



The 14 November, 2007 Mw 7.8 Tocopilla, northern Chile earthquake within the Iquique seismic gap

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A prominent seismic gap persisted in northern Chile between the towns of Antofagasta and Arica for 130 years. This 500 km segment along the South American subduction zone last ruptured in 1877 in a devastating M9 earthquake. On November 14th 2007, an M_w 7.8 earthquake started near the coastal town of Tocopilla to break the southernmost 200 km of the seismic gap. In Tocopilla and several other communities in the backcountry, a majority of the structures were destroyed. Commencing in 2006, in close cooperation between the GFZ Potsdam (Germany), IPG Paris (France), the Universidad Católica del Norte, Antofagasta and Universidad de Chile, Santiago (Chile), a network of 15 observatories equipped with seismic broadband and strong motion sensors, GPS receivers and Magnetotelluric probes is being established to monitor the seismic gap. At the time of the Tocopilla earthquake, 12 stations were already deployed with the seismological instruments. We will use the nearfield data together with farfield seismic data and the surficial deformation pattern from InSAR, to derive a detailed rupture model. Preliminary analysis of farfield seismic data indicates an almost unilateral southward rupture that terminated near the Mejillones Peninsula, where an earlier large earthquake, the M_w 8 1995 Antofagasta event, had its northern limit. The Tocopilla event was followed by many large aftershocks with five events exceeding magnitude 6. Based on our local network, we will present a preliminary analysis of the early aftershocks and interpret them in relation to the mainshock rupture.