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An integrated UAS and TLS approach for monitoring coastal scarps and mass movement phenomena. The case of Ionian Islands.

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Mediterranean tectonically-active coastal areas are a highly-dynamic environment balancing internal tectonic dynamics with external geomorphic processes, as well as manmade influences. Especially in touristic areas characterized by high built-up pressure and land value, where these dynamics are even more concentrated, the evolution of coastal environments needs careful and high-resolution study to identify localized risk and the processes they derive from.

Recently, new advanced remote sensing techniques such as Unmanned Aerial Systems (UAS)- and Terrestrial Laser Scanners (TLS)-aided monitoring have improved our capabilities in understanding the natural processes and the geomorphic risks (i.e. mass movement phenomena).

An integrated study comprising Unmanned Aerial Vehicles (UAV) and Light Detection And Ranging (LIDAR) sensors was conducted in coastal areas of the southern Ionian Islands (Western Greece) aiming to the mitigation of earthquake-triggered landslide risk and to responsible coastal development. Located at the northwesternmost part of the Hellenic Arc, this area is characterized by high seismicity and has been affected by destructive earthquakes mainly due to the Cephalonia Transform Fault Zone (CTFZ), which constitutes one of the most seismic active structures in the Eastern Mediterranean region. One of the most common environmental effect triggered by these earthquakes are landslides distributed along fault scarps in developed and highly visited coastal areas. Furthermore, this area is highly susceptible to hydrometeorological hazards inducing intense geomorphic processes, including Medicanes among others.

These technologies allow a highly-detailed view of landslide processes, providing insights on the structures and factors controlling and triggering failures along coastal scarps as well as highlighting susceptible zones and high-risk areas with accuracy and mitigating adverse effects with precision and clarity. Overall, by providing a better understanding of the risks the approach used allows a more sustainable development of these coastal segments enhanced by risk mitigation.

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