

Seismic hazard assessment for the city of Arequipa – Southern Peru

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The Peruvian territory is located in the central portion of the Andean region, which has one of the highest seismicity level in the world caused by the subduction of the Nazca plate below the South American one. The Southern Peru portion has a peculiar seismotectonic setting, with the Wadati-Benioff zone dipping with a larger angle than in the Central and Northern Peru portions and is being twisted to accommodate the contortion that the deep part of the slab present at these latitudes.

Most destructive earthquakes that have affected Arequipa have been originated in the Peru-Chile border region, where three earthquakes with magnitude M_W near 9.0 (in 1604, 1868 and 1877) have occurred. However there are other seismogenic zones, closer to Arequipa, where also use to occur, and with more frequency, large magnitude earthquakes that provoke serious damage in this city and in other smaller towns in Southern Peru, such as the events occurred in 1958, 1960, 1979, 1996 and 1999.

Based on data obtained from regional seismographic networks installed in Southern Peru in 1965, 1969, 1975-1976 and 1980-1981, and also on hypocentres determined with teleseismic data, it has been possible to identify several seismogenic zones distributed along the intraplate, interplate and at intermediate depth subduction portions. We shall present in these paper the seismicity level existent in each seismogenic zone and determine the hazard that the existing seismicity in that region represents for Arequipa and for other important towns in Southern Peru.