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Holocene environmental reconstructions based on organic and mineral deposits of Mt Śnieżnica landslide, Outer Western Carpathians, Poland

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The Outer Western Carpathians is a region in Poland with an exceptionally high number of landslides. Besides geohazard issues, these landslides are frequently an archive of the past environmental changes thanks to organic and mineral material accumulated in numerous landlocked pits where small peat bogs formed. We investigated a large landslide body developed on the northside part of Mt Śnieżnica. No historical information exists related to the instability of this region. After finding and examining 20 pits, we selected three for detailed analyses. We extracted three cores with the use of a peat sampler. The cores were 10 cm in diameter and up to 4,2 m deep. Compared to other landslides in this region, the depth of peat bogs is substantial and suggests that the landslide is a minimum of several thousand years old. Laboratory analyses included: bulk density measurement, geochemical analyses (organic matter, SiO₂ter, SiO₂biog, CaCO₃, TOC, TIC, C, N, S, Na, K, Mg, Ca, Fe, Mn, Cu, Zn, and Pb contents) of biogenic deposits (405 samples), AMC radiocarbon dating of plant tissue (20 pieces), macroscopic charcoal (420 samples each representing 1 cm slice of the core). The aim of the present study is 1) to reconstruct environmental conditions in the area, 2) dating of the landslide formation in relation to climate change during the Holocene, and the main events after its triggering: changes in vegetation cover, hillslope instability, e.g., soil erosion, hydroclimate fluctuations, and human impact. Our results fill the gap in environmental reconstruction encountered by other authors investigating this part of the Outer Western Carpathians and push forward the ongoing discussion on the environmental conditions during the Holocene in this region.