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Preliminary aftershock distributions of the 27 February 2010 M_w 8.8 Maule Earthquake from International Aftershock Survey data

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On 27 February 2010 the M_w 8.8 Maule earthquake in Central Chile ruptured a well known seismic gap, which last broke in 1835. Shortly after the mainshock, Chilean agencies (UC Santiago, UC Concepción) and the international seismological community (USA (IRIS), France (IPGP), UK (University of Liverpool), Germany (GFZ)) installed a total of 142 portable seismic stations along the whole rupture zone in order to capture the aftershock activity. Most stations were in the field until September 2010, with a subset remaining until January 2011; the UK stations will remain in the field beyond this time. The data from the initial deployment are open and are being distributed through the IRIS and GEOFON data centres. We will present preliminary aftershock distributions based on automatic detection algorithms. In total, for the period between March and September 2010 we detected ∼60,000 locatable earthquakes, of which we form a subset of ∼7,000 events with high quality locations. The depth of events in the high quality subset is generally well constrained such that the plate interface is clearly defined, and can be separated from overriding plate seismicity. First order features that can be identified are: 1.) A pronounced cluster of seismicity is apparent at 25-35 km depth and 50-120 km perpendicular distance from the trench (with some NS variation). 2.) A secondary band of seismicity can be identified at 40-50 km depth and ∼150-160 km perpendicular trench distance and between 34° and 37°S. Although the secondary band lies along the continuation of the primary one, it is clearly separated from it by a gap with sparse seismicity. 3.) Intense crustal seismicity is found in the region of Pichilemu. This region hosted the strongest aftershock (M_w=6.9), a normal faulting event with NW strike. The aftershocks extend from the plate interface to the surface and are aligned on a NNW-SSE oriented band in map view. 4.) An isolated shallow cluster of crustal seismicity occurs beneath the volcanic arc (36.42°S, 71.1°W) near Laguna del Dial. Ongoing research is concerned with calculating first motion focal mechanisms for the larger events and improving locations by relative location methods.