

Overview: high-rate GPS for dynamics of aseismic slip

	Seismic	Aseismic
Processes	Seismicity, tremor, VLFE, LFE	Slow slip event (SSE), afterslip, preslip
Interacting processes	Episodic tremor and slip (ETS), Swarm + slow slip	
Observation methods	Seismometers	Geodesy (GNSS, tiltmeters, strainmeters)
Time scale	Various, down to subdaily	Usually > 1 d

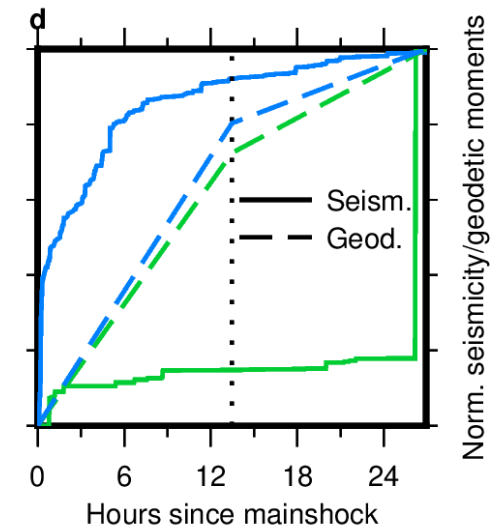
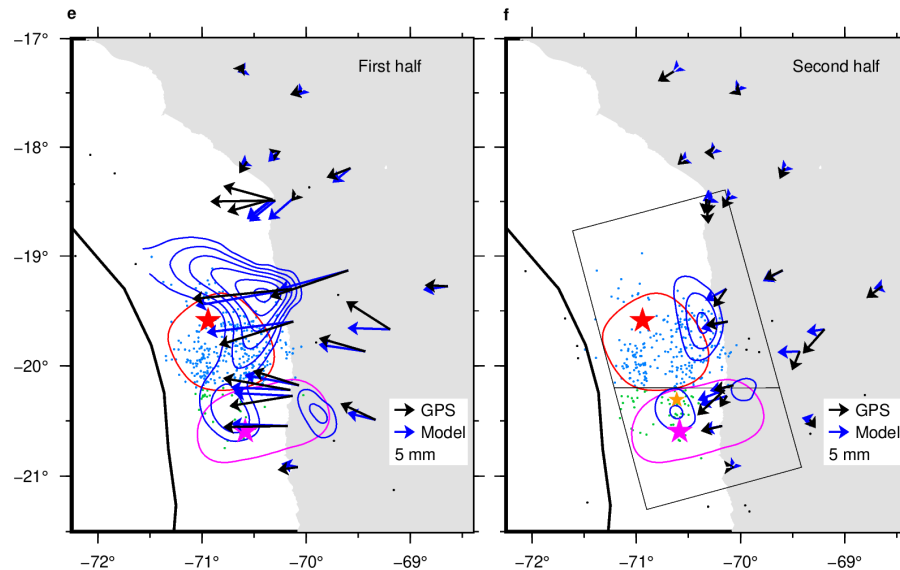
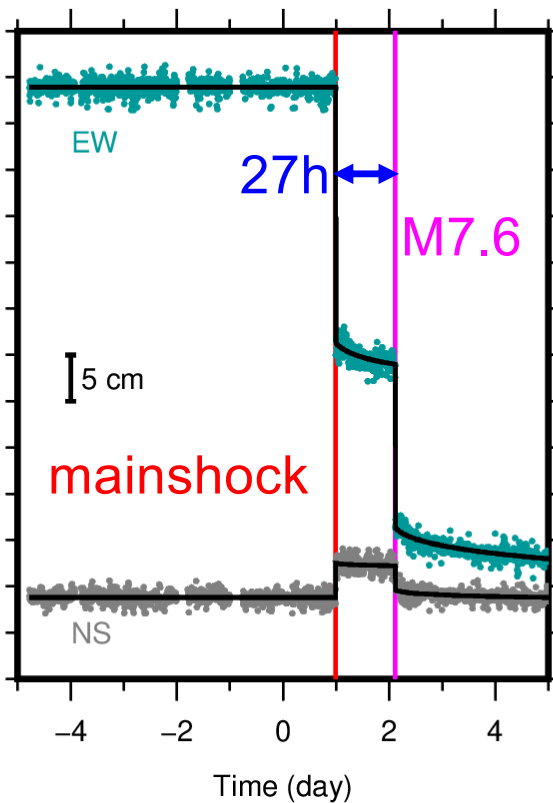
- Target: seismic and aseismic interaction in a subdaily time scale
- Purpose: To gain insights into fault mechanics
- Approach: analysis of high-rate, subdaily, GPS coordinates
 - Noisier, but more finely sampled
 - Alternatives to strainmeters and tiltmeters

Yuji Itoh
(postdoc at cycle)

Topic 1: Nucleation of the 2014 Iquique largest aftershock

Itoh, Socquet, Radiguet,
under consideration in NGeo for 4w!

d GPS displacement at IQQE

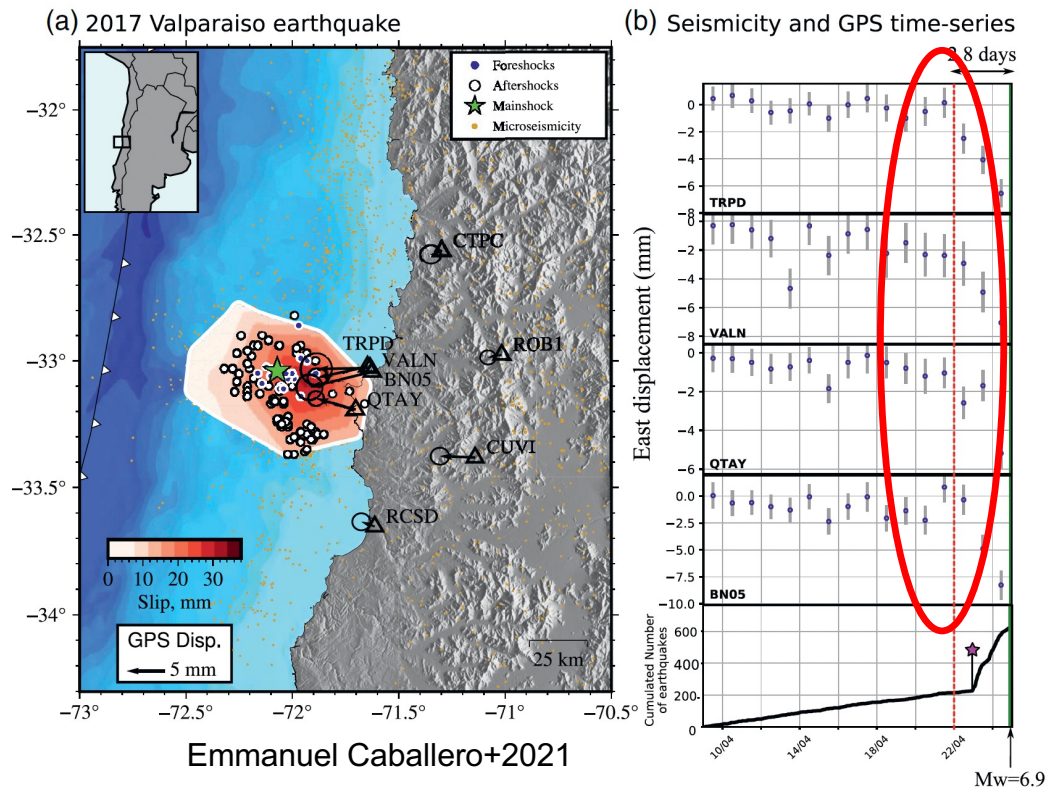


- Interevent afterslip for 27h has a peak between the two epicentres
- Interevent seismicity around the largest aftershock area accelerated
- Nucleation of the largest aftershock was driven by afterslip

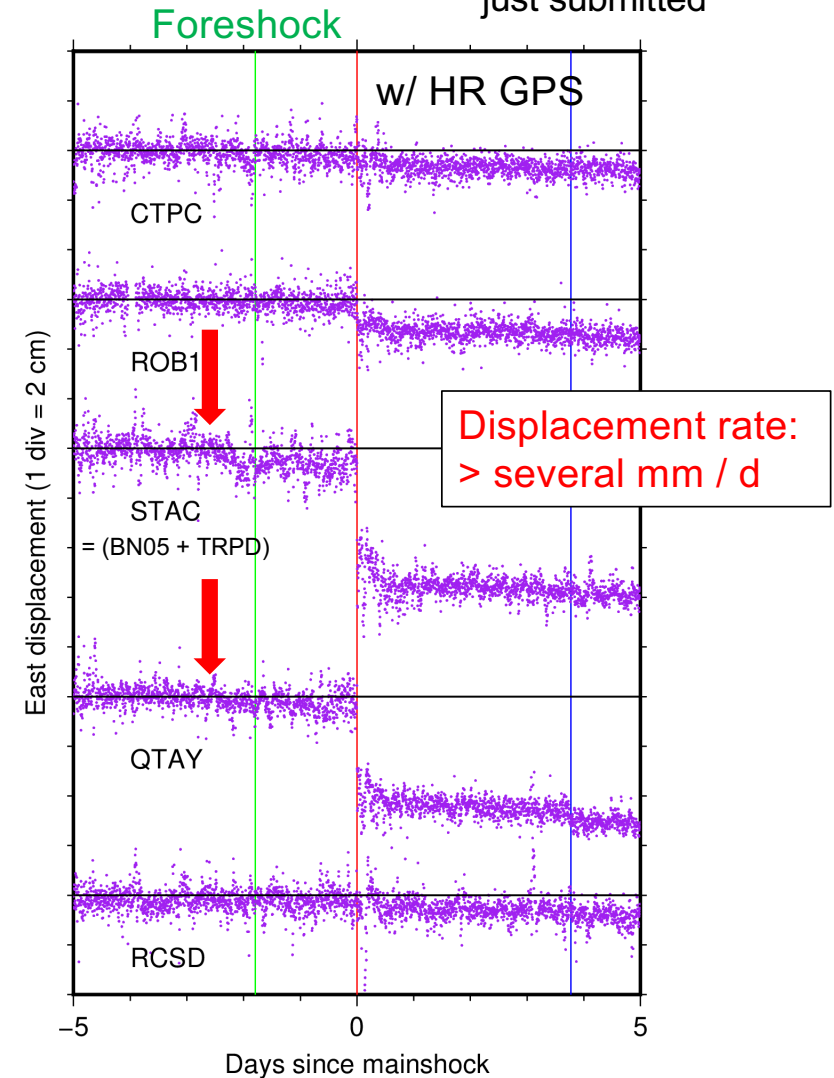
Displacement rate: several cm / d

Topic 2: Aseismic slip behind the 2017 Valparaíso sequence

Moutote, Itoh, et al.
just submitted



- The aseismic displacement onset looks slightly earlier than the onset of the foreshock burst
- Early postseismic deformation identified

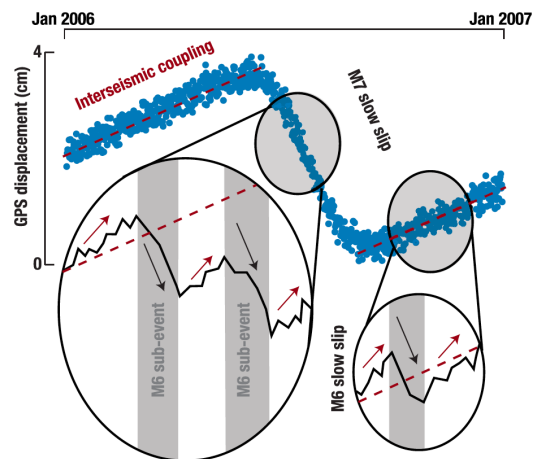


Topic 3: Subdaily variation of slow slip events (SSE)

Current main topic

- Tremor activity changes in a subdaily time scale; also sensitive to tides
 - Not well-studied for SSEs

Displacement rate:
several mm / 5-10 d

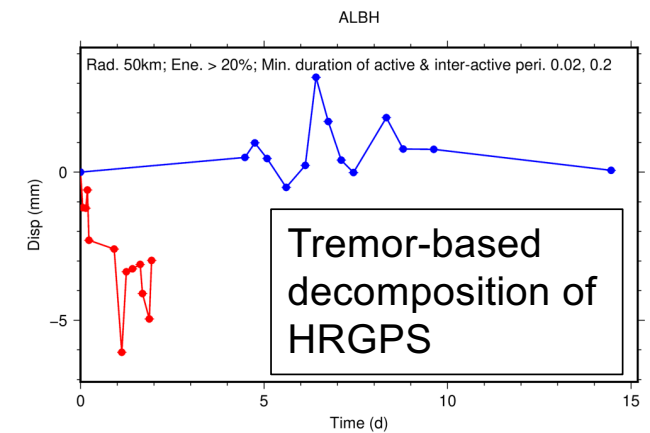
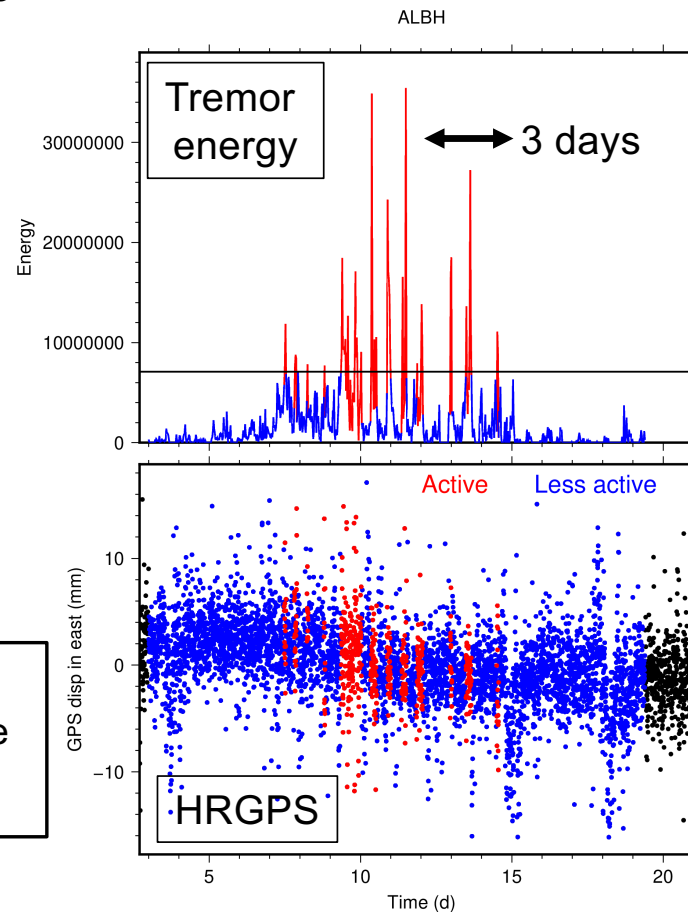


A: Subduction Megathrust

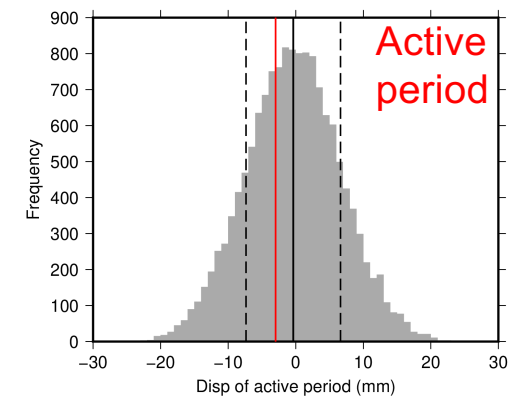
Jolivet+Frank2020

Current issues

- Not significant compared to the noise
- Spatial pattern is not coherent



Error evaluation



Extra: 1 Hz displacement waveform of the 2023 Turkey earthquakes

- HR GPS can capture dynamic displacement waveform **without** saturation
- To be introduced in more detail in a grand seminaire on the turkey earthquakes on 23 March

Not aseismic, though...

