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Landslide hazard assessment at Teide-Pico Viejo stratovolcano, Tenerife, Canary Islands.

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A detailed landslide hazard assessment is being undertaken at the twin stratovolcano Teide-Pico Viejo in the central part of Tenerife. The significance of this study is accentuated by an increase of seismic activity in this area in March 2004. In addition, during October 2004 there was an increase in fumarolic activity.

Teide-Pico Viejo has been produced during the fourth cycle of edifice construction in the Upper Group of the Las Cañadas edifice, the first of which began 3 Ma ago. In the context of the present study, it is important to recognise that the previous 3 cycles ended with voluminous, explosive phonolitic eruptions associated with caldera forming events and probably, with major sector collapses. The problem of determining potential instabilities on volcanic edifices requires a different approach from conventional deterministic back analyses. These are generally undertaken on slopes of similar composition that have collapsed, as a method of determining the likely failure conditions and strength parameters of the failed slopes. The alternative approach proposed here is based on a combination of geomechanical classification systems and stochastic slope stability analyses.

Using existing geological data and new morphological surveys, a series of maps are produced which show the distribution of the different geotechnical units, as well as defining weaker sections within the complex. A combination of these data is used in preliminary limit equilibrium models. During the analysis, the effects of hydrothermal alteration on the strength characteristics of the rock-mass will be considered, as will the influence of alteration on the stability of the complex and the effect of low shear strength breccia units which are known to exist in the complex. One of the major

objectives of this study will be an investigation of different methods of quantifying the uncertainty associated with assumptions embedded within limit equilibrium stability models and the use of geomechanical classification systems in calculating rock-mass strength.