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# Comparison of event-based landslide inventory maps obtained interpreting satellite images and aerial photographs

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Landslide inventory maps are a common type of map used for geomorphological investigations, land planning, and hazard and risk assessment. Landslide inventory maps covering medium to large areas are obtained primarily exploiting traditional geomorphological techniques. These techniques combine the visual and heuristic interpretation of stereoscopic aerial photographs with more or less extensive field investigations. Aerial photographs most commonly used to prepare landslide inventory maps range in scale from about 1:10,000 to about 1:40,000. Interpretation of satellite images is a relatively recent, powerful tool to obtain information of the Earth surface potentially useful for the production of landslide inventory maps. The usefulness of satellite information – and the associated technology – for the identification of landslides and the production of landslide inventory maps, remains largely unexplored. In this context, it is of interest to investigate the type, quantity, and quality of the information that can be retrieved analyzing images taken by the last generation of high and very-high resolution satellite sensors, and to compare this information with the information obtained from the analysis of traditional stereoscopic aerial photographs, or in the field. In the framework of the MORFEO project for the exploitation of Earth Observation data and technology for landslide identification and risk assessment, of the Italian Space Agency, we have compared two event-based landslide inventory maps prepared exploiting two different techniques. The two maps portray the geographical distribution and types of landslides triggered by rainfall in the period from November 2004 to May 2005 in the Collazzone area, Umbria, central Italy. The first map was prepared through reconnaissance field surveys carried out mostly along roads. The second map was obtained through the combined visual interpretation of 1:10,000 scale, colour ortho-photo maps, and images taken by the IKONOS high-resolution satellite. The comparison was executed considering: (i) descriptive landslide statistics, (ii) cartographic matching or mismatching, to quantify positional and dimensional errors (over-estimated or under-estimated landslide size), and (iii) differences in the frequency-area statistics, that quantify the number of landslides in different size classes. We discuss the results obtained in view of their importance for the production of landslide inventory maps. We emphasize advantages and limitations of the different information used, and of the adopted approaches and techniques.