Geophysical Research Abstracts
Vol. 18, EGU2016-10214, 2016
EGU General Assembly 2016

3D seismic velocity structure in the rupture area of the 2014 M8.2 Iquique earthquake in Northern Chile

Jack Woollam (1), Amaya Fuenzallida (1), Tom Garth (1), Andreas Rietbrock (1), Sergio Ruiz (2), and Hernando Tavera (3)

(1) University of Liverpool, Earth, Ocean and Ecological Sciences, Liverpool, United Kingdom (a.rietbrock@liverpool.ac.uk), (2) Universidad de Chile, Santiago, Chile, (3) Instituto Geofisico del Peru, Lima, Peru

Seismic velocity tomography is one of the key tools in Earth sciences to image the physical properties of the subsurface. In recent years significant advances have been made to image the Chilean subductions zone, especially in the area of the 2010 M8.8 Maule earthquake (e.g. Hicks et al., 2014), providing much needed physical constraints for earthquakes source inversions and rupture models. In 2014 the M8.2 Iquique earthquake struck the northern part of the Chilean subduction zone in close proximity to the Peruvian boarder. The pre- and aftershock sequence of this major earthquake was recorded by a densified seismological network in Northern Chile and Southern Peru, which provides an excellent data set to study in depth the 3D velocity structure along the subduction megathrust.

Based on an automatic event catalogue of nearly 10,000 events spanning the time period March to May 2014 we selected approximately 450 events for a staggered 3D inversion approach. Events are selected to guarantee an even ray coverage through the inversion volume. We only select events with a minimum GAP of 200 to improve depth estimates and therefore increase resolution in the marine forearc. Additionally, we investigate secondary arrivals between the P- and S-wave arrival to improve depth location. Up to now we have processed about 450 events, from which about 150 with at least 30 P- and S-wave observations have been selected for the subsequent 3D tomography. Overall the data quality is very high, which allows arrival time estimates better than 0.05s on average. We will show results from the 1D, 2D, and preliminary 3D inversions and discuss the results together with the obtained seismicity distribution.