GSA Data Repository 2017064

The M_w 8.3 Illapel earthquake (Chile): Preseismic and postseismic activity associated with hydrated slab structures

Poli et al.

Supporting Information

Identification of repeating earthquakes

We study the presence of repeating earthquakes with Mw>4 in the CSN catalog using data from 2011 when good station coverage is present in the region (Fig. S3). To individuate a repeater we calculate the cross correlation of vertical component seismograms in a frequency band from 0.5Fc to 2Fc (Uchida and Matsuzawa, 2013), where the corner frequency (Fc) is calculated for 3MPa stress drop (Sato and Hirasawa, 1973). We used signals from 2 sec before P waves up to 15s after the arrival of S waves. A repeater is defined when the correlation coefficient for 2 or more stations exceed 0.95 (Fig. S5).

Cited references

Sato, T., and T. Hirasawa (1973). Body wave spectra from propagating shear cracks, J. Phys. Earth 21, 415–431.

Uchida, Naoki, and Toru Matsuzawa. "Pre-and postseismic slow slip surrounding the 2011 Tohoku-oki earthquake rupture." *Earth and Planetary Science Letters* 374 (2013): 81-91.

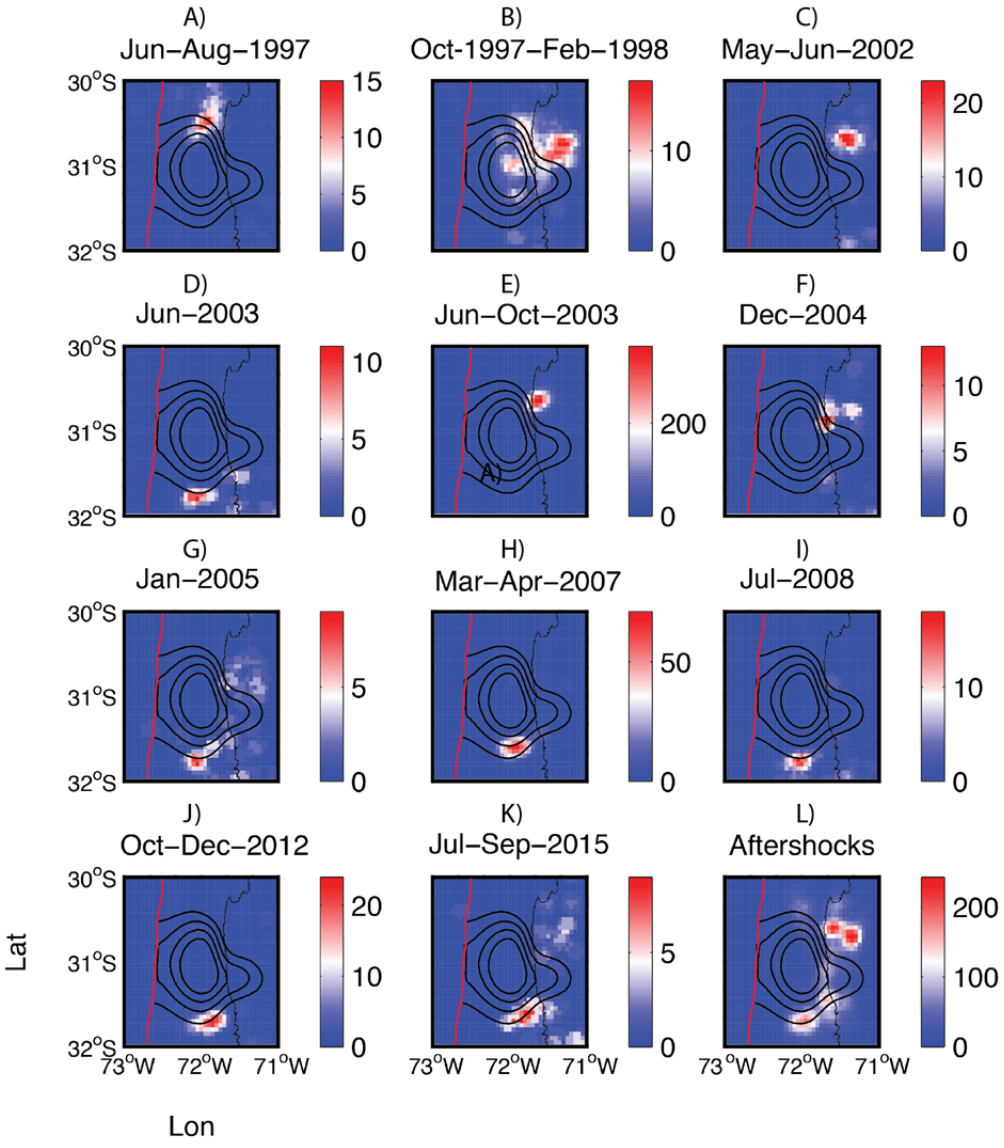

Figure DR1: Map view of the swarms. Each map represents the cumulative number of events in the period reported in the top of each figure, using a 0.05deg grid. The color is proportional to the event number. The bottom right map shows the distribution of the aftershocks.

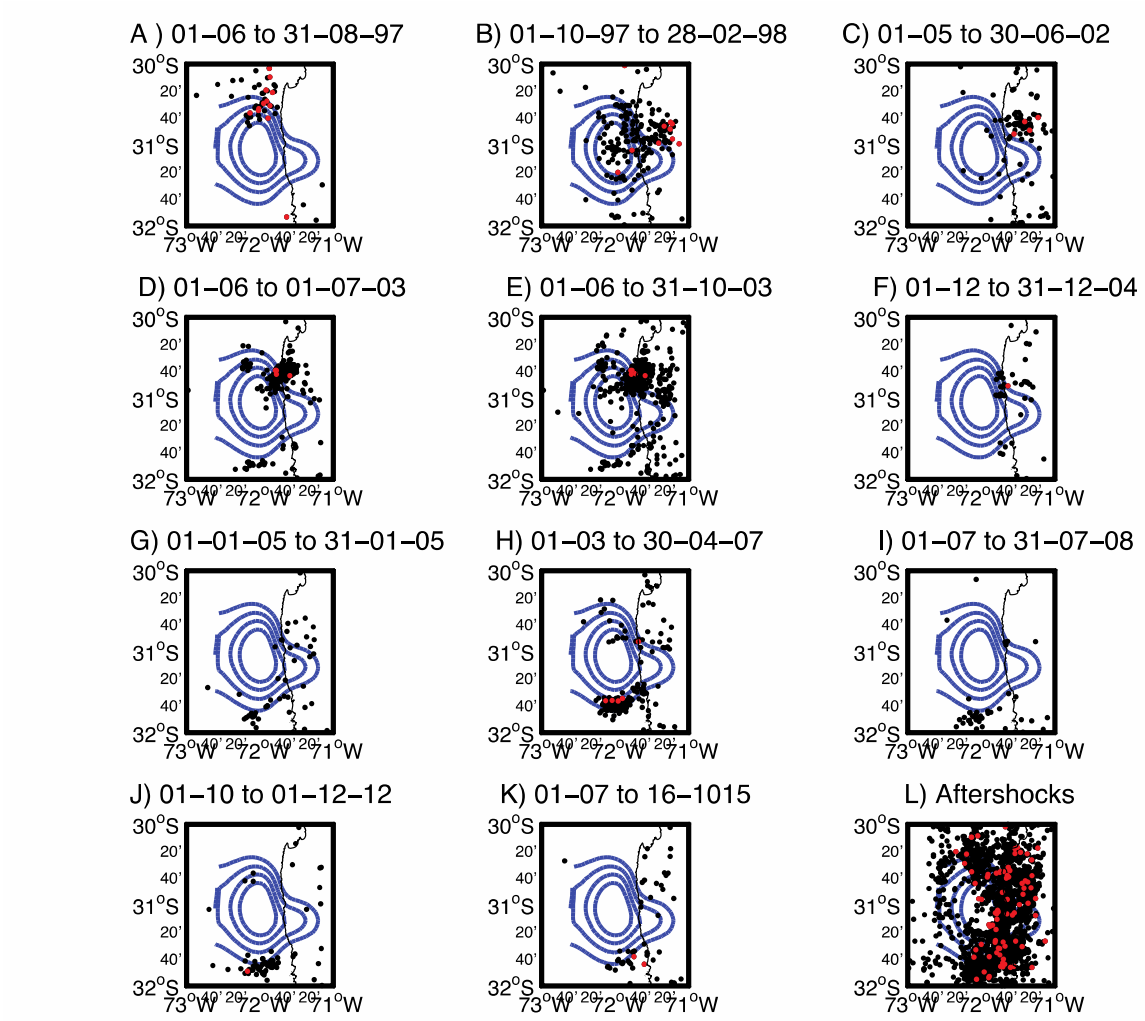

Fig DR2: Maps of the various swarms and aftershocks. Event with M>5.5 are in red, the rest are in black. The dates of the swarms are reported on top of each figure.The right bottom plot is for the aftershocks.

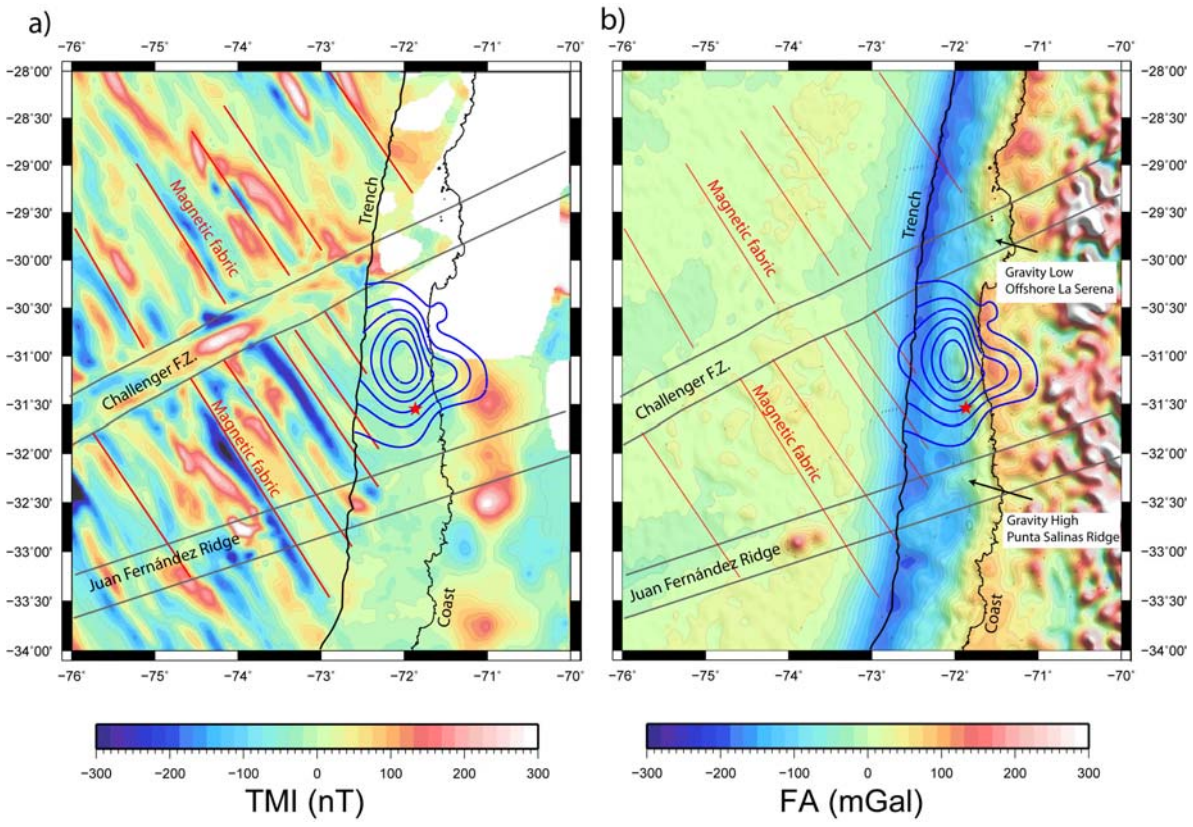

Figure DR3: Magnetic (a) and free gravity anomaly (b) maps.

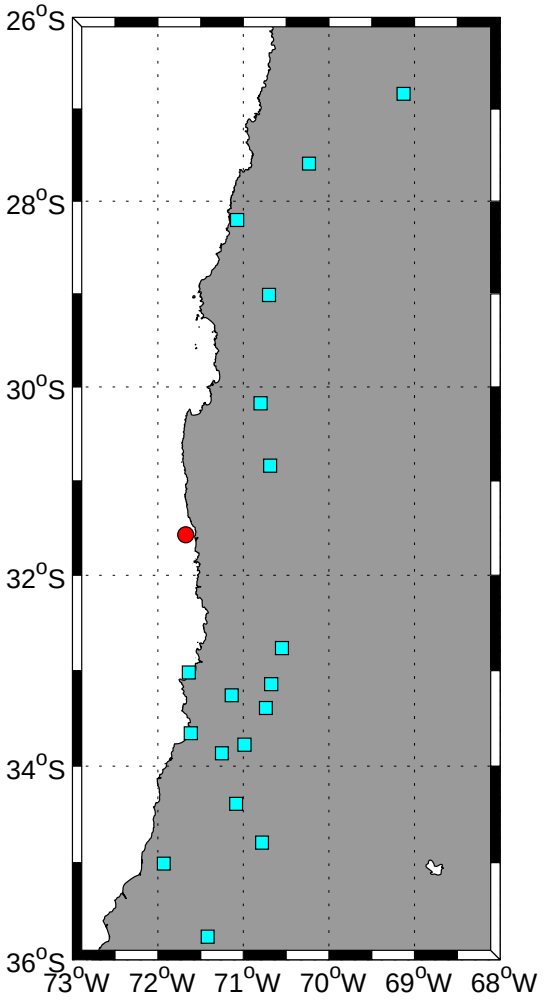

Fig DR4: Map of the stations (cyan square) used to study the repeating events. The red dot is the epicenter of the Illapel earthquake.

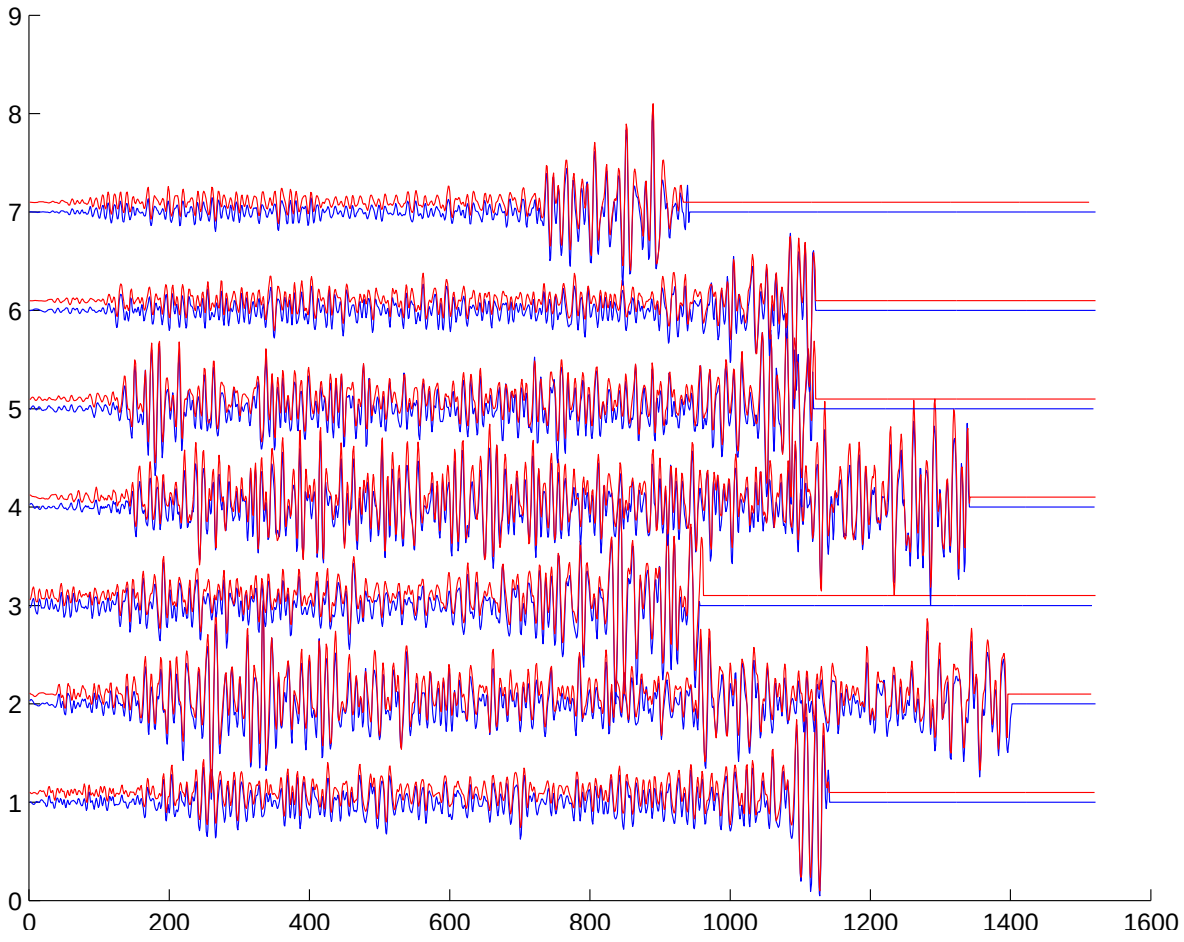

Fig DR5: Example of positive detection for a repeating earthquake. In red are the waveforms for the Mw4.4 event at UTC 2016-02-03T17:20:55, while the blue traces are for the Mw 4.2 at UTC 2015-09-27T16:44:30. The correlation coefficient foe each couple is larger than 0.95.