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MEASURING THE ROLES OF STEEPNESS AND SOIL TYPE IN THE TRIGGERING OF LANDSLIDES IN ITALY: AN NATIONWIDE STUDY COMBINING SRTM DATA AND THE AVI LANDSLIDE DATA SET

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A common aspiration of many geomorphologists is to assess the landslide susceptibility of a landscape through some sort of calibrated analysis of a DTM. ˜To this end, we have combined SRTM (Shuttle Radar Topography Mission) digital elevation data for Italy with the nationwide AVI database of landslide events and a map of soil type. This blend formed the basis of a semi-quantitative, regional assessment of slope instability; important factors such as seismic intensity and land cover type were also considered. ˜At first sight this analysis should have been a straightforward GIS procedure; in practice, many technical difficulties had to be overcome. ˜To begin with, the SRTM DTM data required several reprocessing steps. ˜The SRTM DTM in its present form has a resolution of 3 arc seconds (about 90m at the latitude of Italy), contains many dropouts or missing data (as a result of SAR shadowing or layover), and is not correctly geoid-located. ˜The DTM required an adjustment in georeferencing, clipping to mask out open-water (lake and marine) pixels, and interpolation across missing pixels. ˜Missing data are a severe problem in the Alps and analysis there cannot be fully trusted. ˜In the Apennines, however, missing pixels are rare and the SRTM data appears much more reliable. ˜Some further processing was required to build a regionalized (moving window) measure of terrain steepness, which was then merged with the AVI point data for landslide event locations (1007

events for the period 1918-1990). The soil classification map also needed substantial processing, including an adjustment in its georeferencing and the construction of attribute tables. Our primary task was to quantify the modulating effect of soil type on the likelihood of landslide occurrence for a given terrain steepness. ˜We will present some preliminary results from the merging of all three data sets. ˜We will follow with an analysis of the modulating effect of soil type on the likelihood of landslide occurrence for a given terrain steepness. Finally we will show some early modelling results, based on Bayesian logistic regression, that make a simple assessment of this effect in the presence of random effects.