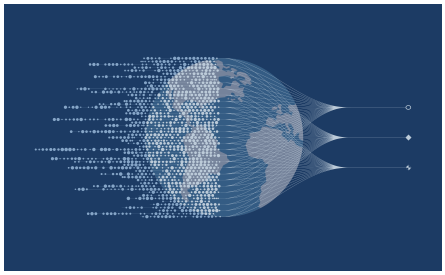

ID: **P1.2-077** Type: **E-poster**

# -Temporal Analysis of b-Values Along Fault Zones in the Central Himalayas Following the 2015 Gorkha Earthquake

This study investigates the spatial-temporal distribution of b-values along five fault areas the Judi fault, Thaple fault, Kathmandu fault, Motihari-Gauri Shanker fault and the Motihari-Everest fault following the Gorkha earthquake (MW 7.8). The study area spans the central Himalayas, bounded by latitudes 26.5°–29° N and longitudes 84°–87° E. An earthquake catalogue comprising 10 500 events was compiled from the National Seismological Centre and NAMASTE Networks Nepal. The frequency-magnitude distribution reveals b-value variations across the fault areas, ranging from 0.45 to 0.69, consistent with aftershock sequences. Notably, the Judi fault, Thaple fault, and Motihari-Everest fault areas exhibit low b-values of 0.45 ± 0.02, 0.48 ± 0.02, and 0.55 ± 0.04, respectively, suggesting potential regions for future seismic activity. These low b-values align with the thrust faulting mechanisms inferred from the focal mechanisms of the mainshock and major aftershocks. Temporal analysis of b-values emphasizes fluctuations from 25 April to 12 May 2015. Among the selected regions, the Motihari-Everest fault area shows critical strain conditions, as indicated by its stepwise energy release pattern, suggesting it is mechanically locked and susceptible to future seismic events.

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**Session Classification:** P1.2 The Solid Earth and its Structure

**Track Classification:** Theme 1. The Earth as a Complex System: T1.2 The Solid Earth and its Structure