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# Landslide inventories and susceptibility evaluation: a comparison between aerial-photo interpretation and field survey data

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Research on landslide susceptibility assessment has shown that the quality of the landslide inventory is of crucial importance, because data-driven models used for landside susceptibility evaluation are based on the spatial correlation between past landslide occurrences and a data set of thematic layers representing independent landslide predisposing factors. Thus a comparison between two landslide inventories was made, in both, the landslides, marked as polygons, were classified based on the expected depth (shallow, or deep-seated), and the type of movement.
The present study was carried out in the Tornada river basin (107 km2), Central western Portugal. The basin was chosen for its geological and tectonic features and for the abundance of slope movements. The study area is situated in a dissected old quaternary coastal plateau with an evident syncline structure, where crop out mainly upper Jurassic sandstones and claystones.

The first landslide inventory (LI #1) was built through aerial-photographs interpretation (aerial photos obtained in 1958). 503 'old landslides' has been identified, representing the sum of 140 deep-seated (58.7% of the total landslide area), 277 shallow (32% of the total landslide area), and 86 flows (9.3% of the total landslide area).
The second landslide inventory (LI #2) was obtained by field work made in 2008. 99 'recent landslides' has been identified, representing the sum of 57 deep-seated slides (57.6% of the total landslide area), and 42 shallow slides (42.4% of the total landslide area).
Landslide susceptibility was assessed for slope movements of slide type using the two landslide inventories by using a single predictive model (likelihood ratio) and the same set of landslide predisposing factors (slope angle, slope aspect, slope curvature, wetness index, land use, lithology, soil and bedding attitude) to allow comparison of results.
In a first step, the LI #1 is used to obtain a landslide susceptibility model and the LI #2 is used for the independent validation of this model. In a second step, a new landslide susceptibility model is built based on the LI #2. Model fitting performance and model prediction skill are evaluated and compared by the computation of ROC curves and AUC. In addition, the uncertainty derived from landslide inventorying is quantified by assessing the overlapping degree of susceptible areas obtained from the different prediction models.