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Constraining landslide frequency across the United States to inform county-level risk reduction

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Dear reviewers, dear editors,

We thank Maria Teresa Brunetti and an anonymous reviewer for their positive assessments of our study and their constructive feedback. Below we respond to the reviewer comments (marked as ***paragraphs in bold italics beginning with A***) and outline how we plan to address these suggestions in a revised manuscript. All figure and section numbers refer to the original manuscript.

We are convinced that these moderate revisions should address the reviewers' remarks and will result in an improved and clearer manuscript.

Best wishes,

Lisa Luna on behalf of all co-authors

Response to RC2: Anonymous Referee #2

The study addresses a significant gap in current national-scale landslide susceptibility research by prioritizing the frequency of landslides, which is essential for effective hazard and risk management planning. The manuscript is well-structured and states its objectives clearly, emphasizing the importance of informative landslide hazard estimates for mitigation planning and risk reduction at a national level. The authors employ Bayesian negative binomial regression to model landslide frequencies at the county level using predictor variables that comprise susceptible area, earthquake potential, precipitation frequency, and ecological region. Authors highlight the extreme diversity of landslide susceptibility across the United States, with frequencies described as ranging from a few incidents in some areas to high concentrations in others. There are some minor issues to be modified in the manuscript before publication. The methodology should be presented more concisely and provide the reader with an explanation for further advancing the proposed methods. The proposed manuscript is a significant addition to landslide hazard assessment in that it provides more complete and spatially resolved frequency data than have been feasible with national-scale studies. It is a publication standard, providing valuable information that can be utilized to direct targeted risk reduction and mitigation efforts across the United States.

A: We thank the reviewer for the encouraging appraisal of our work and its implications for landslide risk reduction efforts. We appreciate the feedback that our methods should be

presented more concisely. To address this comment and the related comments of Reviewer #1, we will clarify our approach in a concise manner in a revised version of methods section 2.4. Concerning the suggestion that we provide the reader with an explanation for further advancing the proposed methods, we direct readers to lines 635 to 670 of the discussion, where we discuss how linking weather-related landslide activity to the magnitude and frequency of precipitation events and earthquake-related landslide activity to seismological parameters may improve future estimates of landslide frequency.