Outburst flood risk assessment for the Pokhara Valley, Nepal

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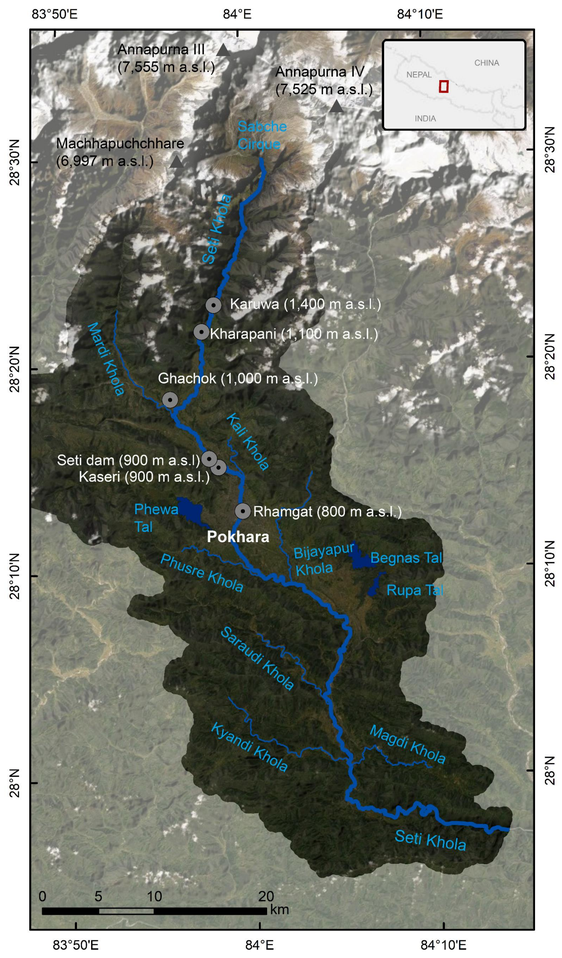
OUR STUDY

- Using scenario-based hydrodynamic modelling to inform a risk assessment for a rapidly growing city situated in a valley prone to outburst floods



POKHARA VALLEY

- Recent and medieval large floods in Nepal's 2nd largest city
- Unique geomorphology: broad fluvial terraces vs. narrow gorges
- Rapid socio-economical changes and urban growth
- ➢ Tripling of population in past three decades
- ➢ Informal settlements in close proximity to river

Fig. 1: Studied area of the Seti Khola (= river) catchment – originating in the glacial Sabche Cirque and major drainage system of the Pokhara Valley.

DATA & METHODS

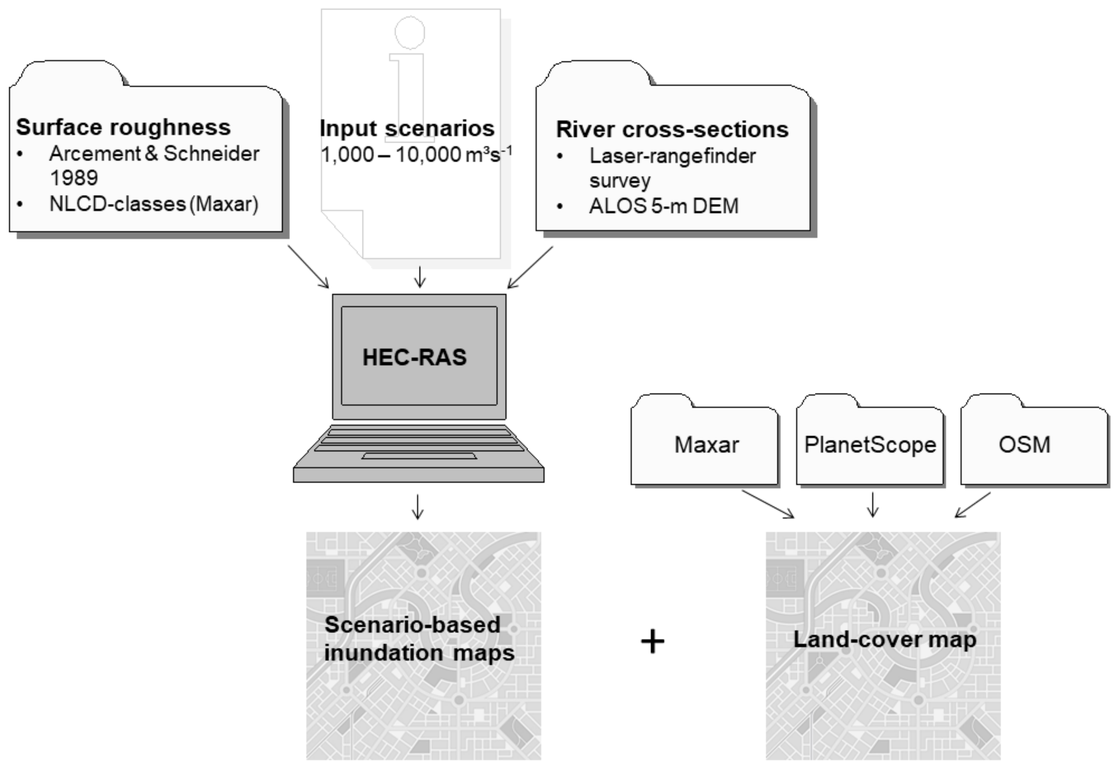


Fig. 2: We use a combination of field- and remotely-sensed data to perform one-dimensional numerical flood modelling in HEC-RAS 5.0.7.

RESULTS

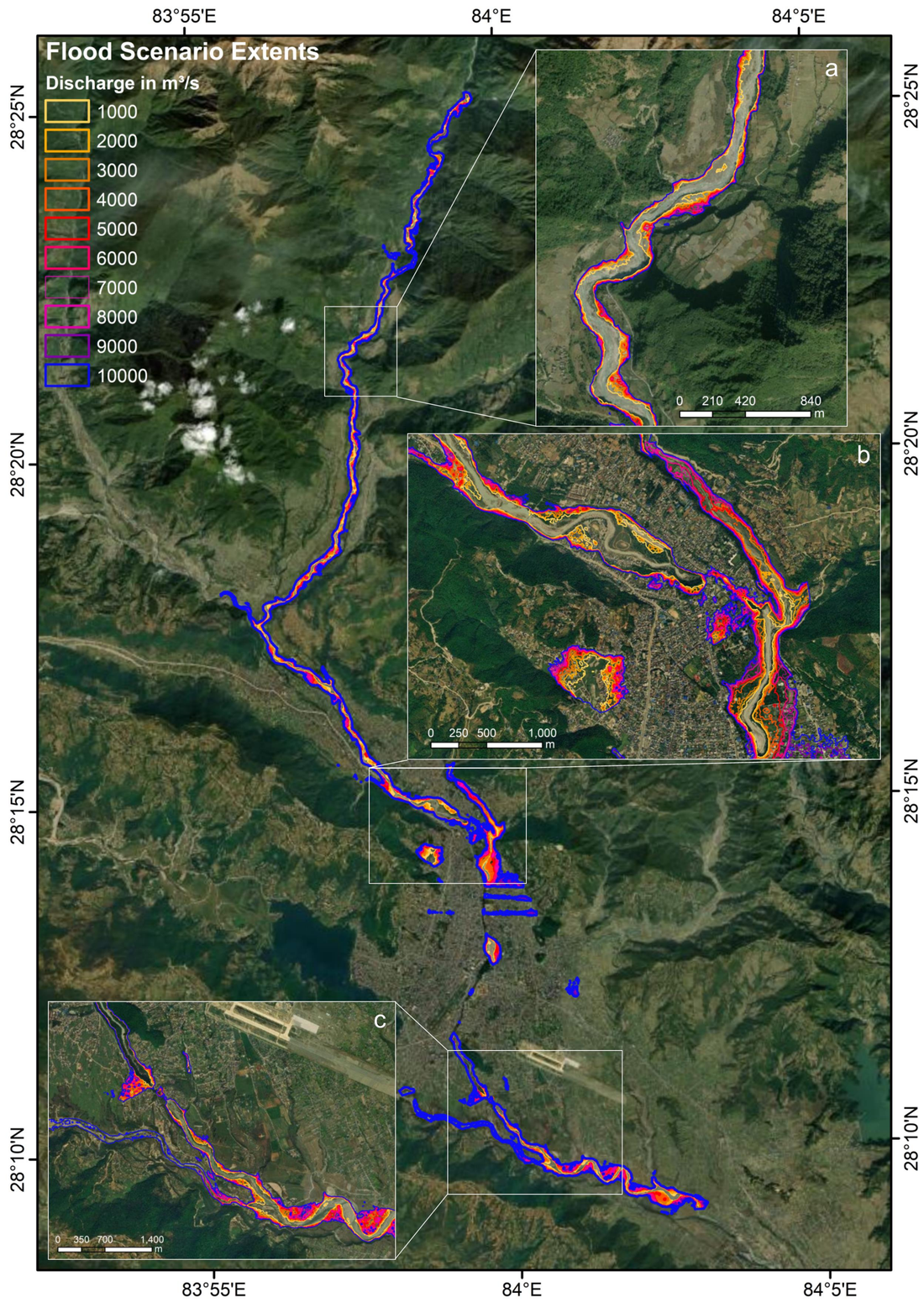


Fig. 3: Inundation limits when modelling steady flow peak discharge scenarios (1,000 to 10,000 m³s⁻¹) in HEC-RAS. Detail-panels highlight modelling results at Kharapani (a), Seti dam (b), and Phusre Khola confluence (c). Displayed on ESRI basemap Maxar satellite imagery acquired in 2020.

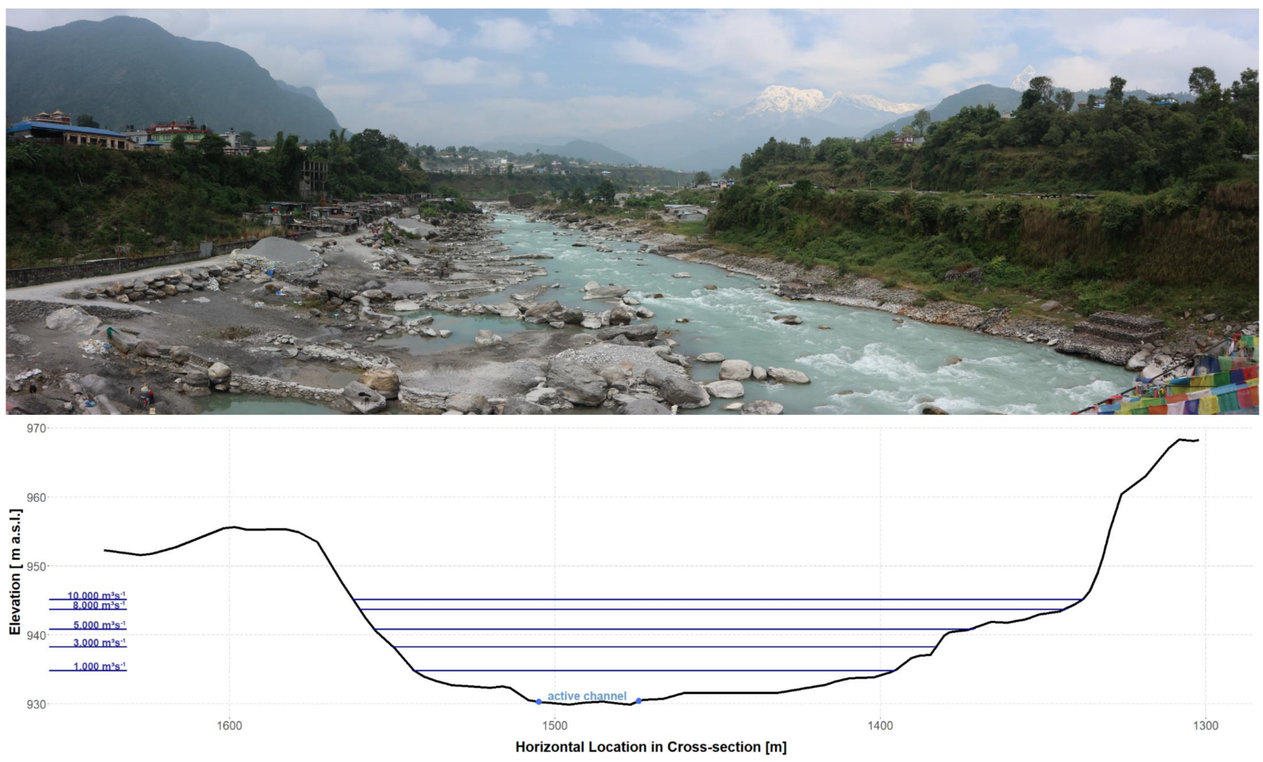


Fig. 4: Water-level simulations for a selected Seti Khola cross-section just upstream of Seti dam. Extensive in-channel gravel-mining activities and associated informal settlements would be affected in all modelled peak discharge scenarios.

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