Geophysical Research Abstracts, Vol. 9, 07265, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-07265

Late Quaternary forearc tectonics documented in marine and lacustrine sediments – Examples from South Central Chile

S. Blumberg (1), H.W. Arz (1), H. Echtler (1), F. Lamy (2), G.H. Haug (1), O.Oncken (1)

(1) GeoForschungsZentrum Potsdam, Telegrafenberg, D-14473 Potsdam, Germany, (2) Alfred-Wegener-Institut für Polar- und Meeresforschung, Am Alten Hafen 26, D-27568 Bremerhaven, Germany (sblumb@gfz-potsdam.de)

The active margin of Southern Chile is characterized by high deformation rates and the occurrence of the world's largest subduction earthquakes. Here we focus on two kinds of sedimentary archives that document the frequency of seismic events and the uplift-history of two different seismotectonic segments: (1) the marine sequence of ODP Site 1232, which was taken just within the Peru-Chile trench and (2) a couple of sediment cores drilled in the Chilean coastal lakes Lanalhue and Lleu Lleu.

(1) The trench sediments of ODP Site 1232 (40˚S, 76˚W) are late Pleistocene in age and mainly of turbiditic origin. Due to the regional tectonic situation, we assume that the turbidites were generally triggered by earthquakes, and we thus regard the sedimentary section as an archive of forearc seismicity. This interpretation is also supported by the average turbidite recurrence time of ∼230 years, which can be correlated to observed coseismic uplift rates, and which is similar to known recurrence intervals of seismic mega-events (∼200 years). However, in the long-term record, the modulation of the turbidite frequency seems to be influenced by sea-level and onshore climate variability.

(2) The sediment cores of the coastal lakes Lanalhue and Lleu Lleu (38˚S, 73˚W) are Holocene in age and allow detailed studies of the regional coastal uplift. A transition from marine to lacustrine facies took place in both lakes at ∼ 8000 years BP and can be well recognized in the records of magnetic susceptibility and geochemical elements. Knowing the Holocene sea level evolution and the present lake levels, we are able to

determine the mean uplift rate during the last 8000 years to $\sim$4.3 mm/yr, which is also congruent with known deformation rates of the specific seismotectonic segment.