

# THE ENVIRONMENT CHANGES AND CHRONOLOGY OF THE LATE VISTULIAN (WEICHSELIAN) AND EARLY HOLOCENE SEDIMENTS IN THE RĄBIEŃ MIRE, CENTRAL POLAND

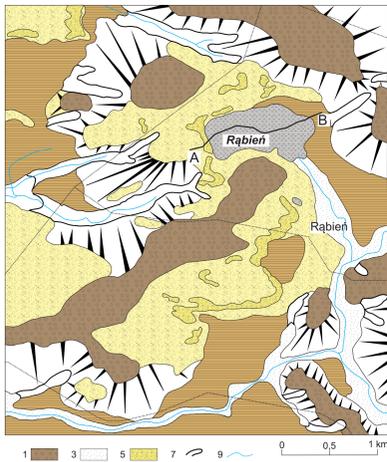
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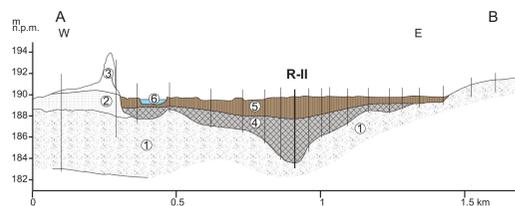


## LOCATION and DESCRIPTION:

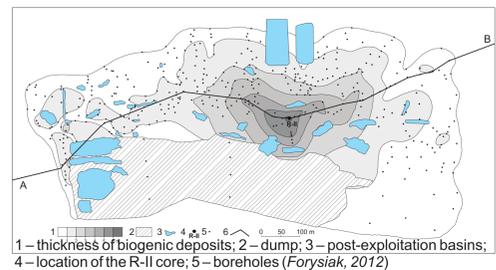
Rąbień mire is located in central Poland, in the morainic Łask Upland, about 11 km to the west of Łódź. The mire is situated in an oval depression surrounded by dunes. The deposits contain mainly biogenic sediments, consisting of gyttja and peat. Lake sediments from the base of the profile (6.2–1.8 m) are covered with peat. From the deepest part of the mire, a 6.2 m core was taken (R-II). Rąbień mire was previously the subject of palaeobotanical and geological studies (Balwierz 2005; Kloss 2005; Kloss and Żurek 2005). These studies indicate that gyttja deposition started during the Oldest Dryas and continued to present day. The present palaeoecological and chronological study focuses on the lower section of the R-II sequence, which is a fairly complete sedimentary record from approximately 15 to 8 ka cal BP. Palynomorphs, plant macrofossils, diatoms, Cladocera, Chironomidae and sediment geochemistry proxy were analyzed. Radiometric dating was also undertaken.



Geomorphological sketch Rąbień peatland (Forysiak, 2012)  
 1 – fluvio-glacial hillocks; 2 – fluvial-periglacial plains; 3 – valley bottoms; 4 – aeolian sand sheets; 5 – dunes; 6 – slopes; 7 – denudational valleys; 8 – peatland; 9 – streams; 10 – line of geological cross-section AB



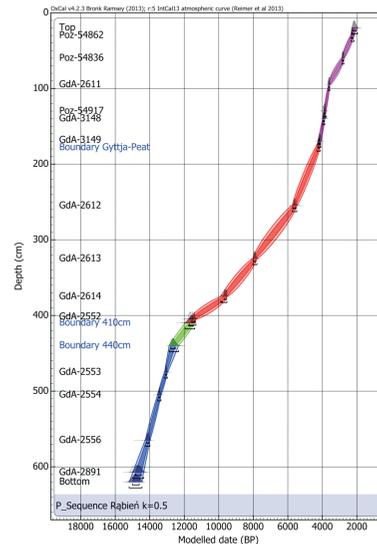
Geological cross-sections (Forysiak, 2012)  
 Pleniveichselian: 1 – vari-grained sands with an admixture of silts and gravels; Late Weichselian/Holocene: 2 – aeolian sands (cover), 3 – aeolian sands in dunes, 4 – gyttja, 5 – peat, 6 – water



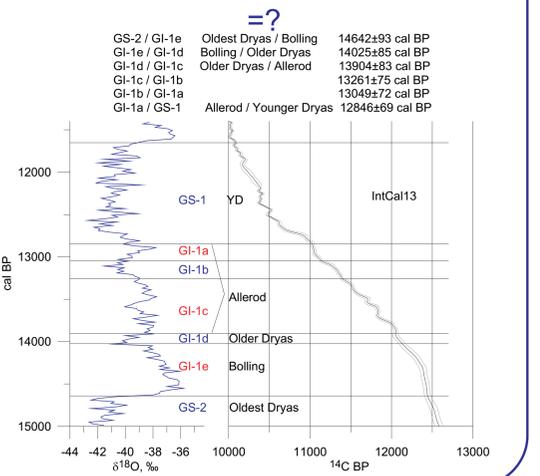
1 – thickness of biogenic deposits; 2 – dump; 3 – post-exploitation basins; 4 – location of the R-II core; 5 – boreholes (Forysiak, 2012)

## AGE - DEPTH RELATION:

The stratigraphic framework for the Rąbień profile was constructed on the basis of fourteen radiocarbon dates of organic material using the P-Sequence function of the OxCal calibration programme. This indicates the base of the profile is 15010-14630 cal yr BP (68.2% conf. interval). The lithological and geochemical data indicate that sudden changes in deposition rate took place at 1.75, 4.1 and 4.4 m.

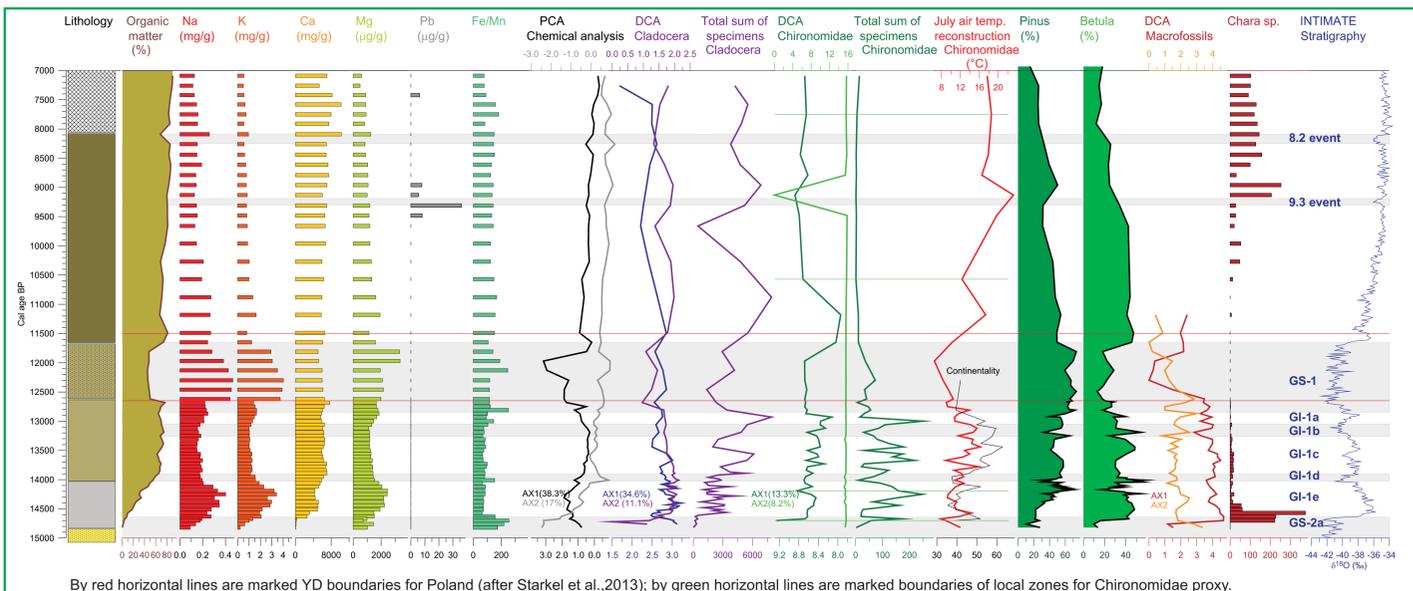
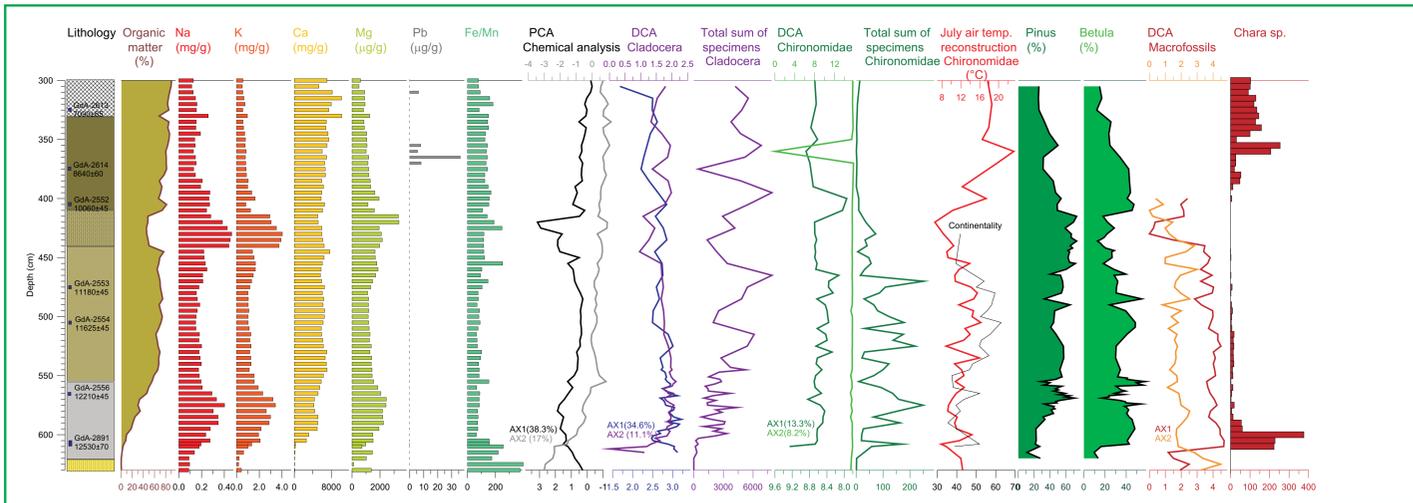


## INTIMATE Stratigraphy vs. chronozones and calibration curve IntCal 13:



## PROXY DATA

Below are presented chosen proxies vs depth and vs age. Values of AX1 and AX2 (PCA or DCA curves) were calculated with using CANOCO 4.5 software:



## CONCLUSIONS:

Presented palaeoecological and chronological study focuses on the lower section of the R-II sequence. This period is characterized by a series of climatic changes. The sequence contains evidence for short-lived climate oscillations during the Late Vistulian in the geochemical and biotic records, i.e. Oldest Dryas, Bolling, Older Dryas, Allerød as well Younger Dryas. Reconstructions were compared with the INTIMATE event stratigraphy and allow us to state that:

- there are general agreement between proxy data for site Rąbień and INTIMATE event stratigraphy, although particular boundaries are shifted,
- different proxies show a bit different speed of reaction on climate change,
- boundaries of the Younger Dryas seem to be delayed compared to GS-1 by ca. 100 years,
- geochemical records indicate presence of cold episodes 9.3 and 8.2 ka (increase mineral matter and lead appearance in circuit geochemical).

Generally, the geochemical, biotic and radiocarbon data are consistent and indicate the main climatic phases recognized in other Polish and European records.

Palaeoecological studies based on lacustrine sediments from Europe predating the Late Glacial are scarce, therefore, every study that provides data for the Late Vistulian are desirable. Rąbień mire data are also valuable as one of the first biogenic sediments in Polish Lowland indicating presence of episodes 9.3 and 8.2.

## REFERENCES

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