

Joint seismic and geological investigations for the central seismic gap zone of the Himalayan orogenic belt

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The Himalaya orogenic belt is the largest continental collision zones on Earth with high population density and high risk of large earthquakes. The April 25, 2015, Mw=7.8 Nepal earthquake caused nearly 9000 deaths and destroyed much of the infrastructure in the source area. This earthquake has greatly heightened concern for large earthquakes along the Himalayan front. Many important science questions remain about Himalayan formation, including distinguishing between different possible geometries of the Main Himalayan Thrust and better defining structural causes and locations of rupture segmentation both along-strike and down-dip.

We propose to deploy joint seismic and geological observations, including seismic reflections, broadband and short period seismometers and geological investigations across the central seismic gap zone in Nepal and southern Tibet. It is located to the west of the 2015 Nepal earthquake source area, where a great earth is likely to occur in the near future. The team has experiences with large field deployment in the Tibetan-Himalayan area. This proposal extends the seismic observations by Prof. Gao, who conducted seismic observations reflection across the Tethyan Himalayan, Prof. Klemperer, who deployed temporary broadband and short seismic stations across the aftershock zone of the 2015 Nepal earthquake, Prof. Bai, who deployed permanent broadband seismic stations in Nepal and along China-Nepal boarder, and Prof. Ding, who conducted geological investigations across major faults in Himalayan area.