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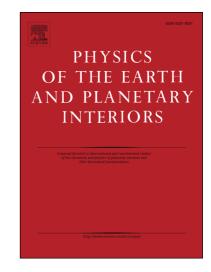
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## **ACCEPTED MANUSCRIPT**

1	Earthquake Swarm of Himachal Pradesh in Northwest Himalaya and its Seismotectonic implications
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5	Abstract
6	On the 27 th of August 2016, seismic swarm activity consisting 58 earthquakes (1.7 $\leq$ $M_L \leq$
7	4.4) occurred in Rampur area of the Kullu-Rampur Tectonic window of Himachal Pradesh in Northwest
8	Himalaya. The epicenters of these events are located at the northern front of the Berinag Thrust in its hanging
9	wall. To better understand the seismotectonics of this region, we analyzed the spectral source parameters and
LO	source mechanism of this swam activity. Spectral analysis shows low stress drop values (from 0.05 to 28.9
l1	bars), suggesting that the upper crust has low strength to withstand accumulated strain energy in this region.
L2	The Moment Tensor solutions of 12 earthquakes ( $\geq 2.7 M_L$ ) obtained by waveform inversion yield the shallow
L3	centroid depths between 5 and 10 km. All these events are of dominantly thrust fault mechanism having an
L4	average dip angle of ~30°. The P-axes and the maximum horizontal compressive stresses are NE-SW oriented;
L5	the relative motion of the Indian Plate. The present study reveals that the swarm activity Himachal region of
L6	NW Himalaya is related to out-of-sequence thrusting or the Lesser Himalayan Duplex system.
L7	
L8	Keywords: Satluj valley, Rampur Swarm, Stress drop, Moment tensor inversion, Lesser Himalayan Duplex.
L9	Highlights
20	• Low stress drop values indicate the low strength of upper crust in the study area.
21	Maximum horizontal compressive stresses are NE-SW oriented.
22	• Seismotectonics of Rampur region attained using MT solutions for events in swarm.
23	Cross-sectional study illustrates out-of-sequence thrusting or the LHD system along Satluj valley.
24	1. Introduction
25	Earthquake swarm is a sequence of large number of closely spaced earthquakes with no distinct or
26	major earthquake within a short time period of time (Mogi, 1963; Scholz, 2002). A Swarm activity is usually
27	identified to be occurred in the outermost layer of the earth i.e. the crust, owing to its high volcanic, geothermal
28	and tectonic activities. The temporal evolution of earthquakes in a swarm activity cannot be explained by any
29	simple law such as the Omori's Law for aftershocks; hence it can be distinguished from the aftershocks which

accompany main shock (Hainzl, 2004). According to Main (1996), each individual earthquake of a swarm

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