

## Estimation of Source Parameters and Moment Tensor Solution through Waveform Modeling of 2013 Kishtwar Earthquake

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**Abstract :** The Jammu and Kashmir region of the Northwest Himalaya had witnessed many devastating earthquakes in the recent past and has remained unexplored for any kind of seismic investigations except scanty records of the earthquakes that occurred in this region in the past. In this study, we have used local seismic data of year 2013 that was recorded by the network of Broadband Seismographs in J&K. During this period, our seismic stations recorded about 207 earthquakes including two moderate events of Mw 5.7 on 1st May, 2013 and Mw 5.1 of 2nd August, 2013. We analyzed the events of Mw 3-4.6 and the main events only (for minimizing the error) for source parameters, b value and sense of movement through waveform modeling for understanding seismotectonic and seismic hazard of the region. It has been observed that most of the events are bounded between 32.9° N - 33.3° N latitude and 75.4° E - 76.1° E longitudes, Moment Magnitude (Mw) ranges from Mw 3 to 5.7, Source radius (r), from 0.21 to 3.5 km, stress drop, from 1.90 bars to 71.1 bars and Corner frequency, from 0.39 - 6.06 Hz. The b-value for this region was found to be  $0.83 \pm 0$  from these events which are lower than the normal value ( $b=1$ ), indicating the area is under high stress. The travel time inversion and waveform inversion method suggest focal depth up to 10 km probably above the detachment depth of the Himalayan region. Moment tensor solution of the (Mw 5.1, 02:32:47 UTC) main event of 2nd August suggested that the source fault is striking at 295° with dip of 33° and rake value of 85°. It was found that these events form intense clustering of small to moderate events within a narrow zone between Panjal Thrust and Kishtwar Window. Moment tensor solution of the main events and their aftershocks indicating thrust type of movement is occurring in this region.

**Keywords :** b-value, moment tensor, seismotectonics, source parameters

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