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Assessment of meteorological time series to estimate the activity of clayey landslides for present and expected future climate conditions.

Y. Durand (1), P. Etchevers (1), G. Guyomarc'h (1), M. Dequé (1), J.-P. Malet (2), O. Maquaire (3)

(1) Météo-France/CNRM/CEN-CNRS GAME; Saint-Martin-d'Hères, France, (2) Faculty of Geosciences, Utrecht University, The Netherlands, (3) LETG-GEOPHEN, UMR 6554 CNRS, University of Caen-Basse Normandie, France.

An important issue in climate impact research is the assessment of the effects of climate variations on geomorphic processes and hazards, such as landslides. Effects of past, present and future climate characteristics on landslide activity can be evaluated by hillslope hydro-mechanical models and simulations of meteorological General Circulation Models -GCMs. However there are a series of problems related to this approach. Among them, the uncertainty in future climate parameters is high, especially if the time context is greater than weather records or because of the low-resolution of the downscaled simulated time series. The French ACI-FNS 'GACH2C' Project (Glissements Alpins à Contrôle Hydrologique et Changement Climatique - Rainfall-Induced Landslides and Climate Change) seeks to develop a multidisciplinary methodology to analyse quantitatively the impacts of climate change on the activity of clayey landslides in the French Southeast Alps. Within this project, several meteorological time series have been computed for two local sites (Super-Sauze, Saint-Guillaume) where active landslides are monitored and investigated. For the last thirty years of the 20th century, the main meteorological surface parameters at hourly time step have been reconstructed for both sites where no observation was yet directly available. The Météo-France 'Safran' model was used to provide adapted surface parameters including air temperature and humidity, wind speed, snowfalls and rainfalls, direct and scattered solar radiation, infra-red atmospheric radiation and cloudiness. Based on prior studies (IMPEX) of the mesoscale impact of a climate change scenario (A2) over the Alps, the different meteorological series have been modified and homogenised in order to

be representative of the expected climate of the 21st century end through appropriate desaggregation procedures. The simulated climate fields as well as the validation operators used and the processed methods are presented. Coupled to hydro-mechanical landslide models, these meteorological data can be used to evaluate the effects of climate variations on landslide activity, and therefore progress in the quantitative assessment of landslide hazard.