



The influence of land use changes and precipitation pattern on shallow landslide activity in the Rocchetta S. Antonio area (Daunia Apennines, S. Italy)

J. Wasowski (1), C. Lamanna (2), D. Casarano (1)

(1) CNR-IRPI, via Amendola 122 I, 70126 Bari, Italy (j.wasowski@ba.irpi.cnr.it), (2) University of Bari, c/o CNR-IRPI, via Amendola 122 I, 70126 Bari, Italy

In this work we research into the historical variations in the landslide activity occurred in the last three decades in the municipal territory of Rocchetta Sant'Antonio (Daunia region, southern Italy). This predominantly rural area is known for recurrent landslide problems and as such can perhaps be considered a representative portion of the Daunia Mountains. There is evidence that landsliding has increased in recent years and, though detailed studies are lacking, climate change has been invoked as a significant causative factor. However, the investigations into the climate patterns in Italy in the second half of the last century show a general decrease in precipitation, with, starting from the seventies, a significant lowering of average winter rainfall in southern Italy. While such trend should lead towards a higher stability of slopes in Daunia, it seems that the pronounced 20th century human alterations of the local environment in the 20th century have produced the opposite effects. We recognize that landslide susceptibility is not simple to map and model, even where the controlling physical factors are relatively well known. Therefore, to demonstrate the influence of climate and land use (and land cover) changes on landsliding in the Rocchetta Sant'Antonio area, we examine the temporal series of landslide frequency and land use maps, as well as the precipitation/temperature patterns in the last decades. The occurrence of the above average precipitation in the last winters is the main causative/triggering factor of recent slope failures, but the results also show clear connections between the land-use changes in the last 30 years and the current high landslide activity. We then argue that for hillslope areas modified by man in the recent decades, the combined

effects of land use and rainfall pattern changes need to be considered to avoid a risk of overestimating the relative impact of climate change on landslide activity. We also stress that the analysis of the temporal impacts of climate change on slope stability is difficult, because the historical information on landslide activity is typically episodic and often incomplete.