Operational early warning of shallow landslides in Norway: Evaluation of landslide forecasts and associated challenges

Mads-Peter Dahl, Hervé Colleuille, Søren Boje, Monica Sund, Ingeborg Krøgli, and Graziella Devoli
Norwegian Water Resources and Energy Directorate (NVE), Hydrology Department, Oslo, Norway

The Norwegian Water Resources and Energy Directorate (NVE) runs a national early warning system (EWS) for shallow landslides in Norway. Slope failures included in the EWS are debris slides, debris flows, debris avalanches and slush flows.

The EWS has been operational on national scale since 2013 and consists of (a) quantitative landslide thresholds and daily hydro-meteorological prognosis; (b) daily qualitative expert evaluation of prognosis / additional data in decision to determine warning levels; (c) publication of warning levels through various custom build internet platforms. The effectiveness of an EWS depends on both the quality of forecasts being issued, and the communication of forecasts to the public.

In this analysis a preliminary evaluation of landslide forecasts from the Norwegian EWS within the period 2012-2014 is presented. Criteria for categorizing forecasts as correct, missed events or false alarms are discussed and concrete examples of forecasts falling into the latter two categories are presented. The evaluation show a rate of correct forecasts exceeding 90%. However correct forecast categorization is sometimes difficult, particularly due to poorly documented landslide events.

Several challenges has to be met in the process of further lowering rates of missed events of false alarms in the EWS. Among others these include better implementation of susceptibility maps in landslide forecasting, more detailed regionalization of hydro-meteorological landslide thresholds, improved prognosis on precipitation, snowmelt and soil water content as well as the build-up of more experience among the people performing landslide forecasting.