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Global Landslide Hazard Assessment for Situational Awareness (LHASA) Version 2: New Activities and Future Plans

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A remote sensing-based system has been developed to characterize the potential for rainfall-triggered landslides across the globe in near real-time. The Landslide Hazard Assessment for Situational Awareness (LHASA) model uses a decision tree framework to combine a static susceptibility map derived from information on slope, rock characteristics, forest loss, distance to fault zones and distance to road networks with satellite precipitation estimates from the Global Precipitation Measurement (GPM) mission. Since 2016, the LHASA model has been providing near real-time and retrospective estimates of potential landslide activity. Results of this work are available at https://landslides.nasa.gov.

In order to advance LHASA's capabilities to characterize landslide hazards and impacts dynamically, we have implemented a new approach that leverages machine learning, new parameters, and new inventories. LHASA 2.0 uses the XGBoost machine learning model to bring in dynamic variables as well as additional static variables to better represent landslide hazard globally. Global rainfall forecasts are also being evaluated to provide a 1-3 day forecast of potential landslide activity. Additional factors such as recent seismicity and burned areas are also being considered to represent the preconditioning or changing interactions with subsequent rainfall over affected areas. A series of parameters are being tested within this structure using NASA's Global Landslide Catalog as well as many other event-based and multi-temporal inventories mapped by the project team or provided by project partners.

In addition to estimates of landslide hazard, LHASA Version 2 will incorporate dynamic estimates of exposure including population, roads and infrastructure to highlight the potential impacts that rainfall-triggered landslides. The ultimate goal of LHASA Version 2.0 is to approximate the relative probabilities of landslide hazard and exposure across different space and time scales to inform hazard assessment retrospectively over the past 20 years, in near real-time, and in the future. In addition to the hazard. This presentation will outline the new activities for LHASA Version 2.0 and present some next steps for this system.

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