



The comparison between a ground based and a space based probabilistic landslide susceptibility assessment

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Probabilistic landslide susceptibility assessments attempt to predict the location and threat posed by known landslides. Under the assumption that landslides will occur in the future because of the same conditions that produced them in the past, geomorphologists use susceptibility assessments to predict the location of future landslides. We present an attempt to exploit satellite data to prepare a landslide susceptibility zonation for the Collazzone area that extends for 79 sq km in the Umbria region, Central Italy. For the study area we have prepared a map of the Normalized Difference Vegetation Index (NDVI) obtained by processing raw NIR and RED channels (b2 and b3 bands) at 15 m x 15 m resolution of an image acquired by the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER), on board the TERRA satellite, and a map of Land Surface Temperature (LST) obtained by processing raw TIR channels (b11 to b15 bands) at 90 m x 90 m resolution from the same image. Both maps, in general proxy for soil moisture maps, were obtained through standard algorithms. As expected, there is a strong correspondence between NDVI and LST, but, when the NDVI does not change, elevation effects and others are predominant in LST. For the Collazzone area we prepared two different susceptibility models. The first was prepared through multivariate analysis of thematic data (including morphometry, lithology, structure and land use) obtained through traditional methods, primarily the interpretation of aerial photographs and field work. The second susceptibility model was prepared using terrain morphology and information obtained processing satellite data. The two models were compared in term of model fit and model performance and were validated exploiting landslide inventories not used to build the models. The two susceptibility models are very similar from a geographic and a classification point of view. This is good news, as it tells us that for landslide susceptibility, thematic maps obtained processing satellite data can be an effective alternative to maps prepared using more traditional, ground based methods.