

*Abstract*

# Landslide Monitoring with Multi-Sensor and Temporal Scale Approaches: A Test Site in Alpine Environment <sup>†</sup>

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Landslides in alpine environment are present as earthflows, rock falls, shallow slides, debris flows, among others. The dynamics of the surface deformations have many causes, among them the inner geomorphological processes, extreme weather events or human activities that aggravate or accelerate it.

In this work, we combine diverse technologies (sensors) at different spatial and temporal scales (platforms) to better understand the complexity of the gravitational mass movement located in Corvara in Badia, Italian Dolomites. The setup consist of: (i) a monthly surveying GNSS for tracking artificial corner reflectors (reflecting objects) used in three different scales for determining velocity vectors: in situ, proximal and remote sensing. (ii) two in situ stations equipped with a DSLR camera with an automatic time-lapse program based on a low-cost solution system acquiring two daily images covering active part of the landslide for tracking objects and conducting photogrammetry analysis, (iii) an UAV platform with compact cameras flying yearly on the active landslide (8 ha.) for proximal sensing scale retrieving DEM, orthomosaics and cloud points determining 6-axis movement in objects and (iv) Sentinel-1 imagery processed by Synthetic Aperture Interferometry (InSAR) as remote sensing application combined to the previous ones. The benefits and drawbacks of every approach will be presented.



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