Landslide domains in data-poor regions: case study on East Sikkim, India

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Landslides present a major global hazard and disproportionately affect communities in developing countries. In these often data-poor regions the assessment of hazard is impeded by the lack of detailed information on landslide conditioning factors. Available information can be limited and biased; it is often collected for geo-engineering purposes and rarely reflects natural processes. Here we present the development of a methodology to augment existing landslide data using landslide domains. Landslide domains are established by dividing a region in areas of similar characteristics which influence the style of landsliding (e.g., relief, geomorphology, vegetation). Landslide domains are particularly useful as they allow the application of knowledge gained in specific locations on landslide processes to be applied more broadly across a larger area. To highlight the application of landslide domains we use as a case study the Indian district of East Sikkim (about 1000 km^2) in the Eastern Himalayas. Landslide hazards in East Sikkim are particularly severe due to climate, geology, and geomorphology. Our methodology to delineate landslide domains includes the integration of (i) analogous processed-based models developed in data-rich landslide areas, (ii) existing landslide data, including available landslide inventories, physiographic, climatic and geological data, and (iii) remotely sensed and fieldwork data at selected locations. In doing so, we hope to present a methodology that can facilitate an understanding of landslide hazard in data poor-areas such as East Sikkim and demonstrate how this method could be applied to other data-poor regions.