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# Bathymetric and seismic evidences of a regional strike slip system fault (ASF) along the submarine forearc of Central Chile and their potential link on generation of giant earthquakes

Ximena Contardo-Berrios (1) and Nina Kukowski (2)

(1) Pontificia Universidad Católica de Valparaíso. Escuela de Ciencias del Mar. Av. Altamirano 1480. Valparaíso, Chile (ximena.contardo@ucv.cl), (2) Friedrich-Schiller-Universität Jena. Institut für Geowissenschaften Lehrstuhl für Allgemeine Geophysik Burgweg 11. Jena, Germany

A very relevant issue in the study of any convergent margin refers on seismogenic zones and their potential generation of destructive earthquakes and tsunamis, which may affect densely populated coastal areas. Previous subduction zone studies emphasized the connection between regional faults and rupture area of big earthquakes. A recent and important question in the study of the Chilean convergent margin, is on the nature and mechanisms controlling a regional strike slip fault in the submarine forearc and its potential seismogenic activity.

Preliminary results from bathymetry, revealed a kilometric scale strike slip fault -now named as the "Antuvilu system fault" (ASF)-, displayed along the submarine forearc (around 33°30'-37°S). ASF is nearly parallel to the margin, with a general tendency NNE-SSW. A set of structures with an oblique tendency (NNW-SSE) respect to the main fault is also clearly identified.

Those bathymetric evidences are consistent with the observed fault geometries on seismic lines, characterized by positive flower structures, which evidence strike slip faults with a predominant transpressive style. However, a less frequent transtenssive style is also observed (∼35°-35°30′S). Submarine slope basins mostly are half-grabens controlled by subvertical bordering faults (with reactivation), governing differential uplift and subsidence. Some local sediment sources and consecutive downlaps represent past reactivation on bordering faults. Evidences of active faulting are inferred from escarpments affecting the sea floor and discontinuous and displaced BSR in the sedimentary sequence (∼36°S).

As it has been observed, the kilometric ASF evidences an active and dynamic structure, controlling slope basins and forearc morphology, but it would also play an important role in seismicity; the latter would be almost evidenced in the close proximity of the rupture area generated from slip model distribution of the last Chilean earthquake.

Seismological data indicate that the 8.8 Mw Chilean earthquake, which occurred on February 27th 2010 ruptured very close to this regional structure. Surface projection of the fault plane from slip distribution allows visualizing the location and length of the rupture zone. Thus, several questions can be raised from these observations, e.g., could such a strike slip fault be the rupture area of this last earthquake? Could it be representing a rheological limit across the accretionary prism? Should we look for similar regional structures along the entire margin which may represent potential seismogenic faults? Has this fault been active during the earthquake? A close integration between morphological, geological and kinematical features of the submarine forearc structures with newly generated seismic and geodetic information will be crucial to better understand the nature and dynamic processes linked to the generation of potential giant earthquakes.