

Palaeoenvironmental changes of Orawa-Nowy Targ Basin in the Late Glacial and Holocene recorded in sediments of Grel raised bog

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The Grel raised peat bog is located in the Ludźmierz village vicinity in the Orawa-Nowy Targ Basin. This raised bog, has heavily degraded peat dome covered with numerous post excavation pits which are the results of peat extraction for local purposes. Peat bog is overgrown with birch and pine forests and typical vegetation for raised bog. First palynological study of the peat depositional sequence was performed by Koperowa (1962). The beginning of the peat bog formation was then attributed to the Oldest Dryas. Consequently the Grel is the oldest peat bog in the peatland of the Orawa-Nowy Targ Basin.

Several corings were made at the deepest part of the peat bog basin (GPS N49°28.733', E19°59.293', 601 m asl) because, as a sample compared to the 1960's study, there was a significant compaction of peat and drastic reduction in thickness of peat bog (from the initial ca 8 m in the 1960's, to about ca 4 m today), which is the result of a significant drainage and desiccation.

Two cored logs, were examined by means of loss on ignition (Heiri et al., 2001) and palynological, as well as geochemical, and (mineral material) areometric analyses. The type of peat was determined based on macroscopic analysis. There were performed over 20 radiocarbon datings with using AMS and conventional techniques and an age-depth model was prepared using P_Sequence model in OxCal programme (Bronk Ramsey 2006) and IntCal13 calibration curve (Reimer et al. 2013).

Palynological analysis showed that the mineral sediments underlying peat bog represent the overbank deposits of the Czarny Dunajec River, characteristic for river marshes (possibly of a crevasse character) accumulated during the Oldest Dryas. Only part of the Late Glacial and Holocene climatic changes are clearly marked within the peat bog sequence. The Late Glacial sequence is dominated by mineral deposit (mainly sandy silty clay) with thin organic inserts. The beginning of the accumulation of minerogenic, fen-type peat underlying sphagnum and eriophorum ombrogenic peat (predominating in the sequence) is ascribed to the upper Allerød. Mineral inserts (illuvial horizons) in the ombrogenic peat indicating increases in humidity of the climate (related to periodic floods of the nearby Czarny Dunajec River), were associated with the decline of the Younger Dryas (permafrost degradation), as well as the upper part of the Preboreal Phase and the Boreal Phase of the Holocene. Human impact is very slightly marked in the deposits. Pollen grains of cereals, weeds and other anthropogenic indicators occur only in the top of the sequence (uppermost 30 cm of the log),

which may indicate the removal of the upper, Subatlantic part of the sequence of sediment owing to as the peat extraction.

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