Future global debris flow susceptibility considering climate change, wildfire probability, and glacier retreat

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It is widely accepted that climate changes will affect slope instability, and the presence and prevalence of landslides are expected to be exacerbated. Many areas of the world are experiencing increases in minimum, mean, and maximum temperatures and more frequent heavy precipitation. Due to both climate change and projected population and urban growth, it is reasonable to assume the impact of debris flow hazards will increase.

With climate change and increasing temperatures, the likelihood of increased forest fires leads to an increased likelihood in post-fire debris flow frequency in those burn areas where other debris flow predisposing factors exist and rainfall amounts required to induce debris flows decrease.

Future debris flow susceptibility models (RCP 2.6 and RCP 8.5) were developed and augmented with future wildfire probability, and areas of potential glacier retreat, both of which can subsequently act as amplifiers to global debris flow susceptibility. The resulting debris flow susceptible areas are projected against future population and urbanization centers for a spatial view on human vulnerability.