Can landslide inventories developed by artificial intelligence substitute manually delineated inventories for landslide hazard and risk studies?

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Landslide inventories are essential for landslide susceptibility mapping, hazard modelling, and further risk mitigation management. For decades, experts and organisations worldwide have preferred manual visual interpretation of satellite and aerial images. However, there are various problems associated with manual inventories, such as manual extraction of landslide borders and their representation with polygons, which is a subjective process. Manual delineation is affected by the applied methodology, the preferences of the experts and interpreters, and how much time and effort are invested in the inventory generating process. In recent years, a vast amount of research related to semi-automated and automatic mapping of landslide inventories has been carried out to overcome these issues. The automatic generation of landslide inventories using Artificial Intelligence (AI) techniques is still in its early phase as currently there is no published research that can create a ground truth representation of landslide situation after a landslide triggering event. The evaluation metrics in recent literature show a range of 50-80% of F1-score in terms of landslide boundary delineation using AI-based models. However, very few studies claim to have achieved more than 80% F1 score with the exception of those employing the testing of their model evaluation in the same study area. Therefore, there is still a research gap between the generation of AI-based landslide inventories and their usability for landslide hazard and risk studies. In this study, we explore several inventories developed by AI and manual delineation and test their usability for assessing landslide hazard.