



Evidence of 5 to 6m repetitive uplift of MFT hangingwall and channel abandonment in Suklaha Khola valley, Eastern Nepal

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The Main Frontal Thrust (MFT), the youngest and most active thrust in the Himalayas, has generated multiple magnitude 8+ earthquakes in the past. However, their source, extent and recurrence times are yet to be better constrained. Recent work on the 1934 Bihar-Nepal earthquake, that has ruptured at least a 150 km-long segment of the MFT, has addressed these questions using a multi-methodological approach (field observations, quantitative geomorphology, cosmogenic and radiocarbon dating). Two main areas – Bardibas (North-West) and Lahan regions (South-East) displayed evident multiple seismic uplift recorded by surficial deposits along riverbeds of rivers cutting across the thrust. Here, we focus on the Suklaha Khola (86°13'E), a key location SE of the Kamala river to correlate the western and eastern areas. We use high-resolution topographic data (4 data points /m²) extracted from airborne and terrestrial Lidar Surveys (1) to map the surface rupture of the 1934 event and (2) to map and quantify geomorphic markers of relative co-seismic uplift (such as terraces levels, abandoned paleochannels, active river beds and alluvial cones). We identify 3 uplifted terrace levels of about 5 to 6 m each corresponding to 3 seismic events, and a striking example of channel abandonment likely caused by the most recent event (1934 earthquake). These results corroborate with previous studies performed in the region suggesting a characteristic uplift behaviour along this segment of the MFT.