



Landslides and extreme precipitation over High Mountain Asia: historical patterns and future trends

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The High Mountain Asia region is significantly impacted by landslides every year as a result of complex topography, monsoonal and winter westerly precipitation regimes, and active tectonics. Characterizing the patterns of extreme precipitation over this region and the relationship to landslide triggering has been explored to some extent at local and regional scales using proposed rainfall thresholds that may result in mass movements. However, few studies have considered the multi-decadal signal of extreme precipitation and the potential relationship to landslides over this region. This study presents a framework for evaluating precipitation extremes both retrospectively and into the future within the High Mountain Asia region by comparing several newly available satellite, modeled, and reanalysis precipitation products using a set of established metrics (e.g. maximum 1, 5-day rainfall, number of wet days/year, days above 95th percentile). These metrics are used to evaluate patterns in extreme precipitation over seasonal to decadal time scales and to establish potential triggering relationships utilizing a database of over 1,000 landslides available within this region. Leveraging an ensemble of Global Climate Modeling precipitation estimates, future trends of extreme precipitation are estimated to 2100. This study applies the forecasted trends in extreme precipitation to address potential future changes in landslide variability across the High Mountain Asia region due to extreme precipitation.