



Seminario di Geologia Applicata:

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When displacements are deceptive: the dangerous limitations of InSAR in landslide detection

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Recent advancements in remote sensing, particularly Synthetic Aperture Radar (SAR) differential interferometry, have revolutionised our ability to detect and monitor slope instabilities with unprecedented accuracy and detail. However, how reliably can we extract meaningful insights about slope instabilities from individual remote sensing methods, and when do these methods become limited or even misleading? With the increasing availability of large-scale data, there is a temptation to apply widely available algorithms that generate displacement time series, which may appear accurate at first glance but overlook crucial complexities. Therefore, to gain meaningful insights into the driving processes in addition to identifying previously unknown instabilities, careful integration of multiple techniques is essential. Through case studies, this talk will demonstrate how large-scale InSAR processing can be applied for the preliminary assessment of sites

targeted for major engineering projects, as well as to evaluate interactions between geological structures, infrastructure, and slopes. But it will also highlight how challenges in time series generation—such as underestimations—can lead to misinterpretations, hindering early detection of instability, and emphasise the importance of integrating multiple parameters to improve our understanding of early signs of gravitational movements.

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