



High-Resolution, Three-Component Reflection Seismic Survey in the Southern Central Chilean Andes at 38°S: First Data from Project TIPTEQ

U. Micksch, C. M. Krawczyk and the TIPTEQ research group
GeoForschungsZentrum Potsdam, Telegrafenberg, D-14473 Potsdam, Germany
(micksch@gfz-potsdam.de)

Most of the earthquakes generated around the Pacific Ocean are related to subduction processes and can occur with high magnitudes. With the growing population in these areas, the possible threat from seismic hazard becomes even more serious. A quarter of the worldwide seismic energy in the last century was released in the Chilean part of the Andes, and thereof, most energy by the largest historically recorded earthquake in 1960 ($M_w = 9.5$), the so-called Valdivia earthquake.

Within the TIPTEQ research project (from The Incoming Plate to mega-Thrust Earthquake processes) a reflection seismic profile was shot in southern central Chile at approx. 38°S. The seismic recording of the 90 km long profile started in the Central Valley and continued over the Coastal Cordillera towards the ocean. The seismic line passes over the relocated hypocenter of the unique 1960 event which had a coseismic slip of up to 40 m.

180 three-component geophones were deployed along an 18 km wide spread whereof 4.5 km were shifted in a daily roll-along. With approx. 100 borehole shots, c. 1.5 km apart, this up to 8-fold covered line should deliver a high-resolution image of the seismogenic coupling zone between the subducting Nazca Plate and the South American continent.

The data will be processed and interpreted towards the understanding of the dynamic processes and structures in the survey area, and will be linked strongly to the findings of other TIPTEQ sub-projects, like seismological experiments and geodetic measurements. The high-resolution, three-component survey setup has the potential to provide

information on fluids transported in the subducted Nazca Plate and their migration, as well as to give constraints on a possible subduction channel. The study area shows fundamental differences to the relatively well-known subduction zone in northern Chile (Antofagasta region), such as the amount of trench sediments or fluid content.

Here, we will present first examples of the seismic data and preliminary results from the January 2005 experiment, and will compare them with the single-fold seismic line acquired in 2001 (SPOC survey) at the same latitude.