Multi-temporal landslide inventory for validation of landslide susceptibility maps after 2018 Vaia windstorm event in Belluno province (Veneto Region, NE, Italy).

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Landslide susceptibility maps are often not validated after significant landslide events. In this work, we analyse the impact of the Vaia windstorm on landslide activity in Belluno province (Veneto Region, NE, Italy). The storm hit the area on October 27-30, 2018, causing 8,679 ha of damaged forests and widespread landslides. As shown in the case of windstorm Vivian (1990) and Lothar (1999) (Switzerland), extreme meteorological events can influence slope stability after three to ten years (Bebi et al 2019). Through multi-temporal landslide inventory mapping post Vaia event, we want to access and validate the landslide susceptibility maps produced by using pre-event data from the Italian Landslide Inventory IFFI and assess if the susceptibility has increased in the areas affected by the storm. We used artificial intelligence techniques to prepare multi-temporal inventory and susceptibility maps pre and post-event. In the pre-event event inventory, 5934 landslides and 14 landslide conditioning factors were used to prepare the susceptibility models. We then validate the pre-event landslide susceptibility maps using post-event inventory from the 2018 Vaia windstorm and a following intense rainfall event that occurred in the same area in December 2020. A total of 542 landslides were mapped after the 2018 Vaia storm event, and an update to the landcover map as forest damage layer was used for post-event susceptibility analysis. This study is one of the first attempts to validate pre-event susceptibility maps by utilising multi-temporal artificial intelligence-based landslide inventories in Belluno province (Veneto Region, NE, Italy).

Bebi, P., Bast, A., Ginzler, C., Rickli, C., Schöngrundner, K., and Graf, F., 2019, Forest dynamics and shallow landslides: A large-scale GIS-analysis: Schweizerische Zeitschrift fur Forstwesen, v. 170, p. 318–325, doi:10.3188/szf.2019.0318.