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Flood risk analysis in developing countries using Facebook Connectivity Lab exposure data

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Here we present the first national scale flood risk analyses, using high resolution Facebook Connectivity Lab population data and data from a hyper resolution flood hazard model. In recent years the field of large scale hydraulic modelling has been transformed by new remotely sensed datasets, improved process representation, highly efficient flow algorithms and increases in computational power. These developments have allowed flood risk analysis to be undertaken in previously unmodeled territories and from continental to global scales. Flood risk analyses are typically conducted via the integration of modelled water depths with an exposure dataset. Over large scales and in data poor areas, these exposure data typically take the form of a gridded population dataset, estimating population density using remotely sensed data and/or locally available census data. The local nature of flooding dictates that for robust flood risk analysis to be undertaken both hazard and exposure data should sufficiently resolve local scale features. Global flood frameworks are enabling flood hazard data to produced at ~90m resolution, resulting in a mis-match with available population datasets which are typically more coarsely resolved. Moreover, these exposure data are typically focused on urban areas and struggle to represent rural populations.
Here we present the integration of a new population dataset with a global flood hazard model. The population dataset was produced by the Connectivity Lab at Facebook, providing gridded population data at 5m resolution, representing a resolution increase over previous countrywide data sets of multiple orders of magnitude. Flood risk analysis undertaken over a number of developing countries are presented, along with a comparison of flood risk analyses undertaken using pre-existing population datasets.