

EGU21-14000, updated on 28 Jan 2022

<https://doi.org/10.5194/egusphere-egu21-14000>

EGU General Assembly 2021

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Spatial and temporal dynamics of monsoon-induced landslides in Nepal in 2020

Kaushal Raj Gnyawali^{1,2}, Dwayne D. Tannant¹, Yogesh Bhattarai², Rijan Jayana², and Rocky Talchabhadel³

¹School of Engineering, The University of British Columbia, Kelowna, BC, V1V 1V7, Canada (krg@mail.ubc.ca)

²Himalayan Risk Research Institute, Natural Hazards Section, Bhaktapur, Nepal (gnyawalikr@hri.org.np)

³Texas A&M AgriLife Research, Texas A&M University, El Paso, TX, USA (rocky.talchabhadel@ag.tamu.edu)

In the monsoon season, landslides are major disasters in Nepal, causing loss of life and economic impacts. The landslides triggered in the 2020 monsoon (June – September) in Nepal caused more than 300 fatalities and affected about 800 families. A spatial and temporal database of landslides in this region does not exist, which has hindered an understanding of landslide dynamics and the development of a regional early warning system (EWS). In this study, we prepare a time-stamped (hourly) geo-referenced database of the landslides triggered by the 2020 monsoon in Nepal and investigate their dynamic trends. We track landslides from online news for each day during the monsoon to map their location and time. The database contains 332 mapped landslides, out of which accurate time stamps are available for 126 landslides. The spatial pattern shows a large concentration of landslides in central Nepal (districts of Parbat, Kaski, Myagdi, Baglung, Gulmi, and Syangja). The temporal pattern reveals that landslides in this region occur mostly during late night or early morning. We estimate hourly rainfall thresholds for landslide occurrence from the Integrated Multi-satellite Retrievals for GPM (IMERG) rainfall product. The database and analysis provide a basis for estimating regional rainfall thresholds for Nepal and the design of an EWS.