



Testing landslide susceptibility uncertainty propagation due to the data source of the landslide inventory: satellite imagery versus LIDAR

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Both landslide susceptibility modelling and validation are sensitive to the completeness and quality of the landslide inventory. If we ignore the variation induced by the operator, then the biggest source of uncertainty regarding the landslide inventory is given by the data source used to delineate the landslides. This uncertainty is related especially on the resolution of the dataset (centimetric or metric) and the type (topographic map, satellite/aerial imagery or high resolution DEM). The uncertainty propagates from the landslide inventory to susceptibility modelling and then to validation. We have compared the susceptibility modelling using logistic regression and AHP applied on the same area (area, landslide inventory based on satellite images, and susceptibility modelling and validation are described by Margarint & Niculita, 2014), but with the landslide inventory based either solely on LIDAR data or on satellite imagery. Although the quality of the LIDAR and satellite imagery can influence the output, generally the LIDAR data is a much better source for landslide delineation, because more elements of a landslide can be identified, and also the tridimensional perspective (in true 3D or as shading) allow a more precise delineation. In terms of the sensitivity of the modelling method, logistic regression need a complete inventory to perform well (the feature space need to be covered), while AHP can perform well also with a not so complete inventory. But the higher uncertainty is introduced in regard to the validation, because not complete inventories can bias in both directions the result. As a conclusion we propose and recommend a test of sensitivity, which can be done on any inventory, no matter the source, by random elimination of some delineated landslides, and the modelling and validation using these decimated inventories.