Guest editorial

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The devastating earthquake of 8 October 2005 in the Muzaffarabad region in western Himalaya heavily damaged several parts of northern Pakistan and the north Indian state of Jammu and Kashmir. The earthquake of magnitude 7.6 claimed more than 80,000 lives and clearly exposed the poor standards of building construction—a major challenge facing highly-populated, earthquake-prone, developing nations today. This catastrophic event, one of the worst in recent times, calls for a serious re-evaluation of the hazard potential of the Himalayan belt that witnessed several disastrous earthquakes in the past, namely the 12 June 1897 Shillong ($M \sim 8.7$), 4 April 1905 Kangra ($M \sim 7.8$), 15 January 1934 Bihar-Nepal ($M \sim 8.3$), 30 May 1935 Quetta ($M \sim 7.7$) and the 15 August 1950 Assam ($M \sim 8.7$) earthquakes. There were 14 major earthquakes of $M \geq 7.5$ during the period 1897 to 1952, but none between 1952 and

the 2005 Muzaffarabad earthquake of $M \sim 7.6$. The more recent Sichuan earthquake of $M \sim 7.9$ that occurred on 12 May 2008 along the Longmenshan fault system bordering the Tibetan plateau and Sichuan basin, north of the eastern Himalaya, killed an estimated 95,000 people. Earthquakes like those that struck Muzaffarabad and Sichuan pose a grave seismic hazard in regions like the Himalaya; their effects are magnified by poor quality of construction. Structures are vulnerable even to aftershocks, and additional hazards are posed by landslides and floods due to possible impoundment of lakes. Seismicity studies in the Himalaya indicate an alarming hazard for years to come. The probabilistic seismic hazard map of India and adjoining regions prepared under the Global Seismic Hazard Assessment Programme (GSHAP) of the United Nations indicates a Peak Ground Acceleration (PGA) of 0.25 – 0.3 g in parts of Himalaya, up to 0.35 – 0.4 g in the Burmese arc and northeast India, and a maximum of 0.5 g in the Pamir-Hindukush regions close to the Muzaffarabad region in western Himalaya.

The current special issue comprises papers based on geological, geophysical and geotechnical studies of this previously less-studied but seismically important region of the western Himalaya, with a special reference to the 2005 Muzaffarabad earthquake. The papers deal with the following topics - geological and seismological field investigations, the causative fault system, isostatic

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gravity signatures and their correlation with continental subduction, varied stress regimes in a complex tectonic setup, Coulomb stress changes and zones of activation, the Hattian landslides and slope failures, geotechnical evaluation and application of Global Positioning System (GPS) for estimation of post-seismic deformation.

The lessons learnt from the 2005 Muzaffarabad earthquake in the northwestern Himalaya and the more recent 2008 Sichuan earthquake north of the eastern Himalaya, reiterate the need for strict implementation of suitable building codes and education of the population so that the hazard from future earthquakes can be minimized. Further, there is a serious need to re-evaluate the seismic

hazard scenario and to understand the seismogenesis along the Himalayan belt, particularly the western Himalaya, in the Muzaffarabad region. As the saying goes, “Earthquakes don’t kill, buildings do”. There cannot be a better example than the Muzaffarabad earthquake that claimed more than 80,000 lives even though its magnitude was only 7.6. Future efforts should therefore focus upon design and construction of earthquake resistant buildings according to required specifications of local micro-zones.

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