



Analysis of the micro-seismicity during the preparation of a Megathrust rupture: the case of the Mw 8.2 Iquique earthquake 2014, Chile

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The 2014 Iquique seismic crisis (Chile), culminating with the Mw 8.2 earthquake, April 1st, highlights a complex unlocking of the North Chile subduction interface. The year preceding this event, at least three large seismic clusters were observed: in July 2013, January and March 2014. These clusters are possibly representing the signature of slip transients accompanying the progressive destabilization of the plate contact [Ruiz et al. 2014, Schurr et al., 2014; Kato et al., 2016]. Here we investigate the hypothesis, advanced by Bouchon et al. [2006], that the megathrust triggered through a process of slab deformation. To address this question, a rich earthquake catalog – complete from $M=2.4$ following the local magnitude formula of the CSN – for the year preceding the mainshock has been extracted from the continuous waveform data-set recorded by the IPOC and ILN networks, using the BackTrackBB method [Poiata et al. 2016], an automated methodology for earthquake detection and location. Given the obtained picks of P- and S-waves arrivals, NonLinLoc [Lomax et al. 2000] gives us the location-PDF for each event, allowing us to select events based on the quality of their location. Space-time analysis of the declustered catalog provides new insight into the progressive unlocking of the subduction zone and raises question about the role of the intermediate-depth seismic activity in the triggering the April 2014 crisis.