

The Late Glacial and Early Holocene palaeoenvironmental changes recorded in landslide peat bog (landslide fen) deposits in the northern parts of the Polish Outer Carpathians (Southern Poland)

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In the northern part of the Polish Outer Carpathians, the Beskid Makowski Mts., four landslides formed during the Late Glacial have been identified so far. The landslide peat bogs formed within landslide depressions represent specific type of minerogenic mires filled down by organic-minerogenic deposit. Within the depositional sequences of these peats, palaeoenvironmental changes of the Late Glacial and the Holocene are recorded. The oldest of the studied fens started to form in the Oldest Dryas, the younger ones – in the Bolling (two peat bogs), Older Dryas and the Younger Dryas (Margielewski, 2003; Margielewski, 2006). In the sediments of the four landslide fens of the thickness varying from 4.5 m to 1.5 m, several logs were cored using the Instorf sampler. The laboratory study of the logs, reaching the deepest parts of the fens, included: palynological analysis, peat analysis (microscopic examination of organic deposits), grain-size (aerometric) analysis and content of minerogenic material (loss on ignition) analysis for 2.5 cm long intervals. Over 50 radiocarbon datings made in the studied logs (7-14 ones for each log), enable to date the horizons of lithological and pollen changes.

The loss on ignition curves show large variability of mineral inserts and illuvial horizons in peat deposits, which were formed owing to supply of minerogenic material to the peat bogs related to slope wash during the phases of an increase in precipitation (climate humidity growth). In the Late Glacial sequences of logs, mineral horizons were affected by periodic climate warmings resulting in the permafrost deterioration during the Bølling and the Allerød (see Starkel et al., 2013). However, the Allerød is bipartite in part of analyzed logs: the lower sections of Allerød (AL-1) sequences are usually represented by peat deposition, whereas in the upper parts of the logs (AL-2) numerous minerogenic (clay, silty clay) inserts confirm the climate humidity growth. In the Late Glacial sequence sections pollen of thermophilous trees, such as *Corylus*, *Tilia*, *Quercus*, *Carpinus*, as well as (typical for Subboreal Phase of the Holocene) *Abies alba* and *Fagus sylvatica* occur, which is probably caused by long transport from remote refuges.

During the termination of the Younger Dryas climate cooling, the gradual increase in the delivery of allochthonous material to peat bog is commonly observed. This process is finished by the deposition of clay and silty clay horizon. The lack of the depositional sequences of the upper Preboreal and the whole Atlantic Phase in the majority of logs is caused by the erosional removal of sediments during the climate humidity growth at the beginning of the Subboreal (Margielewski, 2003, 2006).

References

- Margielewski W., (Ed.). 2003. Late Glacial-Holocene palaeoenvironmental changes in the Western Carpathians: case studies of landslide forms and deposits. *Folia Quaternaria* 74, pp. 96.
- Margielewski W., 2006. Records of the Late Glacial-Holocene palaeoenvironmental changes in landslide forms and deposits of the Beskid Makowski and Beskid Wyspowy Mts. Area (Polish Outer Carpathians). *Folia Quaternaria* 76, pp. 149.
- Starkel, L., Michczyńska, D., Krąpiec, M., Margielewski, W., Nalepka, D., Pazdur, A., 2013. Holocene chrono- climatostratigraphy of Polish territory. *Geochronometria* 40(1), 1-21.