



The structure of the 2014 Mw 8.1 Iquique earthquake revealed by offshore observations

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On April 2014 the Iquique Mw 8.1 earthquake ruptured the interpolate contact between the oceanic Nazca and continental South American plates offshore northern Chile between 19.5°S to 21°S in April 2014. This earthquake did not fully release the strain accumulated since the last great megathrust (Mw 8.8) in 1877 and had left an unbroken segment in the south. From December 2014 to November 2016, we deployed an offshore network of 15 Ocean Bottom Seismometers (OBS) that covered the rupture area and the unbroken southern segment using the Chilean Navy ship OPV Toro and R/V Sonne. That data set is supplemented by five weeks of data from 67 OBS installed for a controlled source seismic experiment during cruise MGL1610 of the R/V Marcus Langseth in late 2016. Data acquired onshore by stations from of the IPOC (Integrated Plate Boundary Observatory Chile) and CSN (Chilean Seismological Service) networks are also included.

We present first results of this ongoing project, which include double-difference hypocenter relocations based on waveform cross-correlation. Most of the seismicity occurs between 19.5 and 21°S up-dip of the patch of maximum coseismic slip during the 2014 earthquake, while the seismicity in seismogenic depths is highly concentrated forming well-defined clusters. The observed seismicity provides constraints on the structure of the marine forearc and enables us to relate the seismicity distribution to the background seismicity, seafloor morphology, and regional tectonics.