



Geoethical considerations in early warning of flooding and landslides: Case study from Norway

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The Norwegian Water Resources and Energy Directorate (NVE) runs the national early warning systems (EWS) for flooding and shallow landslides in Norway. The two EWSs have been operational since the late 1980s and 2013 respectively, and are based on weather forecasts, various hydro-meteorological prognosis and expert evaluation. Daily warning levels and related information to the public is prepared and presented through custom build internet platforms.

In natural hazards sciences, the risk of a specific threat is defined as the product of hazard and consequence. In this context an EWS is intended to work as a mitigation measure in lowering the consequence and thus the risk of the threat. One of several factors determining the quality of such an EWS, is how warnings are communicated to the public.

In contrary to what is common practice in some other countries, experts working with EWS in Norway cannot be held personally responsible for consequences of warnings being issued or not. However, the communication of warnings for flooding and landslides at NVE still implies many considerations of geoethical kind. Which are the consequences today for the forecasters when erroneous warning messages are sent because based on a poorly documented analysis? What is for example the most responsible way to describe uncertainties in warnings issued? What is the optimal compromise between avoiding false alarms and not sending out a specific warning? Is it responsible to rely on a “gut feeling”? Some authorities complain in receiving warning messages too often. Is it responsible to begin notifying these, only in cases of “high hazard level” and no longer in cases of “moderate hazard level”? Is it acceptable to issue general warnings for large geographical areas without being able to pinpoint the treat on local scale? What responsibility lies within the EWS in recommending evacuation or other practical measures to local authorities?

By presenting how early warnings of flooding and landslides are communicated in Norway and discussing the questions above, we intend to add to the discussion on what is the ethical responsibility for scientists performing forecasting and communication of natural hazards.