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Slope instability analyses at Monesteroli promontory in The National Park of *Cinque Terre,* Italy

M. Nocentini, N. Casagli

Earth Sciences Department University of Firenze, (nocentini.massimiliano@geo.unifi.it / Fax: +39 055-2756296 / Phone: +39 055-2756343)

The Monesteroli promontory is a classical example of the delicate balance between environment and land cover that characterizes the Tramonti Coast in the Cinque Terre National Park.

Many of the events present in the area are superficial landslides caused by steep slopes and changing land use. The abandonment of terraces, generally, triggers a sequence of processes that attempt to return the slope to its original state: the material retained by the walls tends to move downhill leading to the development of dangerous debris flows.

The absence of possible deep landslides regarding the Monesteroli village seems to be confirmed both by numerical modelling executed with UDEC software and by the initial date returned by the recently installed monitoring system.

The stability conditions of the cliff have been evaluated considering five possible cinematic failures: planar failure, wedge failure, direct toppling, toppling and slide failure and flexural toppling. For each one a “hazard cinematic index” has been defined, obtained from the ratio between the number of poles (or intersections) that satisfy the instability conditions and the total number of poles (or intersections).

The cinematic analysis was subsequently implemented in a GIS platform to obtain, for each mechanism, a relative susceptibility map.

With the objective of evaluating if wave action is one of the causes of the current instability problems of the area, or may become in the future, the return times for storm waves orthogonal to the coast have been determined.

On the base of both the height of storm wave with a return time of 100 years and of those that cause the breaking of waves on the cliff, an attempt to assess the ratio between wave force (Fw) and the resisting force of the cliff (Fr) has been carried out.

The results of this analysis and the absence of morphologic evidence seem to exclude any type of interaction between wave action and the instability problems of the coast.