

The Top-to-the North Shear of the Nazca Slab Beneath the Central Portion of the Andean Region

BERROCAL, J. and FERNANDES, C. Instituto Astronômico e Geofísico, Universidade de São Paulo, São Paulo, Brasil

Important controversies exist about the seismotectonic characteristics in the Andean region, in relation both to the morphology of the Wadati-Benioff zone (WBZ) and to the focal mechanism responsible for the very deep ($h > 500$ km) South American earthquakes. These deep earthquakes are distributed in two well defined and elongated NS segments and a segment among the other two, with ESE-WNW direction, where the M_W 8.3 deep earthquake of June 9, 1994, occurred. Those segments define a lateral continuous structure of the subducted Nazca plate at 600 km of depth.

Based on existing good quality relocated hypocentres, we propose to demonstrate that the Nazca slab portion among 24°S and 01°S , is in a process of a top-to-the north shear in such a way that its deep corresponding extremes seem to be, at present times, at latitudes 29°S and 06°S , respectively. That data also permitted to elaborate an updated and more detailed contour map of the WBZ topography. In this map it is possible to correlate the change on the slab's dip beneath the central and northern Peruvian regions with the subduction of the Nazca aseismic ridge and with a probable north-western migration of the slab comprising the subducted oceanic ridge. The hypothesis presented in this paper, that suggests a northwards translation of the slab in the transition zone at around 600 km of depth, permits to infer a flat horizontal mechanism for the very deep South American earthquakes, similarly to the focal mechanism determined for the large deep Bolivian event of June 1994.