



The Onshore Reflection Seismic Survey of Project TIPTEQ: Structural Image and Petrophysical Interpretation of the Chilean Subduction Zone

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The TIPTEQ project (from The Incoming Plate to mega-Thrust Earthquake processes) studies subduction zone processes which generate mega-thrust earthquakes at the southern central Chilean continental margin. Amongst 13 sub-projects within TIPTEQ, the onshore reflection seismic sub-project aims at imaging and identification of processes in the seismogenic coupling zone, especially at the downdip end, where those mega-thrust events are thought to initiate.

The approximately 95 km long near-vertical reflection (NVR) seismic profile was shot at c. 38° S in January 2005. The E-W trending line runs across part of the Central Valley and continues over the coastal cordillera towards the Pacific, thereby crossing the relocated hypocenter of the 1960 Valdivia earthquake ($M_w=9.5$). 180 three-component geophones were deployed along an 18 km long spread, moving 4.5 km in a daily roll-along for three weeks. 76 explosive shots, with a spacing of approx. 1.5 km, allowed an up to 8-fold CDP coverage. The resulting seismic section shows a strongly structured forearc. The subducting plate interface can be traced down from 25 km depth below the coast to a depth of 60 km below the Central Valley. There are broad bands of reflectivity in the upper and middle crustal levels, dipping towards the east, roughly parallel to the subducting plate. These bands have a thickness of 2-3 km, can be followed to a depth of 40 km and start to fray towards the east. Specific features in the accretionary wedge, like the Lanalhue fault zone, can be identified. To the east of this fault zone the reflectivity decreases rapidly, and the upper crust becomes al-

most transparent. There are bright, reflective spots which might indicate the existence of abundant fluids in the accretionary wedge.

We present the results from poststack processing and migration of the near-vertical reflection experiment, as well as a geodynamic interpretation of the obtained structural inventory with special focus on seismogenic coupling zone processes and a possible subduction channel.