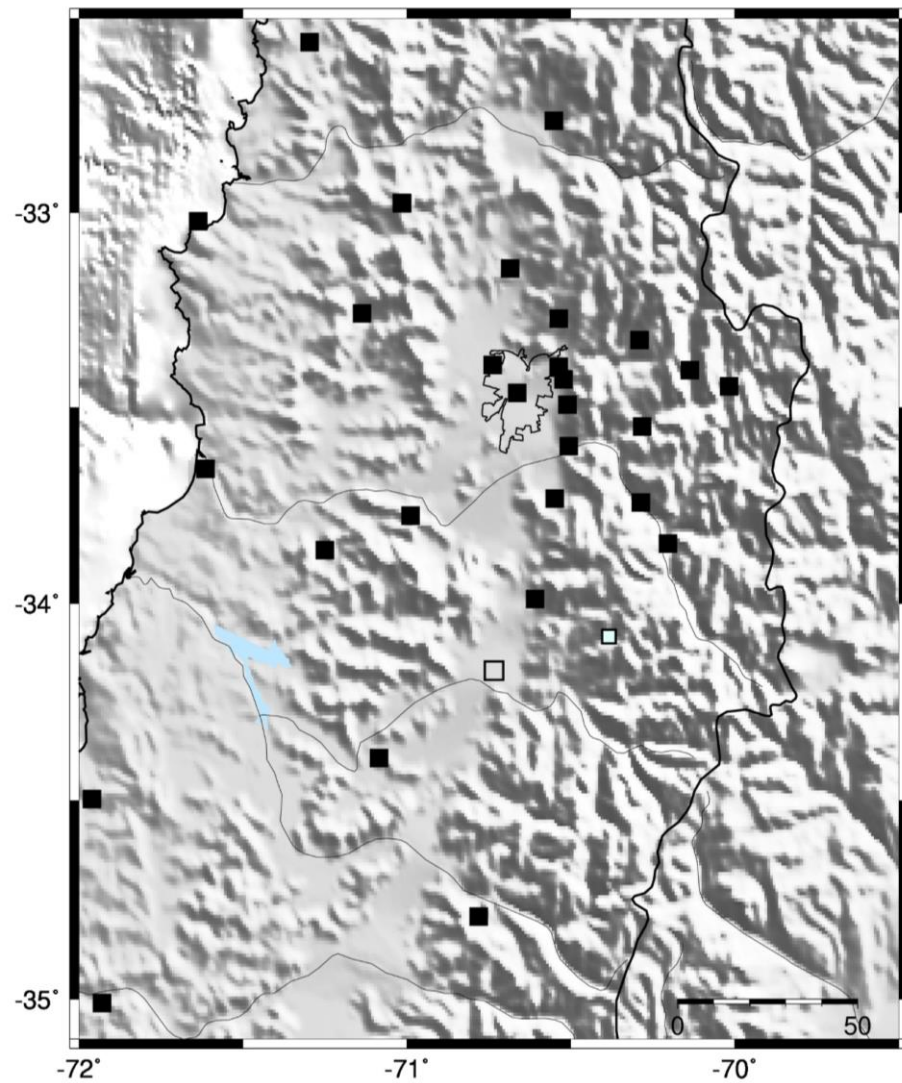


Sismogramas



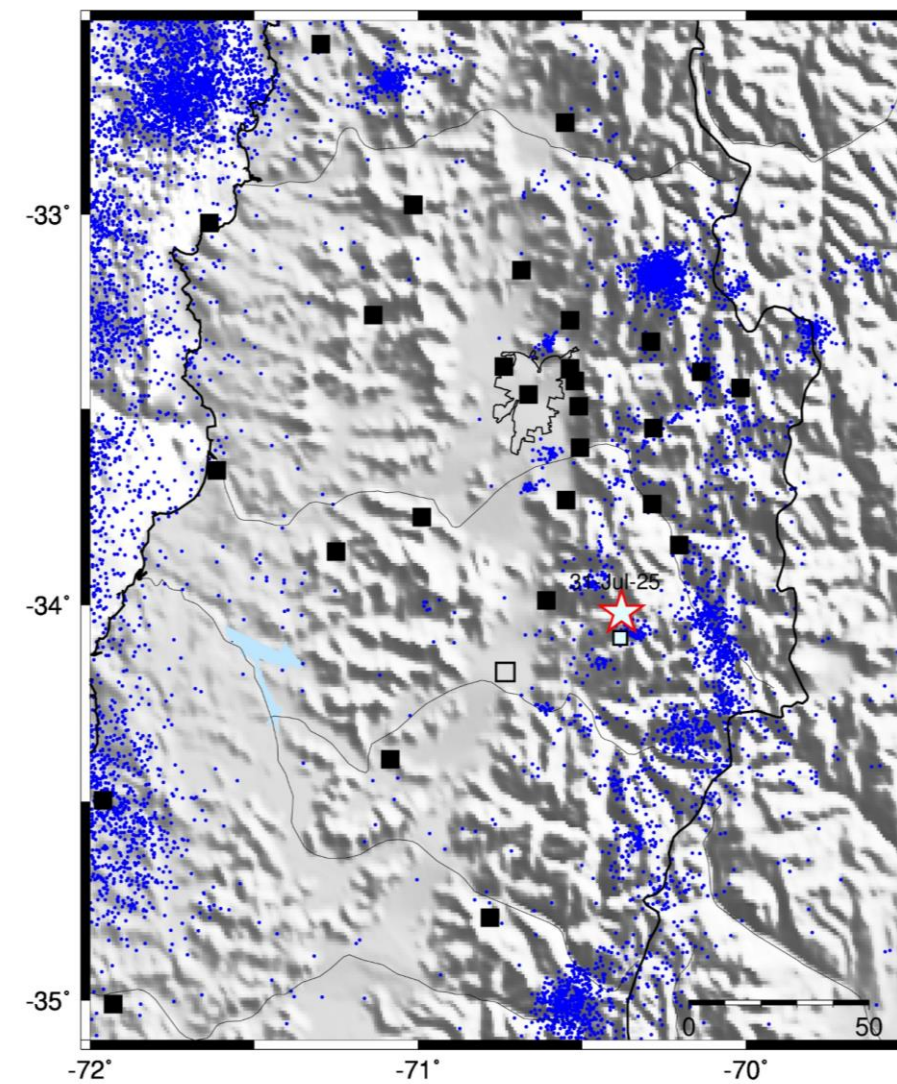
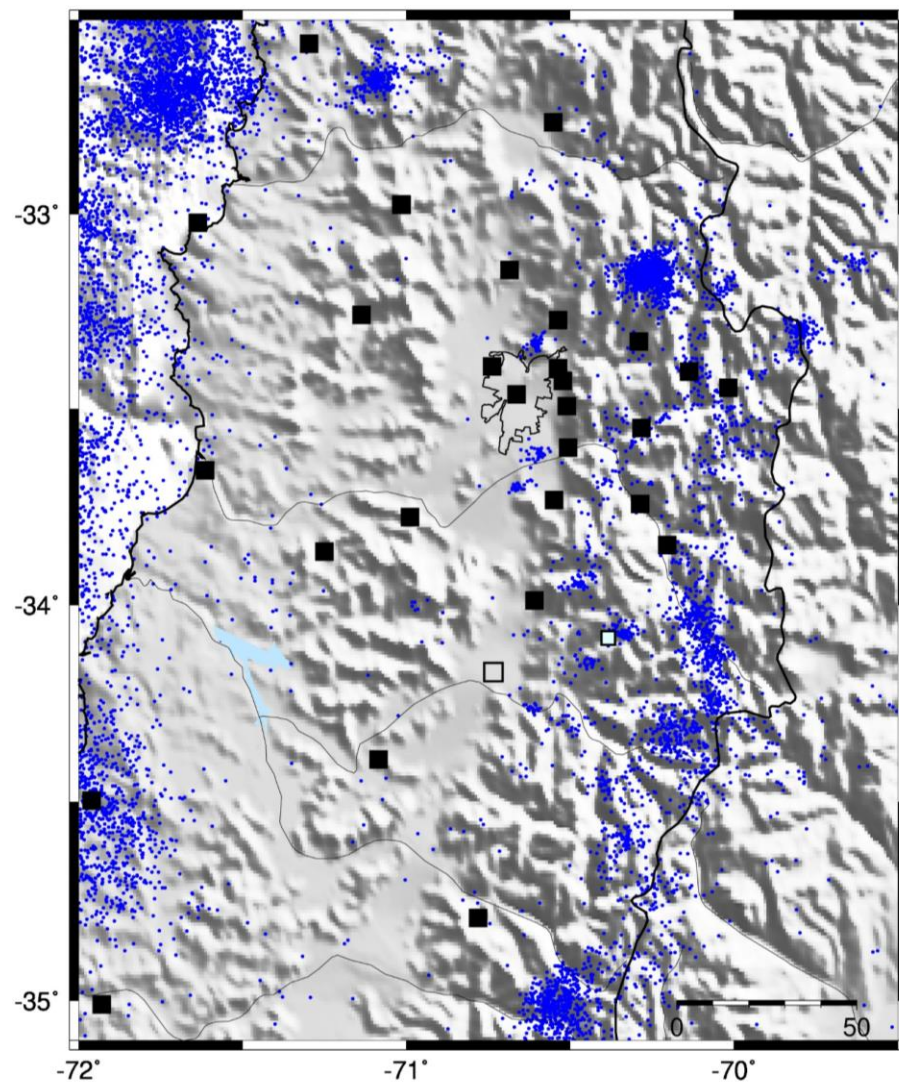
Sismicidad

Zona central de Chile

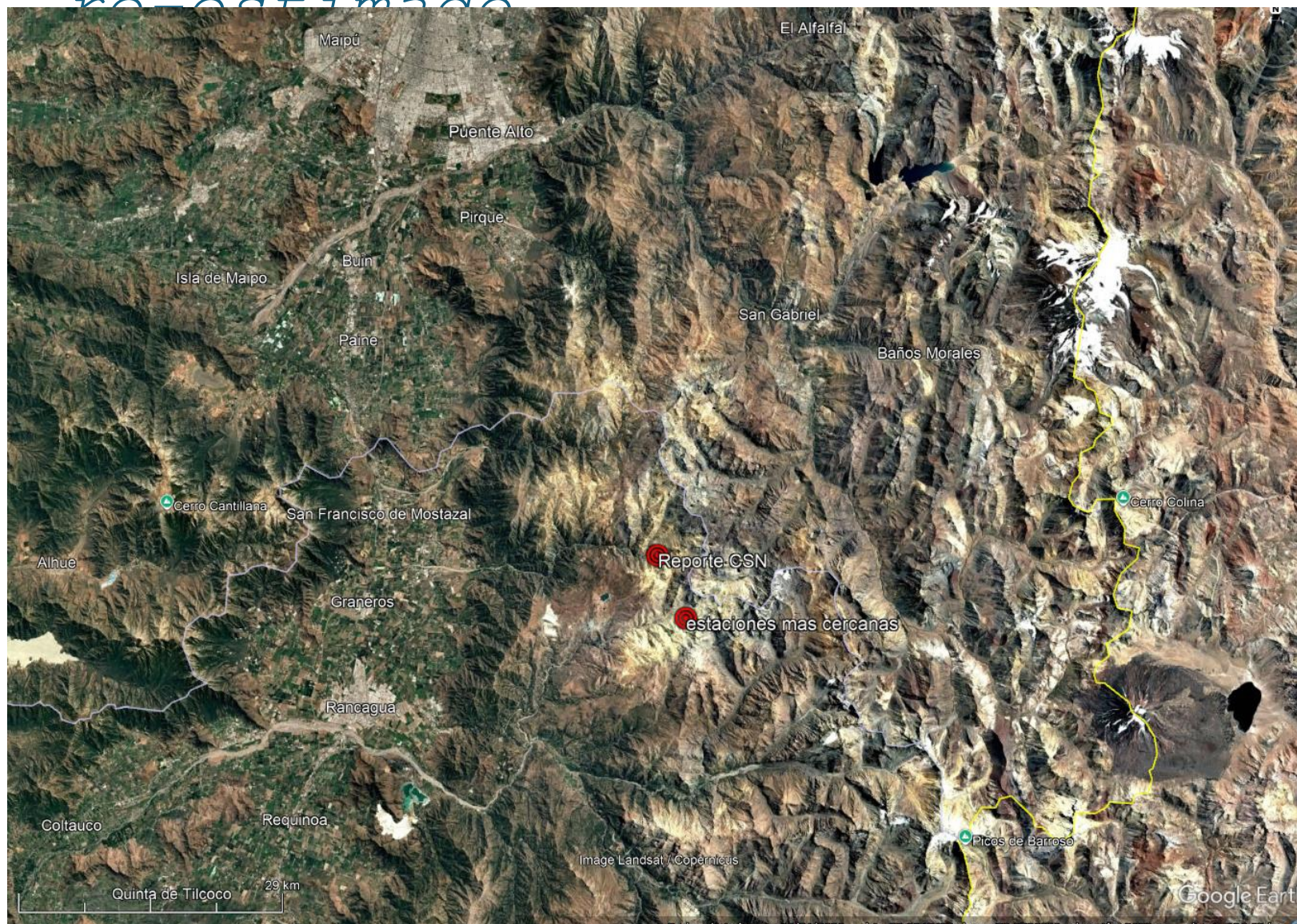


Acelerograma

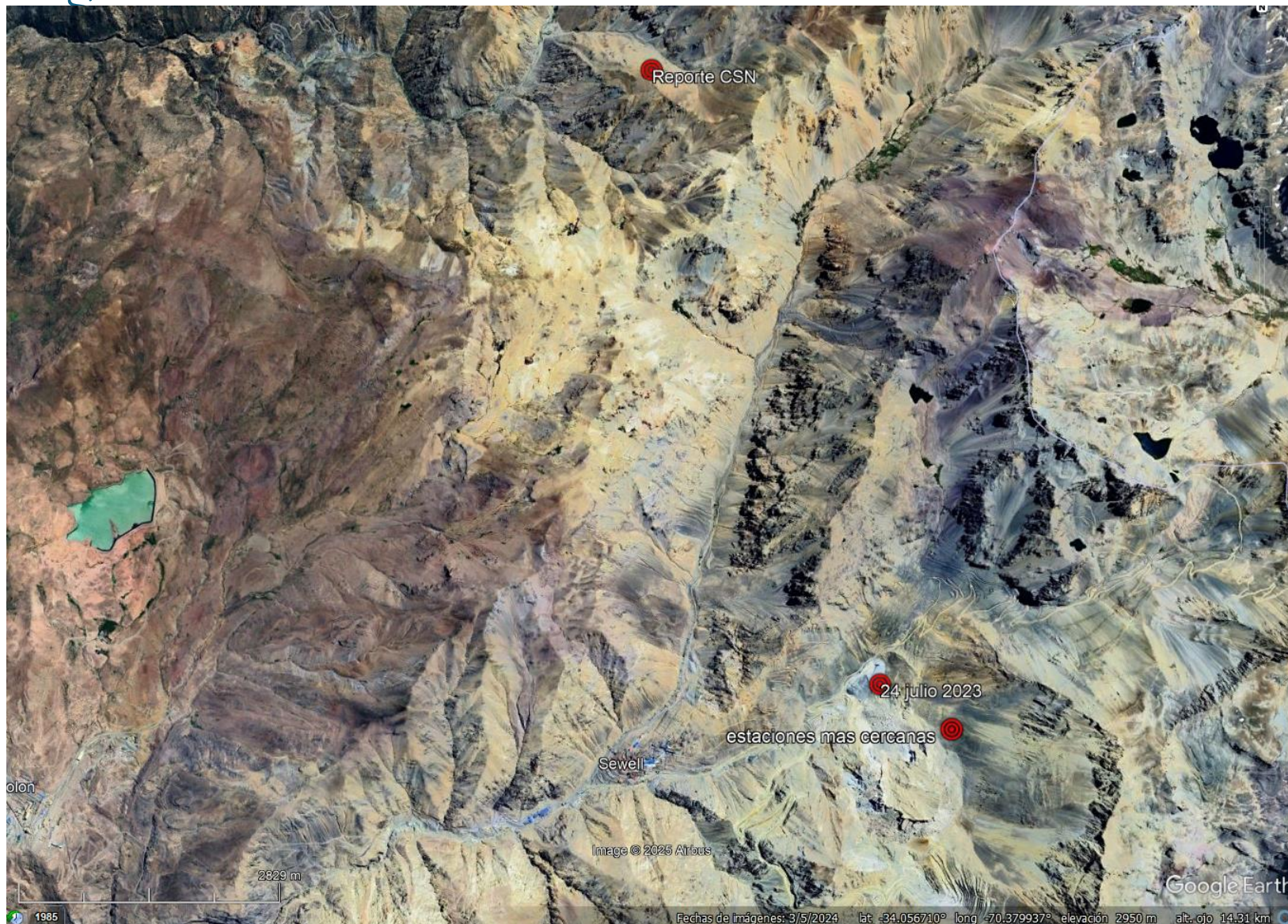
S

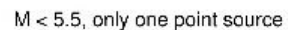


Epicentro 31-Julio-2025



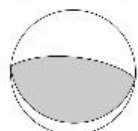
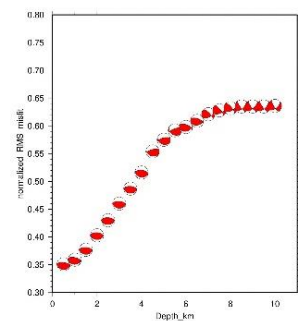
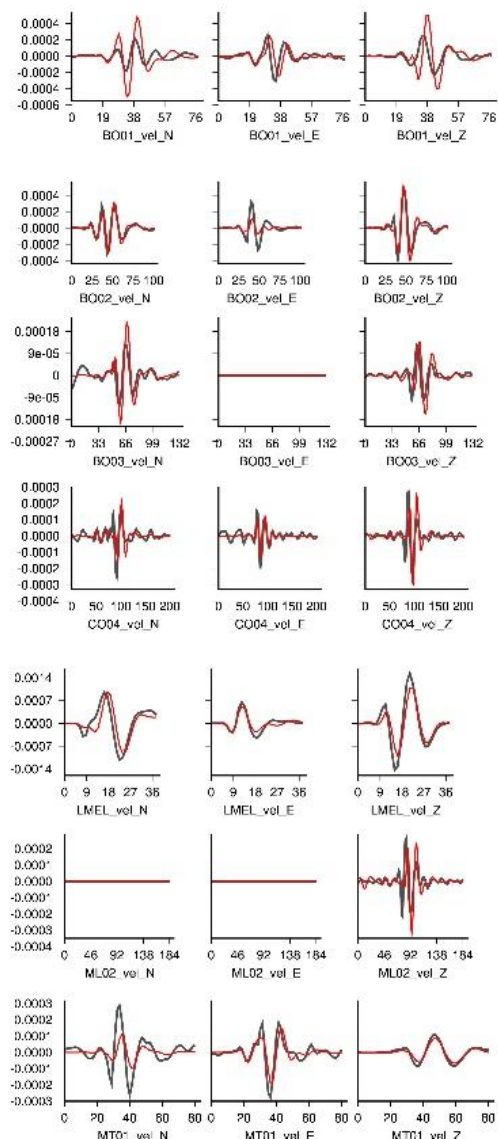
Acelerograma





Frequencies too low

strike dip rake
95. 20. 89.

 $M_w = 4.29$ 

strike dip rake
95.0 20.0 89.3 : best focal mechanism

RMStot = 0.351

RMS_waveforms = 0.523

RMS_polarities = 0.000

time window factor = 130 %

Waveforms USED in the inversion

Polarities USED in the inversion

Selected depth: 0.5 km

73 : num components + polarities
84 % : index of confidence

100% **Free** shipping on orders over \$100. **Free** returns on all orders.

© 2006 Blackwell Publishing Ltd, *Journal of Internal Medicine* 260: 103–110

Epicenter used (lat,long): -34.000 -70.400

Starting depth(km): 0.5

```
strike dip rake of the second nodal plane:
275.8 70.0 90.3
```

#####

```

***** quality: A *****
*****

```

*** END OF FILE ***

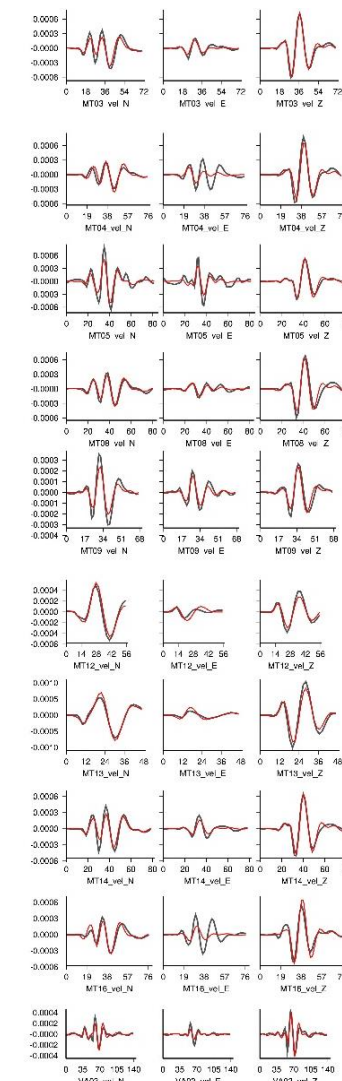
A: focal mechanism STRONGLY CONSTRAINED
B: focal mechanism WELL CONSTRAINED
C: focal mechanism MODERATELY CONSTRAINED
D: focal mechanism WEAKLY CONSTRAINED
E: focal mechanism BARELY CONSTRAINED
F: focal mechanism NOT CONSTRAINED

Event directory:

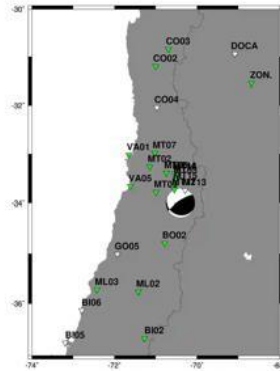
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Date of computation:
Thu Aug 7 01:30:05 PM -04 2025

Method used: FAMEARool MANUAL VERSION

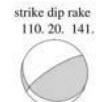


FM-NEAR



M < 5.5, only one point source

Frequencies too low to constrain the STF



strike dip rake
110.20. 141.

RMS = 0.635

Selected depth: 3.0 km

36 = number of components with frequency > 0.015 Hz

83 % : index of confidence

4.32 : Mw from waveform inversion

Epicenter used (lat, long): -33.990 -70.400

Starting depth(km): 3.0

strike dip rake of the second nodal plane:
237.5 77.5 74.3

quality: A

Signification of quality: A: focal mechanism STRONGLY CONSTRAINED

B: focal mechanism WELL CONSTRAINED

C: focal mechanism MODERATELY CONSTRAINED

D: focal mechanism WEAKLY CONSTRAINED

E: focal mechanism BARELY CONSTRAINED

F: focal mechanism NOT CONSTRAINED

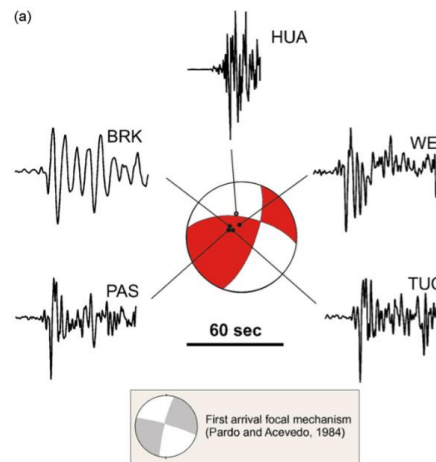
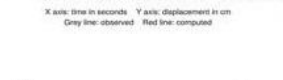
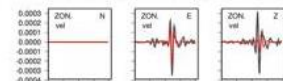
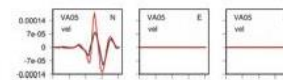
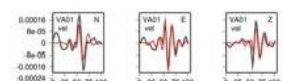
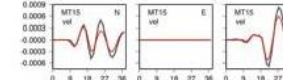
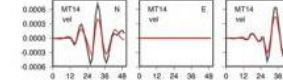
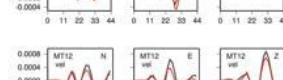
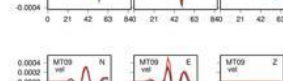
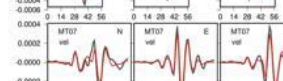
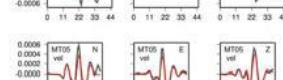
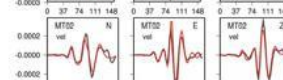
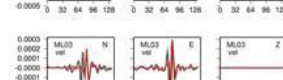
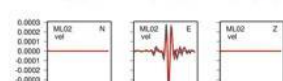
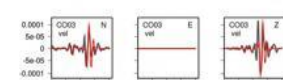
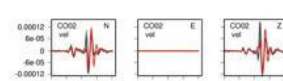
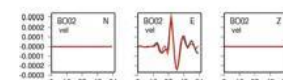
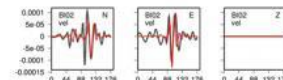
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Date of computation:
Tue Jul 26 13:52:25 -04 2023

Method used: FMNEAR

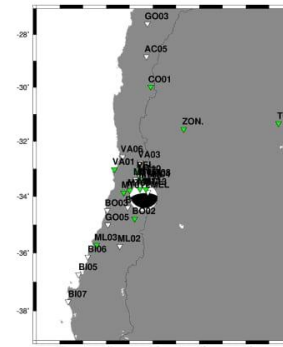
!!! AUTOMATIC COMPUTATION !!!

2023



Alvarado et al
(2009)

Origin Time (UTC): 2025-07-31 21:04:03.00sec
Region: 28 km NE of Machali, Chile



M < 5.5, only one point source

STF not constrained hence no



strike dip rake
265.65. 82.

RMS = 0.577

Selected depth: 3.0 km

32 = number of components

82 % : index of confidence

4.42 : Mw from waveform inversion

Epicenter used (lat, long): -34.031 -70.404

Starting depth(km): 3.0

strike dip rake of the second nodal plane:
102.7 26.1 106.0

quality: A

Signification of quality: A: focal mechanism STRONGLY CONSTRAINED

B: focal mechanism WELL CONSTRAINED

C: focal mechanism MODERATELY CONSTRAINED

D: focal mechanism WEAKLY CONSTRAINED

E: focal mechanism BARELY CONSTRAINED

F: focal mechanism NOT CONSTRAINED

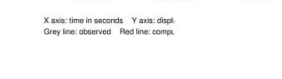
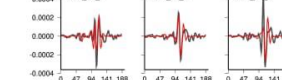
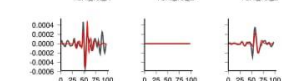
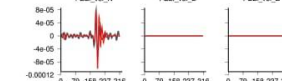
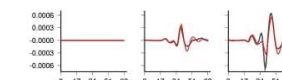
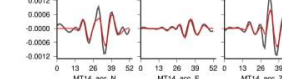
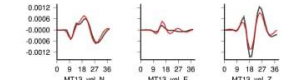
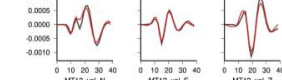
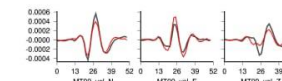
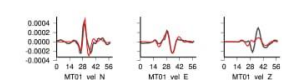
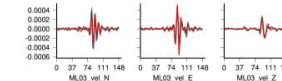
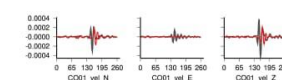
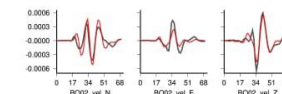
Event directory:
home/fmnear/USGS_hip/MWFMNEAR/FMNEAR/20250731213430_2

Date of computation:
Thu Jul 31 00:31:01 PM -04 2025

Method used: FMNEAR

!!! AUTOMATIC COMPUTATION !!!

2025



X axis: time in seconds Y axis: displ
Grey line: observed Red line: comp.

Conclusiones

- Se puede observar un evento a las 17:34 (CLT) del 31 de julio de 2025
- En las estaciones B004 y LMEL, las más cercanas a ET no se observa actividad equivalente en las 24 horas previas
- El CSN localiza inicialmente el evento unos 7 km al norte de Sewell, con magnitud 4.2 (sismología.cl)
- Relocalizaciones más finas indican que el evento se encuentra en cercanías de El Teniente
- Se observan dos eventos que se pueden considerar como réplicas menores (M1.5 y 2.2) a las 23:02 y 08:16 (1 de agosto). Otras menores a las 17:47 y 08:15 (1 de agosto).
- Sismo superficial de similares características a aquel del 24 de julio de 2023
- Formas de onda (B004 y LMEL) muy similares
- Modelación indica un campo compresión general norte-sur

Estimación de

fuerza M4.2

4.3:

1.0 km x 0.5 km x

10 cm

Preocupación: Renovación de red

La RSN sufre degradación: 19 de los 297 acelerógrafos originales no funcionan (6.4%). Equipos obsoletos (> 15 años, fabricación discontinuada).

Presupuestos disminuyen año a año

Costos unitarios

Gracias

120221

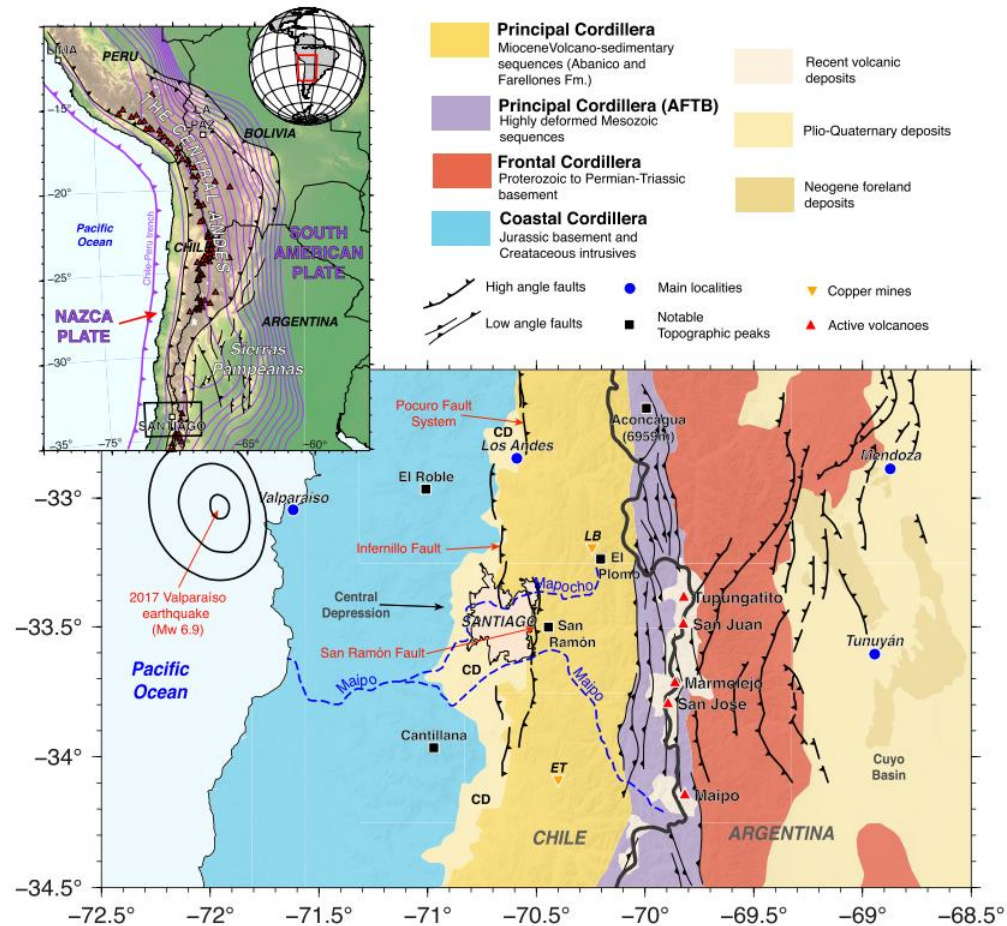
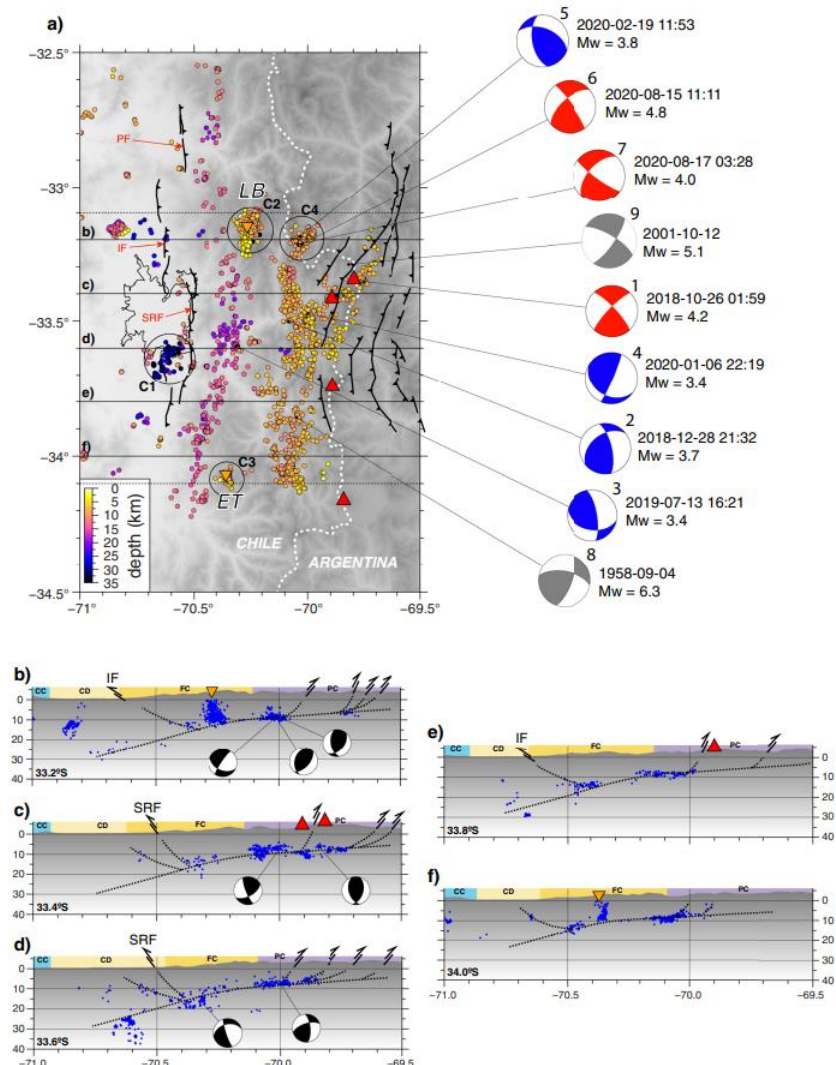


Figure 1. Geological setting of the south-central Andes, between 32.5°S and 34.5°S. The inset (top-left) shows the location of our study region in relation to the western margin of South America, between central Chile and Western Argentina. The red arrow shows the general convergence of the Nazca plate. The purple lines show the Nazca top contours according to the Slab2 model (Hayes, 2018). Convergence velocity is 65 mm/yr (DeMets et al., 2010). Red triangles show the location of active volcanoes along the South-American margin (GVP, 2022). Geological information on the map (bottom) has been compiled from previous studies (Charrier et al., 2005; Farias et al., 2010; Giambiagi et al., 2003; Riesner et al., 2018). The black contours represent the slip area associated with the 2017 Valparaíso earthquake (Ruiz et al., 2017). The thick black line corresponds to the Chile-Argentina border. Note how the principal structures switch from an eastern vergence (Frontal



M 4.3 - 25 km ENE of Machalí, Chile

2023-07-24 08:24:05 (UTC) | 34.065°S 70.410°W | 1.4 km depth

Moment Tensor

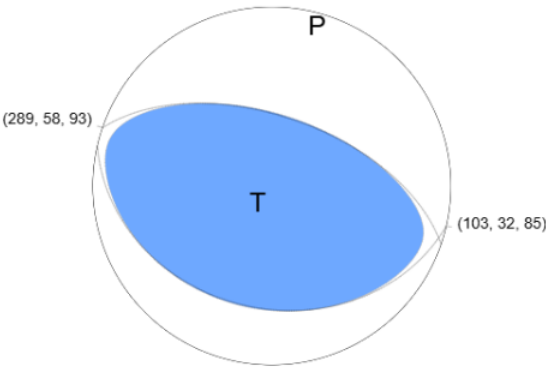
View all moment-tensor products (1 total)

Contributed by [US](#) last updated 2023-09-30 21:36:39 (UTC)

- ✓ The data below are the most preferred data available
- ✓ The data below have been reviewed by a scientist

Regional Moment Tensor (Mwr)

Moment	3.274e+15 N-m
Magnitude	4.28 Mwr
Depth	5.0 km
Percent DC	95%
Half Duration	-
Catalog	US
Data Source	US
Contributor	US



Nodal Planes

Plane	Strike	Dip	Rake
NP1	289°	58°	93°
NP2	103°	32°	85°

Una mirada hacia el futuro: Distributed Acoustic Sensing

Infraestructura única de telecomunicaciones transformada en “arreglos sísmicos”

- 3500 km de longitud
- 12 puntos en tierra

Project with D. Rivet (GeoAzur)

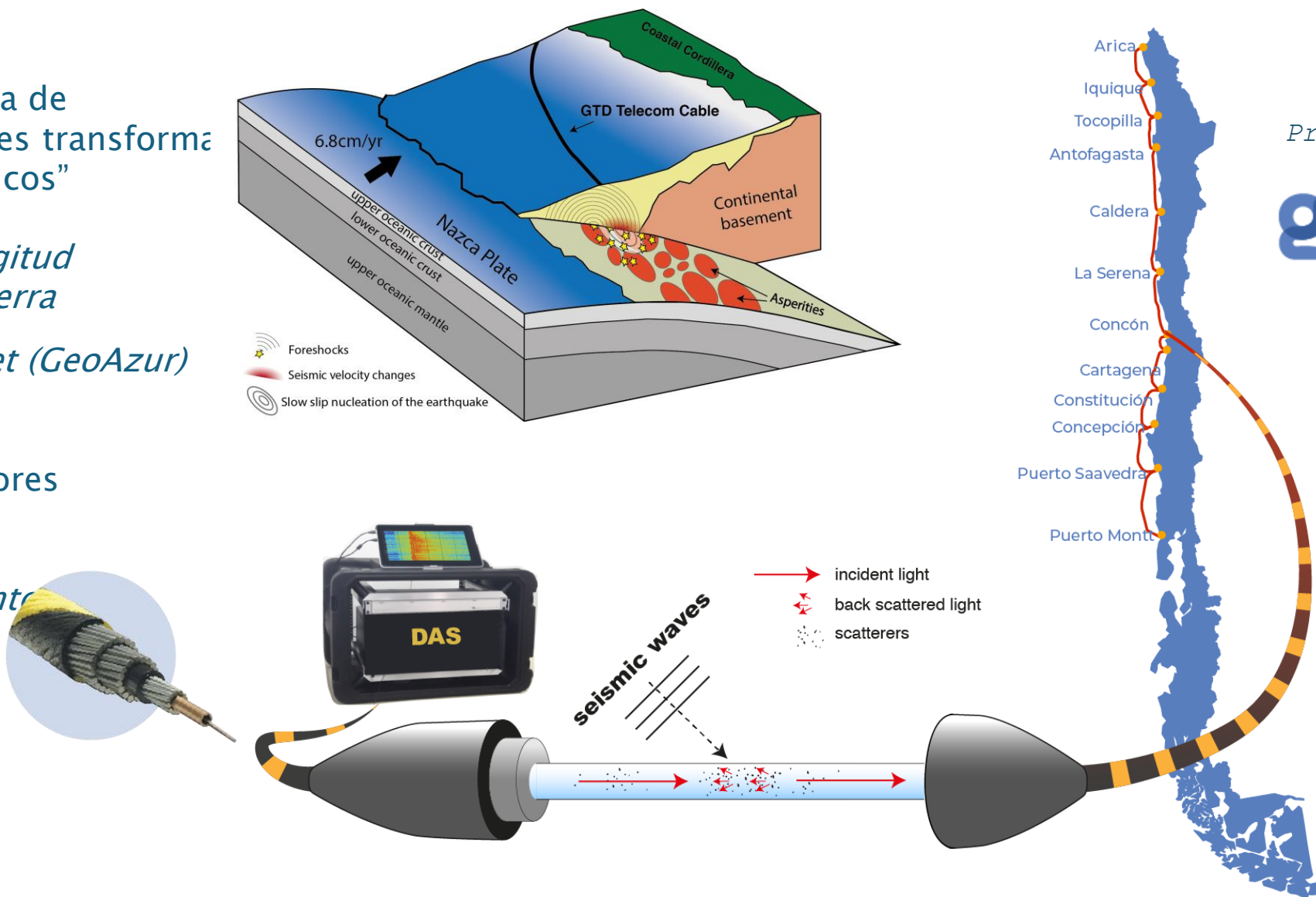
Fibra óptica

Red densa de sensores

150 km de largo

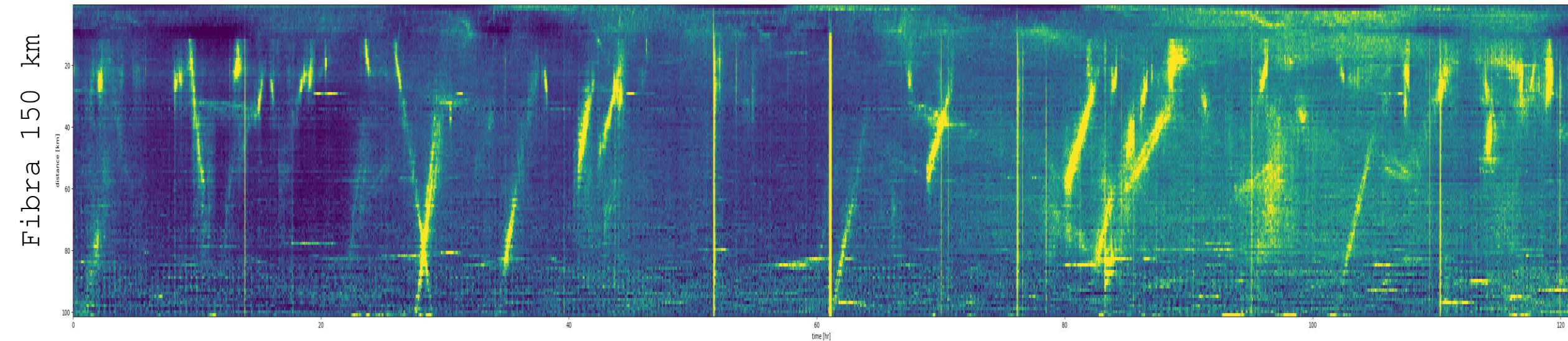
50 000 sensores

4 m espaciamiento



DAS Registro de 5 días

Minimum noise level



van den Ende et al. in prep

5 días

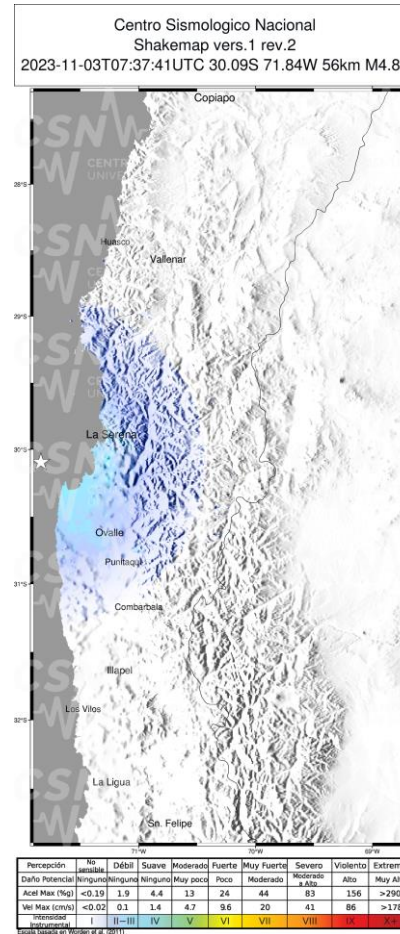
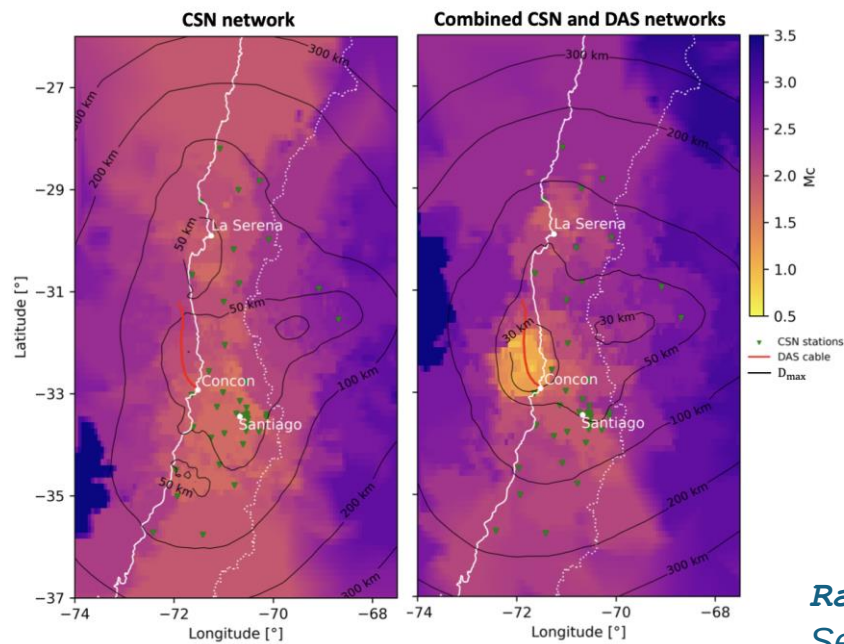
M4.6

UTC 07:37

03-Nov-2023

Registros DAS de un sismo M4.6
4 m de separación entre canales

150 km arreglos
37000 sensores
125 Hz muestreo



Rango Dinámico
Señal se «satura»
Solución bajo investigación

