



Comparison of multi-temporal TLS data for collapses and/or landslides monitoring of a coastal area: Coroglio cliff at Campi Flegrei (Italy).

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The area under consideration is the Coroglio cliff localized in the Campi Flegrei caldera (CFC). The latter is a volcanic area resulting by two major eruptive collapses. The first of these two catastrophic eruptions dating back to 39 ka and is defined as Ignimbrite Campana (IC). Its deposits cover an area of approximately 30,000 km², while the volume of erupted magma was estimated at 150 km³. The second major eruption is the Neapolitan Yellow Tuff (NYT) dating back to 14.9 ka. It covers an area of about 1000 km² and a volume of ejected material exceeding 40 km³. The Coroglio cliff constitutes the rocky front of Posillipo hill beaten by the sea. The Posillipo hill is a structural high located on the eastern rim of the CFC. It is the morphological evolution of the caldera rim of NYT. Lithologically consists of a tuff extremely lithified, associated to the eruption of NYT, overlaid by more recent products of the Campi Flegrei. The Coroglio cliff has an elevation of 150 m a.s.l. and a breadth of at least 200 m. It is composed of different lithologies, mostly of volcanic origin, and locally by paleosols. The proximity and the action of the sea and/or wind makes these materials highly erodible. Recently the Laser Scanning technique has shown to be a very useful tool not only to get an item of information and integration derived for measurement of landslide but also to monitor and predict the landslide. This study presents a Terrestrial Laser Scanning (TLS) application for the landslides monitoring by multi-temporal comparison laser scan data. The TLS seems to be a very appropriate tool for the geomorphology evolution of an area. The instrument used in this study is a long range TLS based on the Time of Flight method (TOF) manufactured by RIEGL[®], model VZ 1000. Two measurement campaigns of the Coroglio cliff were performed after one year of each other. The first in May, 2013 and the second in June, 2014. The main objective was to define a 3D model for the site of Coroglio. It formed the starting point of our study. The acquired 3D point cloud are processed by RiscanPro[®] Software supplied by factory. A Digital Elevation Model (DEM) vertical of the cliff and the multi-temporal comparison of the two acquisition have been realized with software ArcGis[®]. The results have shown that it is possible to quantify rock volumes eroded and/or landslide, in addition the potentially unstable area on the Coroglio cliff have been detected. In conclusion the TLS survey technique has provided a valid instrument, coupled to the generation of DEM, to gain quantitative data for the monitoring of instability of the area and of landslides.