Geophysical Research Abstracts
Vol. 18, EGU2016-6730-1, 2016
EGU General Assembly 2016


# Holocene landslide activity in Moldavian Plateau (NE Romania) based on archaeological evidence

Mihai Niculita (1), Mihai Ciprian Margarint (1), and Michele Santangelo (2)

(1) Alexandru Ioan Cuza University of Iasi, Geography, Iasi, Romania (margarint.ciprian@yahoo.com), (2) Consiglio Nazionale delle Ricerche e Istituto di Ricerca per la Protezione Idrogeologica, Perugia, Italy

Landslides are widespread phenomena that contribute to shape the landscape. Assessing the time sequence of landslide activity during the Holocene can help (i) better frame the present day landslide distribution in the wider context of climate change and (ii) better define landslide hazard to take adequate mitigation measures to preserve the elements at risk such as archaeological heritage and currently used structures and infrastructures. Rigorous image interpretation criteria applied to the interpretation of remote sensing images can be a valuable tool to derive information on landslide spatial and temporal distribution. However, it only allows to broadly estimate the relative age of landslides based on their morphologic signature.

In this work, we investigate the topological relations between landslides and archaeological sites for nine selected settlements in the Moldavian Plateau, situated on ridges and hillslopes. Landslides and sites were mapped using high resolution LIDAR DEMs and extensive field validation activities. Landslides were classified as very old (relict), old, and recent, according to their morphologic appearance.

We argue the possibility of (i) assigning a relative age to the three main classes of landslides as they appear on the present day topography, and (ii) assessing the landslide activity during the Holocene. Using this information, we set up a model of landslide evolution during the Holocene for the Moldavian Plateau, NE Romania.

Analysis of the landslide inventories revealed decreasing landslide size over time, and newer landslides tend to occur as reactivations of older landslides, partly remobilizing their deposits, and mostly causing retreat of their escarpments. Analysis of the spatial relationships of the archaeological sites with the landslide inventories revealed that the settlers exploited the natural inaccessible decametric escarpments of very old landslides as defensive measures, whereas retrogressive reactivation of such older landslides partly destroyed the fortresses. Spatial interaction between landslides and sites allowed reconstruction of a first coarse resolution time sequence for landslide occurrence in the Moldavian Plateau. In particular, very old landslides seem to have occurred between the Upper Pleistocene ($\sim$12 ka BP) and 6 ka BP, old landslides occurred not earlier than 6 ka BP, and not later than a few centuries ago. More recent landslides occurred at most during the last centuries. Acknowledging the coarse resolution of this study, we maintain that it underlines a clear spatial and dimensional evolutionary trend of Holocene landslide activity in response to climate changes.

We think this approach can be extended to other archaeologic sites of the study area, and to other areas. Furthermore, similar studies can prove useful for landslide hazard analyses, helping to adopt adequate protection and mitigation measures, framed in a climate change scenario.