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Analysis of landslides triggered in 2010 in Tuzla, Bosnia and Herzegowina

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In many countries in the world, landslide information is sparsely available. This is also the case in Tuzla in Bosnia and Herzegowina, although landslides cause regularly significant damage and occur widespread in different catchments. Therefore, this research aims to summarize all available landslide information in the Tuzla region for a sequence of rainstorms in 2010, to analyse the trigger conditions, to investigate the damages and to examine the anthropogenic cause for the landslide initiation. Numerous interviews have been carried out with responsible institutions but also affected population. In addition, the accessible local archives have been investigated.
The results show that severe consequences from landslide occurrence on the population are often due to illegal construction of houses. The geological setting and the regolith are clearly predisposing factors, however, the human modifications alter the landslide process significantly. The spatial distribution of landslides and their geophysical properties are analysed and displayed within a GIS. By applying the Intensity-Duration rainfall model it was determined that in the area of the Tuzla landslides, the triggering conditions are reached by 72 hours precipitation conditions with an average intensity of 1.42 mm/h, however, ranging between 0.5 and 20 mm/h in shorter periods. Furthermore, the landslide initiation is clearly highly influenced by anthropogenic factors such as mining, deforestation and slope cutting. These results demonstrate, that a sound and through analysis of landslides in this area, but also throughout Bosnia and Herzegowina would be necessary in order to protect the society from the intense negative consequences.