

SEISMIC HAZARD IN BOLIVIA

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Regional structures, such as own- going slabs, severely bias hypocentral, particularly depth, estimation of earth- quakes when only regional and teleseismic P-arrivals are used to determine the epicenter. The region of Bolivia is unusual in that it includes a downgoing slab, the Nazca plate from the west, at about 8 cm/a, and a mid-crustal décolle- ment in the east, of the Subandean old-thrust belt into the Brazil Shield, at about 1 cm/a. Also, the largest earthquake in the record of Bolivian seismicity was that of 9 June 1994 of moment magnitude 8.3 and of depth 640 km. Thus, there are four difficulties in estimating the seismic hazard in Bolivia. First, there is usually bias in the estimation of the hypocenters from which the hazard has to be estimated. Secondly, expressions for attenuation of velocity and acceleration need to be valid down to a depth of 640 km for the various regions of Bolivia, for example, for the partially molten region of the Cordillera Occidental and for the region of the Bolivian Altiplano (with its 25 km of sediments). Thirdly, although the hazard from the Nazca plate is known, recently constructed higher buildings in Bolivian cities mean that lower frequencies now need to be consi- dered. Finally, the continuing post- Oligocene shortening in the Subandean fold-thrust belt, at present approxi- mately 130 km, means that large earth- quakes probably occur in this region with return times longer than the record of Bolivian seismicity.