



Hazard assessment of large volcanic landslides. New findings from Teide stratovolcano, Tenerife.

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Large-scale slope failures are common phenomena on most volcanoes and represent one of the most hazardous geological processes. In spite of their destructive potential the mechanisms of such mass movements are not yet well understood.

As in a hazard assessment on other types of landslides, several main tasks should be performed: First, the most susceptible areas are determined; secondly, magnitude-frequency relationships should be defined and incorporated into scenarios for future events; and thirdly a runout analysis is performed and hazard maps are elaborated. Finally, recommendations for hazard mitigation should be defined.

Unfortunately, only very few studies that present a complete hazard assessment are available. Most efforts have been focussed on understanding failure mechanisms and stability conditions. However, one of the main problems in the study of volcano instabilities is related to the large uncertainties in the strength and other physical properties of volcanic material on the flanks and in the interior of large volcanoes, and this constrains most of the hazard-assessment tasks.

In the present study, Teide edifice in Tenerife has been used as an example of a complex stratovolcano and a comprehensive set of geotechnical measurements has been collected. An analysis of these values is used to develop a new geotechnical classification of volcanic materials. Moreover, detailed geological and morphological surveys and sophisticated stability analyses of Teide have been carried out. The results show that Teide is stable and will continue to be so in the foreseeable future.

However, this study at Teide volcano so far only comprises parts of the first tasks of the previously mentioned hazard assessment. Therefore, scenarios of possible future events, runout analyses and resulting hazard maps are missing. Consequently, hazard mitigation mainly includes the rather simple monitoring system of the volcano activity.