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The effect of satellite rainfall uncertainty on landslide predictions

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With the development of remote sensing technology, satellite rainfall products have become more and more credible. Although the potential of satellite rainfall products in landslide hazard assessments has been recognized, few studies evaluate the effect of satellite rainfall uncertainty on landslide predictions. This study attempts to explore the effect of satellite rainfall uncertainty on rainfall-triggered landslide predictions. We select the Emilia-Romagna region in northern Italy as the study area, and the NASA GPM-based IMERG data as the representative of satellite rainfall estimates. Satellite rainfall uncertainty is first characterized by generating rainfall ensembles for rainfall conditions responsible for landslides. The generated rainfall ensembles are then applied to the definition of rainfall thresholds using the bootstrap technique. The prediction performance of rainfall thresholds is finally evaluated through calculating the criteria of hit rate and false alarm rate. We anticipate that this study will encourage the research community to account for the satellite rainfall uncertainty when exploring the use of satellite rainfall in landslide hazard assessment.