

ROCK SLOPES MONITORING BY TERRESTRIAL SAR INTERFEROMETRY

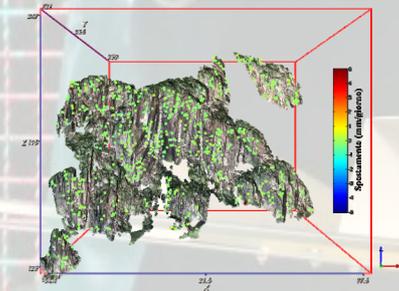
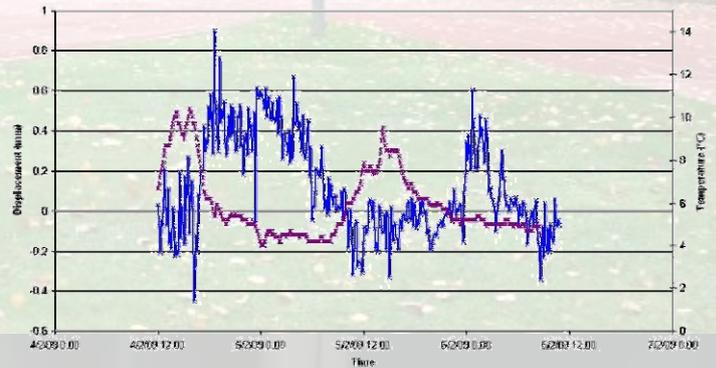
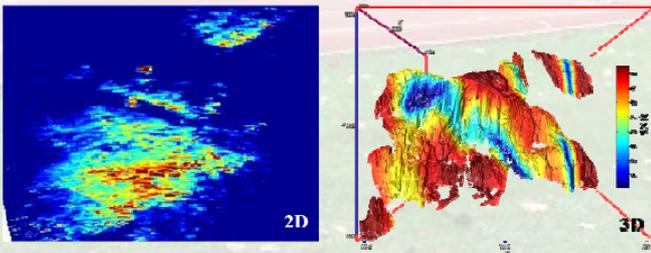
NHAZCA S.r.l. (spin-off company of “Sapienza” Università di Roma) performs the monitoring of rock slopes and cliffs by Terrestrial SAR Interferometry (TInSAR). Such a technique allows the displacement remote monitoring of large slopes to be performed, in order to identify unstable areas and to provide information about the rock fall and toppling susceptibility.



Terrestrial SAR Interferometry (TInSAR) is an innovative remote sensing technique used by NHAZCA S.r.l. for the monitoring of landslides, volcanoes, historical buildings, and infrastructures. TInSAR technique allows automatic 2D displacement maps of the investigated area to be achieved (both night and day and in every weather and lightning condition). By such peculiarities, TInSAR technique is not affected by the restrictions (monitoring of single points and need for reflectors or targets) of the conventional monitoring techniques, thus allowing the real time and early-warning monitoring to



be performed. The radar sensor adopted by NHAZCA is IBIS-L by IDS S.p.A.



The achievable results are, therefore, displacement maps of the slope area falling in the instrumental view area and displacement time series of single zones of the slope. In this way, unstable areas can be identified and the displacement evolution can be assessed. By the integration of TInSAR and Laser Scanner, the displacement maps can be rigorously georeferenced on the high resolution DTM of the scarp, allowing a quick and easy identification of the unstable areas.



Recently, NHAZCA has been involved in the monitoring of a rock scarp in Bolzano (Italy) and of cliffs in the Gargano Peninsula (Italy) by TInSAR. The achieved preliminary results allowed the overall stability of the investigated slopes to be assessed. However, some unstable rock blocks were identified because of a more emphasized elastic displacement behaviour, and a higher susceptibility to rockfall and toppling was assigned.



Terrestrial SAR Interferometry can therefore be considered an extremely efficacious solution for the rock-fall susceptibility analysis of rock-slopes and for the identification of the best solution for the risk mitigation.