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Multi-sensor Change Detection for Quantification of Landslide Hazard in Santorini island, Greece

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Last decade, there has been an increasing demand in geo-engineering society for automatically monitoring areas susceptible to landslide and rockfall events. Traditional methods were compiled by in-situ observational methods from experts or by point-based approaches such as inclinometers and GPS measurements. Lately, innovative remote sensing technologies gave the opportunity to apply active sensors such as Terrestrial Laser Scanning technology or passive ones such as UAV photogrammetry for accurate, precise and time effective local scale modelling of the landslide event. Structure from Motion (SfM) methodology gave the capability to produce ultra high-resolution orthomosaic and Digital Terrain Models (DTMs) of hazardous regions, via detailed point clouds. The current research demonstrates a powerful approach to monitor and characterize topographical changes between different epochs by integrating different platforms and sensors for robust modelling of the landslide's dynamics. Analytically, in this particular case, multitemporal change detection techniques were performed between two different datasets acquired during summer 2014 with a Terrestrial Laser Scanner (TLS) and summer of 2018 with a UAV platform. The significance of this specific research region ("Apothikes", Santorini island) originated from the notable undesired human activity that takes place in prone areas and the restlessness tourist activity during the year. The proposed study demonstrates the urgent need to eliminate potential landslide hazard to the wide region of Santorini and mitigate the potential precursors of landslide hazard via the integration of innovative remote sensing tools.