

Source parameters of the 2019 Ms6.3 Medog earthquake in the southeastern Tibetan plateau and its tectonic implications

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An Ms6.3 earthquake occurred at Medog County, Nyingchi City, Tibet at Beijing time 04:15 on 24 April 24 2019. This earthquake is located in the northeast corner of the Himalaya orogenic belt where the Indian plate underthrusts beneath the Eurasian plate. Here the crustal shortening and the tectonically rotated deformation is the strongest with respect to other areas along the Himalayan orogenic belt.

Based on the waveforms recorded by the local broadband seismic stations we deployed at the eastern Himalaya syntaxis, and the waveform and traveltimes data obtained from Chinese and international seismic networks, we determined the earthquake location, focal mechanism and rupture process.

The resulting epicenter of this earthquake is ($94.56 \pm 0.01^\circ\text{E}$, $28.41 \pm 0.01^\circ\text{N}$) and the focal depth is 13.3 ± 1.6 km below the surface (or 11.5 ± 1.6 km beneath the sea level). The focal mechanism solution strike/dip/slip is $202^\circ/17^\circ/20^\circ$. The large rupture is mainly concentrated about 5 km to the NNE of the initial rupture area. Combined with other previous geophysical and geological studies, we infer that the earthquake occurred at the rapid turning area where the Main Himalayan thrust suddenly rotated nearly 90° . The major tectonic feature for this area is the west-dipping subduction and northward thrust of the Sang syntaxis with respect to the Namche Barwa syntaxis.

Keywords: Eastern Himalaya syntaxis, 2019 Ms6.3 Medog earthquake, earthquake relocation, Focal mechanism solution, Source rupture process