

POSTERY

PALAEOECOLOGICAL INVESTIGATIONS OF THE EEMIAN INTERGLACIAL PEAT SEQUENCE NEUBRANDENBURG-HINTERSTE MÜHLE (MECKLENBURG-WESTERN POMERANIA, NE-GERMANY)

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An Eemian interglacial sequence was explored in the gravel pit “Neubrandenburg-Hinterste Mühle” (HM) near Neubrandenburg (NE- Germany). According to the palynological classification of Strahl (2000) the HM-section represents a complete Eemian sequence. The profile is situated in a former kettle hole depression between underlying till (Wartanian) covered by Weichselian till. The today still visible 3 m long and max. 2 m wide profile is located in the western part of the Eemian paleodepression. The sampled sequence is generally subdivided in three units, 1: in the lower part 0,5 m limnic organic silt deposits; 2: appr. 1,9 m strongly compressed Eemian peat with numerous wood remains in the upper part, and 3: redeposited peaty lenses in sand layers on the top.

The limnic sedimentation began during the Late Saalian period in a landscape characterized by herbaceous vegetation and heliophytes (cf. Fig. 1). Later dominated cool, clear and calcium carbonate-rich lake water, also inhabited by *Characeae*, what indicates presence of stonewort meadows, most typical to waters up to 10 m in depth. Abundant in calcium carbonate this water level, as well as pH of ca 7,8, is supported by the occurrence of *Ceratophyllum demersum*. When considering plant macroremains, the beginning of sediment accumulation at the initial phase of basin development was recorded as numerous statoblasts of *Cristatella mucedo* and remains of brown mosses. Aquatic plants often recorded for Late Glacial periods of cool climate were represented by *Potamogeton gramineus* and *Nymphaea candida*. The peaty and humid area as well as highly trophic muddy lakeshore area were covered by plants like *Scirpus sylvaticus* and *Phragmites australis*. The protocratic phase of Eemian vegetation succession began with the development of pioneer forest habitat, characterized by dominance of light birch forest followed by pine forest. The end of

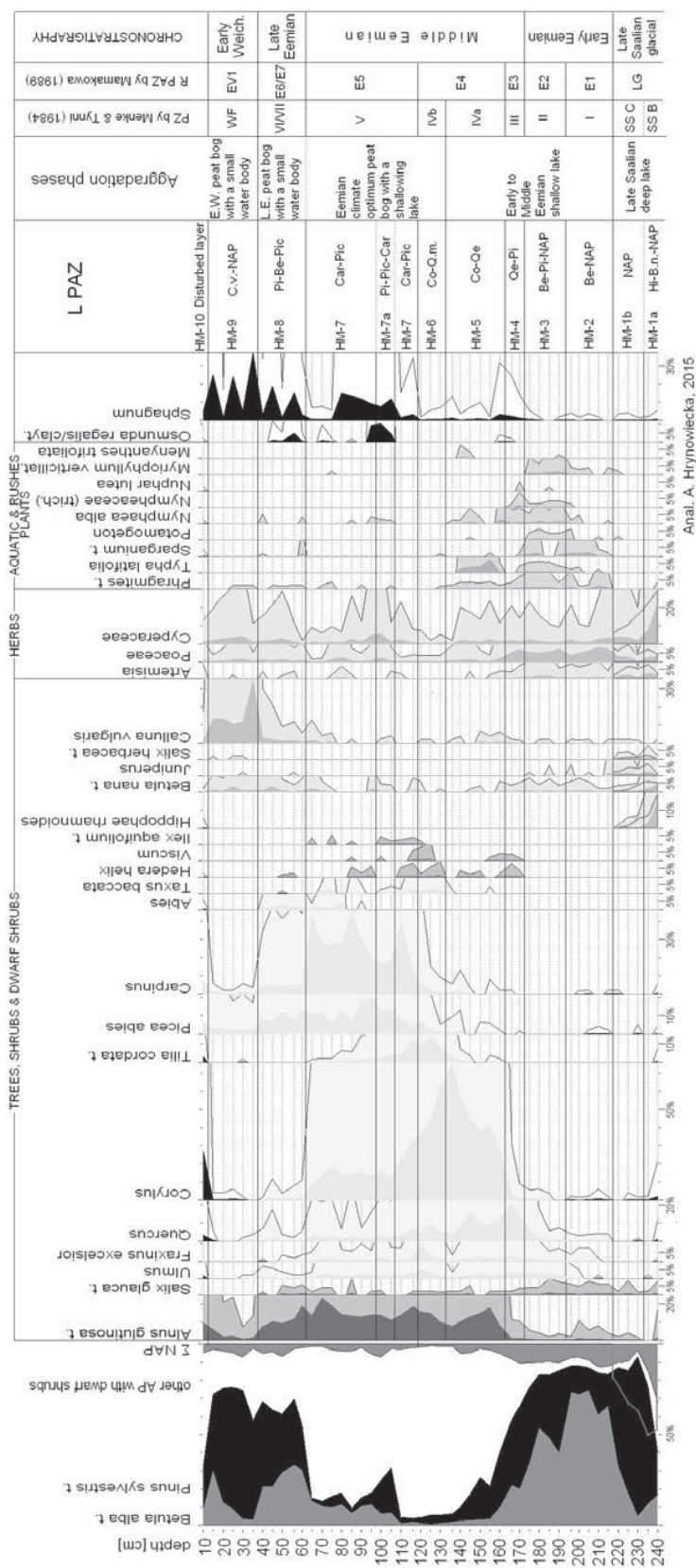


Fig. 1. Pollen diagram presented of selected taxa with local pollen zones (L-PAZ) of Hinterste Mühle section (A. Hrynowiecka). The color description: dark green - azonal plant vegetation, yellow - thermophilic vegetation, red - indicators of warm climate, blue - indicators of open landscape, light green - water and rush vegetation. A lighter color were marked of pollen values which are multiplied with factor x10. The dark blue line marked values of pollen after excluding Pinus pollen from the AP + NAP sum.

dominating limnic conditions is marked by a decrease in the frequency of aquatic vegetation and increasing amount of brown mosses. In the water reservoir prevailed favourable conditions for the zooplankton development similar to the Late Saalian. Continues *Poaceae* occurred quite numerous indicating a significant brightness of *Betula* communities. The water level in the reservoir was decreased - a rich participation of aquatic plants like *Nymphaea alba* and *Myriophyllum verticillatum*, and expanded the lakeshore belt of rushes. The beginning of mesocratic ecological phase of Eemian is characterized by the development of thermophilic communities initially dominated by oak forest with appearance of warm climate indicators (*Hedera helix*, *Viscum*). The ensuing climate optimum was characterized by the encroachment of hazel-oak forest and after mixed deciduous forest, and limnic sedimentation ceased in the basin during this phase. The beginning of mesocratic phase of Eemian Interglacial characterized by the development of thermophilic communities initially dominated by *Quercus* and accompanying *Ulmus*, *Fraxinus* and *Corylus*. Water and rushes plants were still present numerous and tree vegetation of *Corylus* with accompanying *Quercus* began to dominate. The basin shore was still covered by riparian forests with *Alnus*, which occupied even the local belt of rushes. In the wet environment grew mostly the riparian forest with *Alnus*, *Ulmus* and *Fraxinus* and also appeared communities with *Picea* and *Taxus*. In the interglacial optimum reigned mixed forests with *Carpinus* and *Picea*. There were often *Hedera helix*, *Viscum* and *Ilex aquifolium*.

Younger part of mesocratic phase was characterized by the dominance of *Carpinus* initially with numerous participation of *Tilia*, *Corylus* and increasing participation of *Picea* (HM-7 L PAZ).

However, there has been a breakdown of communities with *Carpinus* corresponding to this interglacial optimum (zone E-5 acc. to Mamakowa 1989, 2003) and bears a record of further oligotrophication. In this phase bears also a record of further oligotrophication in transition bogs and humid depressions of raised bogs. The progressive deterioration of conditions in the reservoir indicates increasing attendance of *Ephippia*. Very numerous branches of brown mosses and the decreasing amount of aquatic plant taxa evidence that the basin gradually became shallower until its open waters nearly completely disappeared. The aquatic plants vanished and the following phase of overgrowing and progressive development of a raised bog is marked by the occurrence of wood remains of *Calluna vulgaris* and *Eriophorum vaginatum* as well as by an increase in the frequency of *Sphagnum sp.* The depression gradually became shallower and was overgrown by a forest cover until the closing of its open water. The overgrowing of former Eemian lakes and the transformation to terrestrialization development were often associated with improved thermal conditions and probably also lowering of the ground water table during Middle Eemian Interglacial. In the telocratic phase of Eemian spread communities with *Pinus*, *Betula* and still *Picea*. The anatomical characteristics of the local needle wood taxa representing species such as *Pinus sylvestris* and *P. mugo*. Another coniferous taxa may belong to the genus of *Picea* or *Larix*. Among the broad-leaved group the following local wood taxa were identified: *Betula sp.*, *Salix sp.*, *Populus sp.* and *Calluna vulgaris*. The ending interglacial is characterized by disappearing riparian forest and sporadically appearing of plants rushes. The telocratic phase of Eemian Interglacial was beginning of the appearance of communities with *Pinus* and *Betula* and still persisting *Carpinus* and *Picea*. *Pinus* dominated, other trees disappeared completely and heaths were spreading on acidly soils. The water level fluctuated and the end of the interglacial and deterioration of climatic conditions is documented by the presence of *Betula nana* and *Hippophaë rhamnoides*. At the close of the Eemian interglacial the peat bog was flooded due to a rise in ground water level resulting from increasing humidity of climate. The palaeoecological results data illustrate well the palaeoecology of the aggradation of a shallow water reservoir with fully limnic conditions from the Saalian deglaciation up to a raised bog development up to the end of Eemian interglacial period.

A low U-specific activity were obtained for the U/Th samples from the profile range of 90-135 cm whereas U-concentration. Similar low U-activity is encountered sometimes in the organic-rich profiles, but more often in raised bog type (Kuznetsov, Maksimov 2012). Latter was identified biostratigraphically in the upper part of the Hinterste Mühle sequence (this publ.). Apparently, the reduced U-concentration is characteristic for raised bogs and depends on the hydrological conditions of their formation. The

analytical data obtained for the five samples from the upper part of the HM-profile had been analyzed by Total Sample Dissolution (TSD) technique were taken into age calculation and yielded with standard deviation error $\pm 1\sigma$ isochronously-corrected age of $116 \pm 13/10$ kyr. The data reflects the classification into second half of Eemian interglacial and Early Weichselian for the upper part of peat formation.

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