

## Imaging the seismic history of the MFT: a 100km-long Airborne Lidar Survey in Eastern Nepal

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In May-June 2015, an airborne Lidar survey of the Main Frontal Thrust (MFT) was conducted for the first time along the south side of the Siwaliks in eastern Nepal. The ~ 100 km long swath covered a 10 km wide area from east of Lahan (86°27' E) to west of Bardibas (85°53' E), encompassing large fractions of the surface ruptures of the great 1934 and 1255 earthquakes. The survey, acquired at the driest season of the year, provided a high-resolution (4 data points /m<sup>2</sup>) digital elevation model over a surface area of about 1000km<sup>2</sup>, covering cultivated/forested terrains. We use this new, high quality topographic dataset to build a regionally integrated interpretation of the tectonic geomorphology of the thrust front. The data help refine our mapping of the thrust trace and identify tectonically abandoned fluvial channels and terraces. In parallel, it helps assess the depth of hanging-wall river incision, and quantify the dynamic interaction between cumulative thrust throw and drainage evolution. It affords a critical, wide-ranging comparison of the multiple uplifts of hanging-wall terraces, previously measured at only a handful of field sites. The continuous Lidar swath coverage reveals new areas with striking tectonic geomorphology that lay hidden beneath Sal forests. We discuss the main results and new insights provided by the Lahan/Bardibas Lidar survey. Such results justify the systematic acquisition of comparable Lidar data along the entire length of the MFT in Nepal and adjacent countries.

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