

EGU2020-19449

<https://doi.org/10.5194/egusphere-egu2020-19449>

EGU General Assembly 2020

© Author(s) 2020. This work is distributed under the Creative Commons Attribution 4.0 License.



Exploration of the characteristics of landslide triggering rainfall using rain gauge and numerical weather prediction for Yogyakarta and Central Java, Indonesia

Ratna Satyaningsih¹, Ardhasena Sopaheluwakan¹, Danang Eko Nuryanto¹, Tri Astuti Nuraini¹, Arif Rahmat Mulyana², Rokhmat Hidayat², Mohammad Dedi Munir², and Victor Jetten³

¹Indonesia Agency for Meteorology Climatology and Geophysics (BMKG), Center for Research and Development, Jakarta, Indonesia (ratna.satyaningsih@bmkgo.go.id)

²Sabo Technical Center, Ministry of Public Works and Housing, Yogyakarta, Indonesia

³Faculty of Geo-Information Sciences and Earth Observation (ITC), University of Twente, Enschede, The Netherlands

The existing Landslide Early Warning System (LEWS) for Indonesia was developed using rainfall thresholds, which were derived from the relationship between rainfall inducing landslides and landslide events in the past. The system utilized the median values of 1-day and 3-day cumulative observed rainfall for determining the threshold and a relatively limited number of landslide events throughout Indonesia during the period of the system development. The system employed a single set of threshold values for all regions despite the possibility of differences in rainfall intensity characteristics for each region. For prediction, the system used rainfall data derived from satellite products and rainfall forecast data with a spatial resolution of $0.25^\circ \times 0.25^\circ$, which is not adequate for catchment-scale landslide analysis.

We attempt to improve the LEWS by applying a statistical approach based on rainfall intensity and duration for a longer time-series of data set. Instead of determining the thresholds for national scale, we focus on the Special Region of Yogyakarta and surrounding cities in Central Java which are prone to landslides but have high population density. In addition to that, we also perform preliminary exploration of the potential of the output of high-resolution numerical weather prediction in simulating the rainfall inducing the landslides for several historical landslide events. This study is part of a project called BILEWS, a Blueprint for an Indonesian Landslide Early Warning System, which aims to develop threshold for landslides and debris flows as the basis for early warning to be applied at several test sites in Java, using tailored rainfall data, combined with empirical and physically-based hydrological and landslide models, as well as historical landslide data.

How to cite: Satyaningsih, R., Sopaheluwakan, A., Nuryanto, D. E., Nuraini, T. A., Mulyana, A. R., Hidayat, R., Munir, M. D., and Jetten, V.: Exploration of the characteristics of landslide triggering rainfall using rain gauge and numerical weather prediction for Yogyakarta and Central Java,

Indonesia, EGU General Assembly 2020, Online, 4–8 May 2020, EGU2020-19449,
<https://doi.org/10.5194/egusphere-egu2020-19449>, 2020