It is not only about the climate - Landslide at Stari Slankamen (Serbia) loess palaeosol sequence

Tin Lukić [1], Milica Radaković [1], Milivoj Gavrilov [1], Rastko Marković [2], Petar Krsmanović [1], Jelena Kolundžija [1], Milan Josić [1], Qingzhen Hao [3], Velibor Spalević [4], Slobodan B. Marković [1,5]
[1]*University of Novi Sad, Faculty of Sciences, Department of Geography, Tourism and Hotel Management, Serbia*
[2]*University of Niš, Faculty of Science, Department of Geography, Serbia*
[3]*Institute of Geology and Geophysics, Chinese Academy of Sciences, China*
[4]*University of Montenegro, Faculty of Philosophy, Department of Geography, Montenegro*
[5]*Serbian Academy of Sciences and Arts, Serbia*
**baca.markovic@gmail.com*

Slope instability is regarded as one of the most widespread natural hazards. On January 5th and 27th 2022, a massive landslide occurred at the most famous loess-palaeosol sequence (LPS) in Serbia. Fortunately, Stari Slankamen LPS was already studied by multiple parameters and proxies in the past decades through numerous papers, which confirm its European importance. Thus, the palaeoenvironmental record it contained is somewhat preserved. This was a 50 m high cliff displaying the last 9 glacial cycles, but after the landslide event, the lower parts of it are covered with collapsed material. Our investigation, focused on the main causal factors, determined that occurred landslide event had rather complex components, reflected in the joint climatological characteristics, properties of the geological substrate, and human activity that further contributed to the intensive change of landscape and acceleration of cliff instability. In the last three months of the year 2021, the precipitation was higher than the 30-year average. The monthly averages for the studied area showed that the maximal precipitation should be expected in May and June, but in the year 2021, this precipitation peak was postponed for November and December. This situation is rare in the 30-year period (e.g. 1993, 2011, 2017). The Mann-Kendall (M-K) test for the precipitation data, as well for the quantified indices - The Precipitation Concentration Index (PCI), The Modified Fournier Index (MFI) and Lang Aridity Index (AILang), indicated that there is no statistically significant trend for the given significance level. Urbanization process and reduced vegetation cover intensified cliff instability. The authors implemented remote-sensing techniques in order to monitor and assess the mechanism of the given landslide event at local level. Results from this study could have implications for mitigation strategies at national, regional, and municipality levels, providing knowledge for the enhancement of geohazard prevention and appropriate response plans.