



## Segmentation of Seismicity in the Mejillones Region, Northern Chile

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The Mejillones Peninsula constitutes a widely accepted seismic barrier which separates two major segments of the Andean subduction zone. There is no evidence that past earthquake ruptures have traversed the barrier. We recently deployed a dense seismic monitoring system on Mejillones to study the local structure and seismicity distribution in greater detail. Between June 2013 and October 2015 we detected about 3000 micro seismic events with magnitudes down to  $M_l = 0.5$  and determined P- and S- arrival times. Precise event location was performed using a regionally updated velocity model and waveform similarity- based improved arrival time picks. This provides a detailed seismicity image of the Mejillones region. Despite clear evidence for young active faults on Mejillones, upper crustal seismicity is only minor. Earthquakes along the interface occur continuously from 25 to 40  $km$  depth. Activity is also observed within the oceanic crust and is particularly high on the near-vertical rupture fault of a  $M_w 6.8$  intra-slab earthquake which followed only weeks after the 2007  $M_w 7.7$  Tocopilla earthquake. Slab-related seismicity partly correlates with the coastline and is higher offshore. We also observe a North-South segmentation with a high level of seismicity at the northern and southern borders of the Mejillones Peninsula and less seismicity in its central part, both onshore and offshore.