Geophysical Research Abstracts, Vol. 8, 01371, 2006
SRef-ID: 1607-7962/gra/EGU06-A-01371


# Impact of the incoming plate on seismogenesis - the role of hydration in the outer rise offshore Chiloe Island, Southern Chile

**E. Contreras-Reyes** (1), M. Scherwath (1), E.R. Flueh (1) and I. Grevemeyer (1)

(1) Leibniz Institute for Marine Sciences, IFM-GEOMAR, Kiel, Germany
(econtreras-reyes@ifm-geomar.de)

The release of water in subduction zones is beleived to be an important process controlling earthquakes both in the downgoing plate and in the seismogenic megathrust fault zone. Water may trigger and nurture rupture propagation. To understand the degree of hydration of the incoming plate, we studied the velocity structure of the lithosphere offshore Chiloe. Seismic wide-angle and refraction data are used to derive 2D velocity models of seismic profiles located seaward of the trench axis on the 18 Myr old oceanic Nazca Plate, offshore of the rupture area of the Great 1960 Chile earthquake. The data were obtained during RV SONNE cruise SO181 of TIPTEQ (from The Incoming Plate to mega-Thrust EarthQuake processes). Two lines run perpendicular to the Chile Ridge and parallel to the Chiloe Fracture Zone (Profile P01a and P05). A third profile is parallel to the Chile trench (P03) and hence normal to P01a and P05. P05 approaches the deep sea trench. The 2D-velocity models derived from tomographic travel time inversion consist of a ˜5.5 km-thick oceanic crust and show a similar P-wave velocity structure along each profile. Nevertheless, the forward analysis of the travel times suggests a faster P-wave mantle velocity along P01a (>8.0-8.1 km/s), which is oriented approximately in the direction of spreading. This degree of seismic anistropy is interpreted as a prefered oritentation of the Olivine caused by mantle flow at the spreading centre. Approaching the Chile trench, however, (preliminary) seismic velocities appear to be lower, suggesting a certain degree of serpentinization of the uppermost mantle. Compared to Middle America (northern Costa Rica and Nicaragua) the dregree of serpentinization is much lower. We therefore speculate that the release of water from the igneous oceanic plate is not of importance for the nucleation of megathrust earthquakes in South Chile.