

Accepted Manuscript

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PII: S0012-8252(17)30071-5
DOI: doi: [10.1016/j.earscirev.2017.08.003](https://doi.org/10.1016/j.earscirev.2017.08.003)
Reference: EARTH 2470
To appear in: *Earth-Science Reviews*
Received date: 11 February 2017
Revised date: 1 August 2017
Accepted date: 5 August 2017

Please cite this article as: Kusala Rajendran, Revathy M. Parameswaran, C.P. Rajendran, Seismotectonic perspectives on the Himalayan arc and contiguous areas: Inferences from past and recent earthquakes, *Earth-Science Reviews* (2017), doi: [10.1016/j.earscirev.2017.08.003](https://doi.org/10.1016/j.earscirev.2017.08.003)

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Seismotectonic perspectives on the Himalayan arc and contiguous areas: Inferences from past and recent earthquakes

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Abstract

Spread over countries including Pakistan, India, Nepal, Bhutan, and China, the Himalayan mountain chain, the most spectacular result of the Indo-Eurasian plate collision, is a locus of destructive earthquakes. Past earthquakes from this region have impacted vast swathes of frontal Himalaya and stretches of alluvial plains south of the range front. Risk from future earthquakes has increased, considering the burgeoning population and an ever-expanding built-environment in the region. While considerable ambiguities exist on the locations, ruptures, and sizes of the earthquakes during the first half of the last millennium (1255, 1344, and 1505 AD), those during the latter half (1803 and 1833 AD) are quite well-documented, all reported from the central Himalayan segment comprising of eastern Nepal, Kumaun, and Garhwal. While dormancy prevailed in the central segment in the intervening period, the Himalayan arc elsewhere witnessed three large/great earthquakes in the last century, namely, 1905 Kangra (Mw 7.8), 1934 Bihar-Nepal (Mw 8.2), and 1950 Upper Assam (Mw 8.6), the last one being the largest intra-continental earthquake in the recorded history. The April 25, Gorkha (Nepal) earthquake (Mw 7.8) located in the central seismic gap terminated the period of low-level seismic productivity that followed the

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