



Capability Of Indonesian Landslide Early Warning System To Detect Landslide Occurrences Few Days In Advance

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Landslide is one of the most disastrous natural hazards in Indonesia in term of the number of fatalities. Experimental Station for Sabo (known as Balai Litbang Sabo) has developed a Landslide Early Warning System (LEWS) for Indonesia region using Delft-FEWS (Flood Early Warning System) as the main platform. This system provides information of landslides prediction three days in advance. The information is conveyed through Balai Litbang Sabo website (sabo.pusair-pu.go.id) and also in Whatsapp group for flood and landslide taskforce. The aim of this study is to test the capability of Indonesian LEWS to detect landslide occurrences few days in advance from the end of 2017 to 2018. The Indonesian LEWS has been developed by utilizing a rainfall-landslide critical line, which is a relationship between rainfalls induced landslides and landslide occurrences. For rainfall data, we use 3-hourly rainfall data obtained from the Tropical Rainfall Measuring Mission (TRMM) for near real time Rainfall and The European Centre for Medium-Range Weather Forecasts (ECMWF) for daily rainfall prediction. The rainfall data are thus simulated and overlaid on a landslide risk map produced by Geological Agency Indonesia. A time-dependent rainfall infiltration and slope stability model (TRIGRS) was also coupled to DELFT-FEWS for few landslide-prone locations in Java Island. Based on verification results, landslides occurred in Pacitan (28 November 2017) and Brebes (22 February 2018) were detected 1-3 days in advance by LEWS. The slope stability analysis was also carried out using TRIGRS at those locations, with predicted precipitation amount at those dates as input for the model. The results show that those locations were having safety factor index lower than 1, indicating high probability for landslide occurrence. Based on the model results and field survey, we conclude that the Indonesian LEWS established by Balai Litbang Sabo has a good prospect to detect landslide occurrences few days in advance. However, this system still needs further development to be accurately used in other Islands. This system was developed based on the data obtained in Java Island. The use of TRIGRS model also needs to be expanded. For the moment we only use TRIGRS model in few landslide-prone locations in Java due to soil data scarcity and limited funding for data collections.