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Pim de Klerk

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(NW Mecklenburg, NE Germany) from the legacy of Franz Fukarek

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Staatliches Museum für Naturkunde Karlsruhe, Erbprinzenstraße 13, D-76133 Karlsruhe, Germany, pimdeklerk@web.de

Keywords:

Early/Middle Holocene, Mecklenburg, NE Germany, peatland development, pollen analysis, Weichselian Lateglacial

Abstract

A pollen diagram from the Moorer Busch near Grevesmühlen (NW Mecklenburg, NE Germany) from the legacy of Franz Fukarek covers considerable parts of the Weichselian Lateglacial and the Early/Middle Holocene. During the Lateglacial *Betula*/*Pinus* forest phase (Allerød), birch forests dominated the upland in which pine played a minor role. During Open vegetation phase III (Younger Dryas) open vegetation types prevailed, though observations of stomata attributable to *Pinus* confirm that pine trees were present around the study area. During the Early Holocene again forests of birch and pine dominated the upland, in which later *Corylus* invaded and became dominant. The middle Holocene section of the pollen diagram shows hardly fluctuating values of pollen attributable to *Corylus*, *Ulmus*, *Quercus*, *Alnus*, *Tilia*, *Fraxinus* and *Hedera*, indicating that rather stable deciduous forests prevailed. During the beginning of this vegetation phase, the basin terrestrialised and *Sphagnum* peat was formed at the cored location that towards the end of this phase graded into a *Sphagnum*-Ericales peat. The pollen section ends shortly above the mid-Holocene elm decline: younger peat deposits have been destroyed by peat extraction after A.D. 1800.

Schlüsselwörter:

Früh-/Mittelholozän, Mecklenburg, Moorentwicklung, NO Deutschland, Pollenanalyse, Weichselspätglazial

Zusammenfassung: Ein Pollendiagramm vom Moorer Busch nahe Grevesmühlen (NW Mecklenburg, NO Deutschland) aus dem Nachlass von Franz Fukarek

Das Pollendiagramm vom Moorer Busch nahe Grevesmühlen (NW Mecklenburg, NO Deutschland) aus dem Nachlass von Franz Fukarek enthält große Teile des Weichselspätglazials sowie des frühen und mittleren Holozäns. Während der spätglazialen *Betula*/*Pinus* Waldphase (Allerød) dominierten Birkenwälder auf dem "Upland", in denen Kiefern nur eine untergeordnete Rolle spielten. Während der Offenen Vegetationsphase III (Jüngere Dryas) gab es weitestgehend offene Vegetationstypen, obwohl die Funde von Stomata von *Pinus* darauf verweisen, dass Kiefern in der Nähe des Untersuchungsgebiets vorkamen. Während des frühen Holozäns herrschten erneut Wälder aus Birken und Kiefern vor, in die später *Corylus* einwanderte und die Bestände bestimmte. Der mittelholozäne Teil des Pollen-

diagramms zeigt kaum schwankende Werte von Pollen, die *Corylus*, *Ulmus*, *Quercus*, *Alnus*, *Tilia*, *Fraxinus* und *Hedera* zugeordnet werden können, was auf das Vorkommen relativ stabiler Laubwälder hinweist. Zu Beginn dieser Vegetationsphase verlandete das Becken und am Untersuchungspunkt wurde *Sphagnum*-Torf gebildet, welcher am Ende dieser Phase in einen *Sphagnum*-*Ericales*-Torf übergeht. Das Pollendiagramm endet kurz oberhalb des mittelholozänen Ulmenfalls: jüngere Ablagerungen sind durch Torfabbau nach A.D. 1800 vernichtet worden.

1 Introduction

Franz Fukarek - who worked for many years at the Greifswald University - is well-known and widely praised as a plant-sociologist and geobotanist (cf. IVERSEN 1962; JESCHKE 1991; KRISCH 1993; KRISCH & SUCCOW 1996; NATHO 1996; HENKER 1997). Additionally, he was devoted to palynology, as is proven by his impressive pollen reference collection still preserved and used by the palaeoecological research group of the Institute of Botany and Landscape Ecology of the Greifswald University. He published many pollen diagrams in his extensive work on plant distribution and vegetation history of the Darß-peninsula in NW Vorpommern (FUKAREK 1961).

After the completion of the Darß-study, Fukarek continued his palynological studies by analysing cores from the Ueckermünder Heide area (E Vorpommern), but was summoned "from above" to give this work less priority (FUKAREK 1968a; DE KLERK 2004). Probably for this reason, Fukarek never published these data. Recalculation of original hand-drawn pollen diagrams (presenting only a limited amount of pollen types) allowed DE KLERK (2004) to present and interpret four of these pollen diagrams. Recently, the original counting lists of Fukarek were found in the Institute of Botany and Landscape Ecology of the Greifswald University, which enabled the presentation and interpretation of the complete dataset of a fifth pollen diagram (DE KLERK 2005).

Together with the counting lists of the studies from the Ueckermünder Heide area, pollen counts were preserved from the Moorer Busch in the Grevesmühlen region (NW Mecklenburg; Fig. 1). In other studies and in archive and historical data this area is also named "Moorer Bruch", "Große Moor" or "Greschendorfer Moor" (cf. KLEMM 1977, 1980). An inspection of the counting lists revealed that the samples encompassed a considerable part of the Weichselian Lateglacial and Early/Middle Holocene. Since pollen diagrams covering these time-frames from W Mecklenburg are rare (e.g. SCHMITZ 1961; JAHNS 2007), a processing and interpretation of the material from the Moorer Busch seemed desirable in order to obtain knowledge on the vegetation history of this region.

According to C.-L. KLEMM (pers. comm. September 2005) Fukarek performed the palynological research in 1966 in order to support the studies into vegetation patterns of the Moorer Busch by KLEMM (1977, 1980). Though some of the material of Fukarek has been lost (e.g. the coring protocols of two cross-sections through the study area), C.-L. KLEMM (pers. comm. September 2005) still possessed the text of a lecture given by Fukarek in 1970 on the pollen diagram, and a copy of an original hand-drawn version including a lithological column. Though JESCHKE et al. (2003) refer to FUKAREK (1968b) for descriptions of peat corings of the Moorer Busch, this publication does not deal with the Moorer Busch at all: the publication lists of Fukarek presented by KRISCH (1993) and NATHO (1996) do not reveal any other publication that might present the data of these corings.

The present paper presents and discusses the pollen diagram of the Moorer Busch.

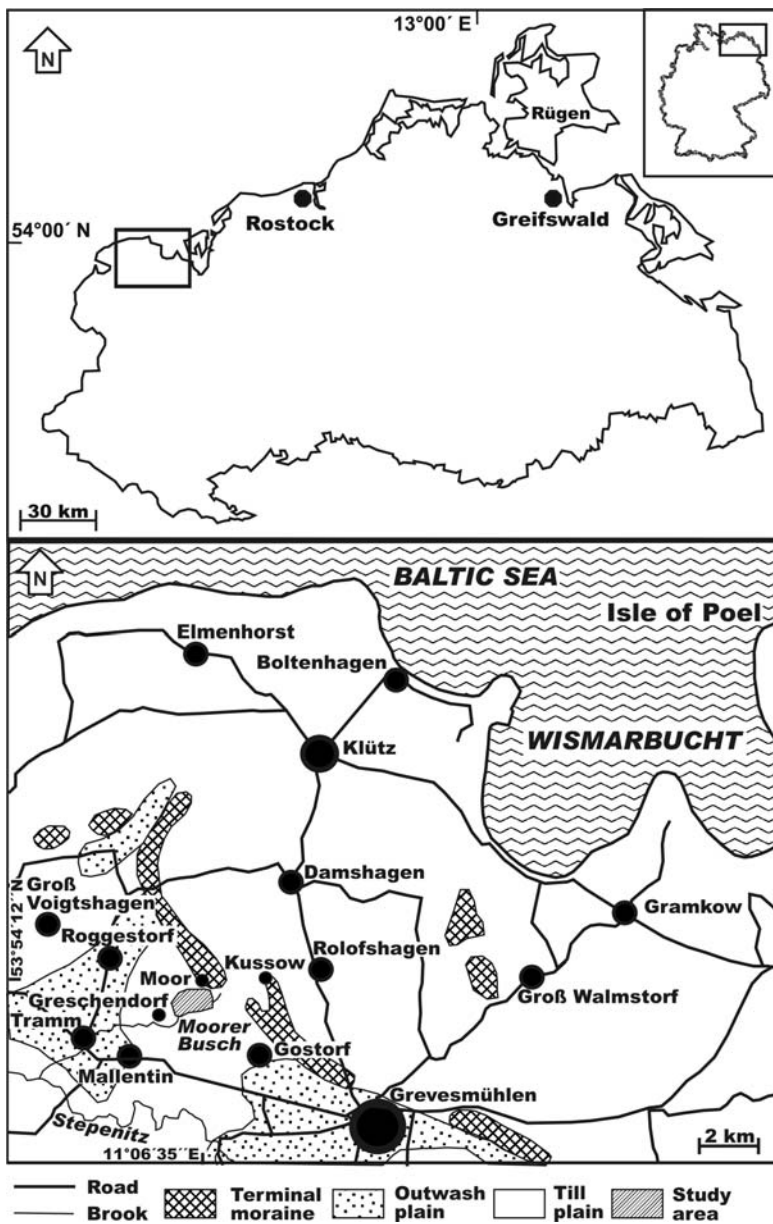


Fig. 1 Location of the Moorer Busch in the Grevesmühlen area (NW Mecklenburg).

Abb. 1 Lage des Moorer Busch nahe Grevesmühlen (NW Mecklenburg).

2 Description of the study area

The Moorer Busch (ca. $53^{\circ}53'54''$ N, $11^{\circ}05'06''$ E) between Greschendorf and Moor is positioned immediately in front of the Pommeranian terminal moraines (Figs. 1, 2) (cf. JESCHKE et al. 2003). Size of the area is ca. 1.25 x 1 km.

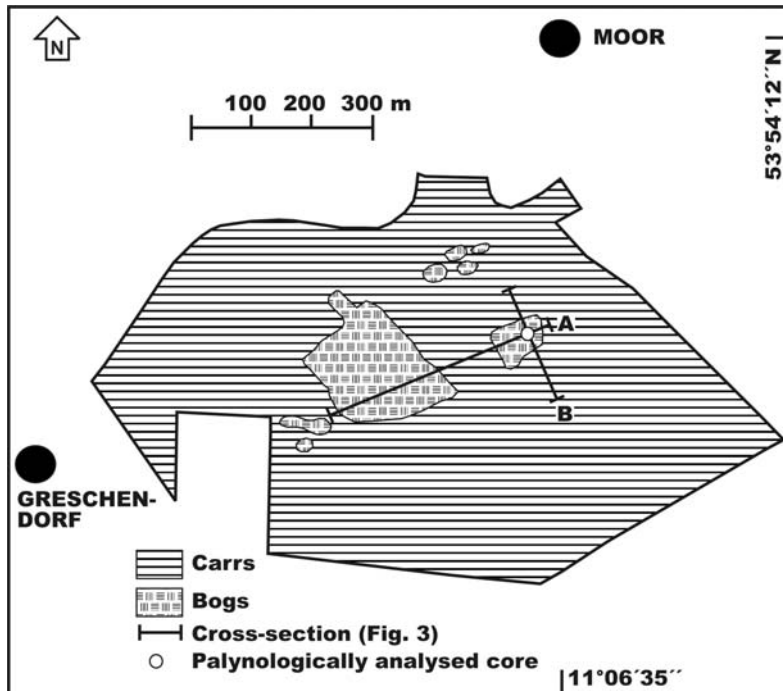


Fig. 2 Map of the Moorer Busch (after Klemm 1977). Included are the positions of cross-sections A and B (Fig. 3) and of the palynologically analysed core.

Abb. 2 Karte des Moorer Busch (nach Klemm 1977). Angegeben sind die Positionen der Querschnitte A und B (Abb. 3) und die Lage des palynologisch analysierten Kerns.

Lithological cross-sections transecting a central bog area of the peatland (based on the lost coring protocols) are presented by KLEMM (1977) and are redrawn in Fig. 3. The lower deposits in the basin consist of aquatic sediments that show the former presence of a lake. According to JESCHKE et al. (2003), a percolation mire (sensu JOOSTEN & CLARKE 2002) had developed after terrestrialisation, locally including bogs (cf. Fig. 2). Due to extensive peat cutting after ca. A.D. 1800, the original peat sequence is (almost) completely destroyed (KLEMM 1977; JESCHKE et al. 2003) and the current indications for the former presence of a percolation mire are meagre.

Currently, the peatland is predominantly forested with *Alnus-Fraxinus* carrs, and *Betula* carrs with *Salix* shrubs along the peatland margins (JESCHKE et al. 2003). Since KLEMM (1977) describes also other vegetation types including *Betula* forests with *Sphagnum* and *Betula-Pinus* forests, a change in vegetation must have occurred during the last decades. The peatland – that is assumed to have been without outlet in previous times (KLEMM 1977) – is currently drained by the brook Rotebäk that discharges in the brook Stepenitz (JESCHKE et al. 2003).

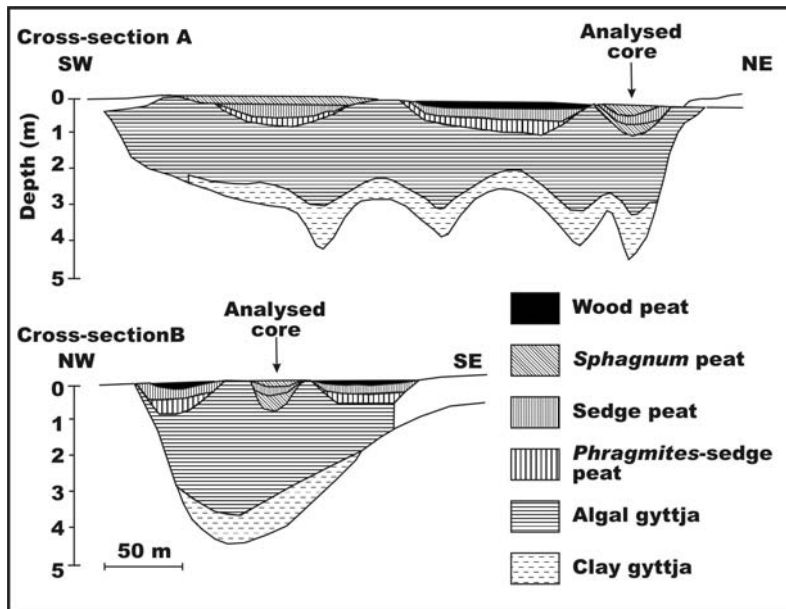


Fig. 3 Lithological cross-sections A and B through the Moorer Busch (modified after Klemm 1977).

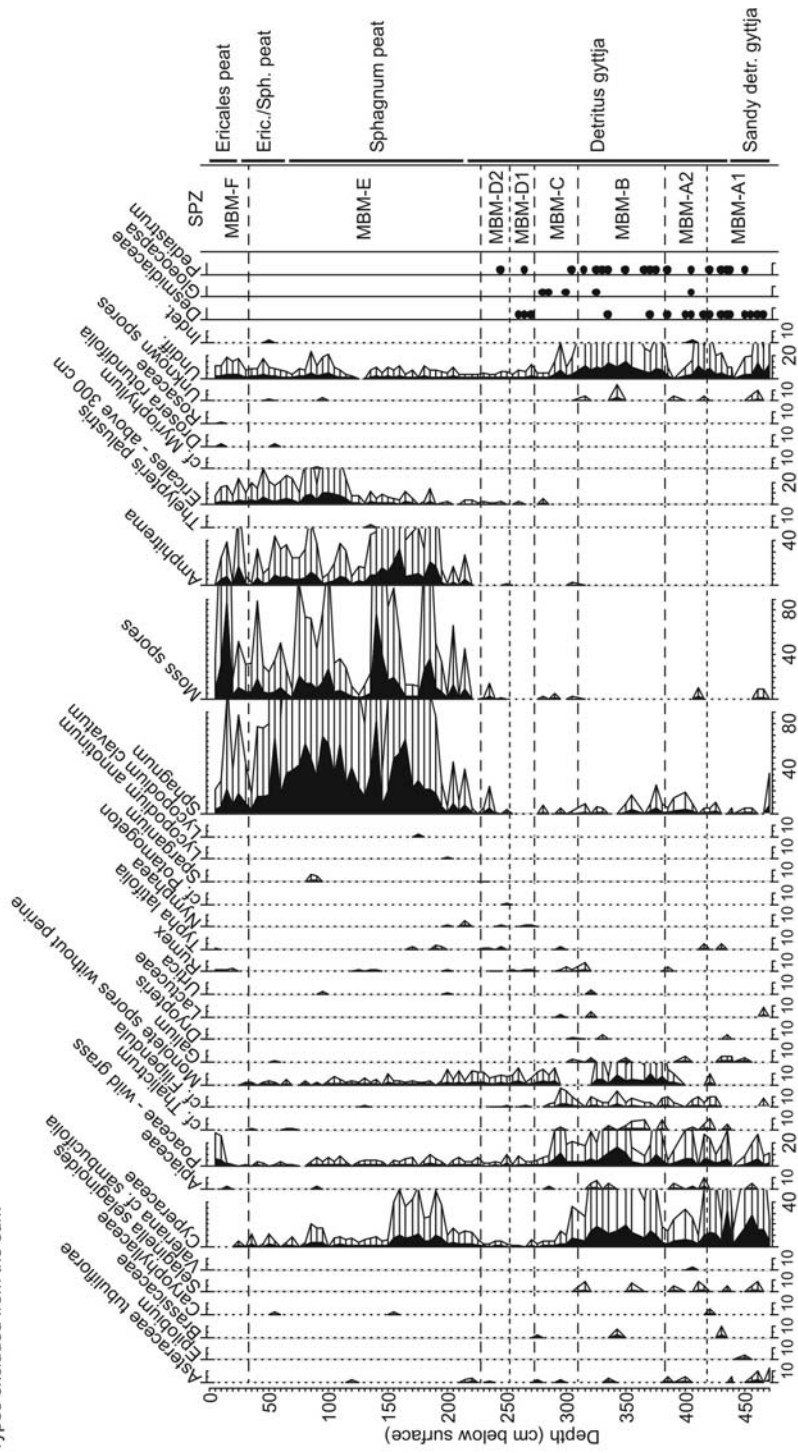
Abb. 3 Lithologische Querschnitte A und B durch den Moorer Busch (nach Klemm 1977).

The palynologically analysed core was taken at the intersection of the cross-sections in a bog area (cf. Figs. 2, 3). The cross-sections show for this core a sediment sequence of (bottom to top) clay gyttja, algal gyttja, *Sphagnum* peat, sedge peat, and again *Sphagnum* peat. This sequence is, however, not in accordance with the lithological column in the hand-drawn version of the pollen diagram preserved by C.-L. KLEMM (pers. comm. September 2005) that is included in Fig. 4. The latter shows a sequence of (bottom to top) sandy detritus gyttja, detritus gyttja, *Sphagnum* peat, *Ericales/Sphagnum* peat, and finally *Ericales* peat. Due to the loss of the original core protocols, the origin of this discrepancy cannot be reconstructed. It can be assumed that the description of the analysed core is the most accurate for the core location, whereas the lithological sequence of the cross-sections will be more accurate for the lateral distribution of peat types.

Fig. 4(a/b) Pollen diagram "Moorer Busch" (MBM), calculated relative to a regional pollen sum. *Ericales* were included in the sum below 300 cm depth and excluded above 300 cm depth. Lithology follows a hand-drawn version of Fukarek of the pollen diagram (C.-L. Klemm, pers. comm. September 2005). Pollen values are displayed with actual values (closed curves) and a 5-time exaggeration (open curves with depth bars).

Abb. 4(a/b) Pollendiagramm "Moorer Busch" (MBM), berechnet auf eine regionale Pollensumme. *Ericales* sind nur unterhalb 300 cm Tiefe in der Pollensumme eingeschlossen. Die Lithologie ist nach einer von Fukarek handgezeichneten Fassung des Pollendiagrammes (C.-L. Klemm, pers. Komm. September 2005). Pollenwerte sind dargestellt als reelle Werte (geschlossene Kurven) und in 5-facher Überhöhung (offene Kurven mit Tiefelinien).

Pollen diagram "MOORER BUSCH" (MBM)
Types excluded from the sum



Analysis: Franz Fukarek

3 Methods

In this paper, pollen type names are displayed in SMALL CAPITALS in order to distinguish them clearly from plant taxa (cf. JOOSTEN & DE KLERK 2002).

The original research methods of Fukarek are unknown, but probably resembled the methods of the Darß-Study (FUKAREK 1961). Coring was most likely with a chamber corer. With respect to sample preparation, FUKAREK (1961) mentions the “common KOH-method” and incidental use of the “Acetolysis method after Erdtman” without further elaboration or references. Samples in the Darß-study were counted with a light microscope with an enlargement of 300 times. The counting lists of the Moorer Busch reveal that these samples were counted up to exactly 200 grains of pollen attributable to trees (excluding CORYLUS), incidentally up to exactly 400, 100, or 50 grains.

Pollen type names in the counting lists are a mixture of non-scientific (mostly abbreviated) names, and scientific (partly outdated) designations. For the present paper, these were transformed into ‘practical’ modern-day pollen type names according to the interpretation of the present author.

Different designations were used in the counting lists for ERICACEAE, CALLUNA, VACCINIUM, ARCTOSTAPHYLOS, and EMPETRUM, of which it is unclear what relationship exists between the first one and the latter four. As the latter were only extremely seldom counted (and thus do not provide paleoecological information), and generally only ERICACEAE were referred to, it was decided for the present study to add all these types together as ERICALES.

It is unclear which morphological entities with which taxonomical affinities were counted under the designations DICRANIUM and “ZIERALGEN”. The latter is translated into DESMIDIACEAE in the present study. The former indicates probably moss spores of *Dicranum*. Since spores of *Dicranum* are morphologically very similar to spores of some other mosses (cf. BOROS & JÁRAI-KOMLÓDI 1975), in the present study the more neutral terminus “moss spores” is used. The observed AMPHITREMA species is most likely *Amphitrema flavum*.

As of the following entities no quantities were noted, only their “presence” is displayed in the pollen diagram (Fig. 4): HIPPOPHAË-REMAINS, PINUS-STOMATA, DESMIDIACEAE, GLOEOCAPSA, and PEDIASTRUM. Of the first it is unclear what remains were encountered, but most likely star-like hairs.

Pollen values were calculated with the TILIA 1.12 computer program (GRIMM 1992) with a pollen sum of types attributable to trees and shrubs (AP) and upland herbs (NAP). The NAP-values are indicative for the relative openness of the upland vegetation. ERICALES were included in the pollen sum below 300 cm depth since Ericales taxa did not grow locally in the lake that persisted during the Weichselian Lateglacial and Early Holocene. ERICALES pollen grains were, however, excluded from the sum above 300 cm depth since Ericales taxa grew probably locally in the bogs that developed in the Moorer Busch after the Early Holocene, and would for these time-periods provide a false picture of the openness of the landscape if ERICALES pollen were included in the NAP.

The pollen diagram (Fig. 4) was prepared with the TILIAGRAPH 1.18 and TGView 2.0.2 computer programs (GRIMM 1992, 2004). Pollen types are displayed with actual values (closed curves) and a 5-time exaggeration (open curves with depth bars). The pollen curves are ordered stratigraphically in order to facilitate a successional interpretation. The pollen diagram is divided into ‘Site Pollen Zones’ (SPZ’s) (cf. DE KLERK 2002) that are a combination of informal acme zones and informal interval zones sensu HEDBERG (1976) and SALVADOR (1994).

4 Interpretation of the pollen diagram

4.1 SPZ MBM-A – Lateglacial *Betula*/*Pinus* forest phase (Allerød)

The lowest pollen zone of the pollen diagram (Fig. 4a/b) is characterised by high values of *BETULA* pollen and low NAP-values (compared to the overlying SPZ MBM-B). Two subzones MBM-A1 and MBM-A2 are distinguished, of which the latter is characterised by conspicuously higher values of *PINUS* pollen than the former. Also prominent are substantial values of *SALIX* (especially in the lower subzone) that decrease in the central part of the upper subzone.

This pollen composition is typical for the Lateglacial *Betula*/*Pinus* forest phase (sensu DE KLERK 2002; classically referred to as Allerød). High values of *BETULA* pollen and low values of *PINUS* pollen during this vegetation phase (compared to regions further southward) are typical for sites within the till plains of northern Vorpommern (cf. LANGE et al. 1986; DE KLERK et al. 2001; DE KLERK 2002; ENDTMANN 2002; THEUERKAUF 2003) and for Schleswig-Holstein (e.g. SCHÜTRUMPF 1955; MENKE 1968; USINGER 1975, 1978, 1981a, 1981b; USINGER & WOLF 1982; BOKELMANN et al. 1983; BOCK et al. 1985), and the Moorer Busch diagram now forms an important bridge between these relatively well-investigated regions. Birch forests dominated the upland in which pine played a minor role. A minor increase in *PINUS* pollen as recorded in subzone MBM-A2 does normally not occur in pollen diagrams from the southern Baltic coast in N Germany towards the end of this vegetation phase, but is not exceptional (e.g. SCHÜTRUMPF 1955; USINGER 1975; BOKELMANN et al. 1983). It might indicate an increase in pine populations on the sandy outwash plains in the surroundings of the study area (cf. Fig. 1). The relatively high values of *SALIX* pollen indicate that willow was also present within the upland forests, though *Salix* may also have occupied the lower moist areas along the lake shores. The occurrence of *HIPPOPHAË*-REMAINS shows that sea-buckthorn was also part of the vegetation in the direct surroundings of the studied spot, though the associated pollen type was only found once.

The types excluded from the pollen sum show relatively high values of *CYPERACEAE* pollen in the lower subzone that might originate from a girdle of sedges along the lake margins. Lower values of this pollen type in the upper subzone indicate that these sedges lost importance or flowered less.

Originally, Fukarek interpreted this zone differently, as becomes clear from the summary-interpretation given by KLEMM (1977) and the text of the 1970-lecture (C.-L. KLEMM pers. comm. September 2005). Based on the relatively high values of *SALIX* pollen, he correlated the lowest subzone with the Younger Dryas. That this interpretation is incorrect becomes clear from the low values of *ARTEMISIA* and *ERICALES* pollen that are normally much higher in diagram sections connected with the Younger Dryas in the northernmost parts of N Germany (cf. MENKE 1968; BOCK et al. 1985; LANGE et al. 1986; DE KLERK et al. 2001; DE KLERK 2002; ENDTMANN 2002; USINGER 1975, 1981a, 1981b; USINGER & WOLF 1982). The lack of comparative palynological material from Mecklenburg-Vorpommern during the late 1960-ies makes such an error understandable. The period with increased *PINUS* pollen values (the current subzone MBM-A2) was interpreted by Fukarek to represent the Early Holocene.

4.2 SPZ MBM-B – Open vegetation phase III (Younger Dryas)

SPZ MBM-B is characterised by relatively high NAP-values, especially of *ARTEMISIA* and *ERICALES* pollen, and to a less extent of *CHENOPODIACEAE* and *CF. HELIANTHEMUM*. Values of *BETULA* pollen have slightly decreased, whereas those of *PINUS* remain at the previous level.

The combination of high values of *ARTEMISIA* and *ERICALES* pollen is typical for the Open vegetation phase III sensu DE KLERK (2002; the Younger Dryas). The forest had predominantly disappeared and open vegetation types prevailed under influence of the colder climate (cf. ISARIN 1997). It has often been assumed that the tree vegetation did not completely disappear

from N Germany, but that birch and pine remained incidentally present without forming closed stands (cf. e.g. LANGE et al. 1986; JANKE 1996; DE KLERK 2002). The observed PINUS-STOMATA in the Fukarek diagram show that pine was actually present in NW Mecklenburg and thus support this hypothesis.

The types excluded from the sum show higher values of CYPERACEAE and POACEAE-WILD GRASS pollen and of MONOLETE SPORES WITHOUT PERINE than in SPZ MBM-A2, but their values are not high enough to be interpreted as (extra)local deposition values (sensu JANSSEN 1973). They indicate that sedges, grasses and ferns were present within the open upland vegetation or within a fringe of wetland vegetation along the lake shores.

Originally, Fukarek interpreted this phase with high NAP-values as an open cool phase within the Preboreal (cf. KLEMM 1977 and pers. comm. September 2005). Also for the pollen diagrams of the Ueckermünder Heide area, unfortunately, Fukarek interpreted consistently pollen zones that can with present-day knowledge be unambiguously ascribed to the Younger Dryas as an early Holocene cool open phase (cf. FUKAREK 1968a, 1972; DE KLERK 2004).

4.3 SPZ MBM-C – Early Holocene *Betula*/*Pinus* forest phase (Preboreal)

Compared to the preceding zone, SPZ MBM-C is characterised by conspicuously low NAP-values that indicate that the upland vegetation had closed again. From the pollen values it can be concluded that *Betula* formed the most important forest element, whereas *Pinus* was less prominently present.

Among the types excluded from the sum, POACEAE – WILD GRASS has a small peak in the central part of SPZ MBM-C. Such a peak might represent an expansion of upland grasses during the open Preboreal Rammelbeek phase (cf. VAN GEEL et al. 1981) although it is also possible that this peak represents an expansion of wetland grasses (e.g. *Phragmites*) (cf. DE KLERK 2002). The fact that pollen types unambiguously attributable to upland herbs (e.g. ARTEMISIA, ERICALES, CHENOPODIACEAE) do not show peaks at the same depth level is an indication for the latter hypothesis.

4.4 SPZ MBM-D – Early Holocene *Corylus* phase (Boreal)

SPZ MBM-D is characterised by rising values of CORYLUS pollen and decreasing values of BETULA pollen. Two subzones are distinguished, of which SPZ MBM-D1 contains steep rising values of CORYLUS pollen, and slightly higher values of ULMUS and ALNUS pollen (compared to the underlying zone). The upper subzone MBM-D2 contains less steeply rising values of CORYLUS pollen, conspicuously lower values of PINUS, and (not-simultaneous) rises in values of ULMUS, QUERCUS, ALNUS, and TILIA.

This zone is therefore interpreted to represent the early Holocene *Corylus* phase (sensu DE KLERK 2004; traditionally referred to as the Boreal). Hazel expanded greatly in the upland vegetation (recorded in the lower subzone). The establishment of extensive stable stands is recorded by the only slightly rising high pollen values in the second subzone. Other deciduous trees such as elm, oak, lime and alder gradually immigrated into the region and started to expand, which is recorded in subzone MBM-D2 by the gradually rising values of the associated pollen types.

The pollen types excluded from the sum do not present any features useful for the reconstruction of the wetland vegetation. The continuing presence of detritus gyttja corresponding with both subzones indicates prevailing aquatic conditions.

4.5 SPZ MBM-E – Middle Holocene

SPZ MBM-E contains – in comparison to the underlying zone – lower values of CORYLUS and higher values of ULMUS, QUERCUS, ALNUS, TILIA, FRAXINUS, and HEDERA pollen. The pollen

values show only minor fluctuations and remain rather stable for a core trajectory of ca. 2 m, demonstrating that upland vegetation changes hardly occurred during the relevant time frame.

This zone is correlated with the middle Holocene, traditionally also referred to as Atlantic period. Deciduous forests containing elm, oak, lime, and ash dominated the upland till plains. Alder probably inhabited the lower moist spots and might have occurred in a carr vegetation along the basin margins. Pine and birch played an only restricted role in the vegetation, as the low *PINUS* and *BETULA* pollen values show, and might have been restricted to the sandy soils of the outwash plains in the surroundings of the study area (cf. Fig. 3), though the occurrence of *Pinus-stomata* at 105 cm depth also point to the (incidental) presence of pine in the immediate surrounding of the study area.

The types excluded from the sum show for SPZ MBM-E high values of SPHAGNUM, MOSS SPORES and AMPHITREMA. High values of SPHAGNUM spores are in good accordance with the formation of *Sphagnum* peat connected with this pollen zone (cf. Fig. 4), indicating that now a bog had come into existence at the cored location. AMPHITREMA – assuming that Fukarek observed *Amphitrema flavum* – is generally associated with wet conditions in *Sphagnum* populations, though it might also occur in hummocks under oceanic conditions (cf. GROSPIETSCH 1972; CHARMAN et al. 2000). The slightly higher values of CYPERACEAE pollen between 195 and 155 cm depth might relate to the formation of sedge peat that is recorded in the lithological cross-sections of Fig. 3 (though not present in the lithological column of the hand-drawn pollen diagram, cf. the description of the study area). ERICALES values are conspicuously higher in the upper part of SPZ MBM-E and indicate that connected plant taxa expanded in the local bog vegetation.

The statement of JESCHKE et al. (2003) that terrestrialisation of the lake occurred in the Subatlantic period is probably an error in data transmission: most likely the Atlantic period was meant.

4.6 SPZ MBM-F – after the mid-Holocene elm decline

The most important difference between SPZ's MBM-E and MBM-F is the conspicuous lower amount of *ULMUS* pollen in the latter, showing that this zone dates from after the elm decline. The decline in *ULMUS* pollen occurs all over Europe and is dated around 5000 ¹⁴C-years B.P. (cf. BIRKS & BIRKS 1980). For Schleswig-Holstein a date of 4970 ± 60 ¹⁴C-years B.P. of this event is available (WIETHOLD 1998), whereas it is dated at the Darß peninsula (NW Vorpommern) at 5011 ± 41 ¹⁴C-years B.P. (KAFFKE & KAISER 2002).

The occurrence of *PLANTAGO* pollen at 10 cm depth is probably related to agriculture by early Neolithic humans. Also the enlarged values of POACEAE – WILD GRASS and RUMEX pollen among the types excluded from the sum might be related to the changes in human societies at the beginning of the Neolithic, though an expansion of wetland grasses and *Rumex* species is also possible.

The subsequent time periods have not been preserved at the cored location as consequence of peat cutting after ca. A.D. 1800 (KLEMM 1977; JESCHKE et al. 2003).

5 Epilogue: a misinterpretation of the palynological data of the Moorer Busch

In the late 1990-ies, two articles were published in a regional newspaper on the Neolithic museum village of Kussow near the study area (BÜTTNER 1997; ANONYMOUS 1998). These mention pollen analyses of the Moorer Busch by an "old pharmacist from Grevesmühlen" who supposedly found that around 7000 years ago "hardly any coniferous trees occurred, but instead hazel, willow and hornbeam". Therefore, the constructors of the Museum village used *Carpinus* wood for their replicas of Early Neolithic houses.

Such a conclusion is in sharp contrast to all known palaeoecological data on the immigration of *Carpinus* into northern Europe in the Holocene (cf. LANG 1994). According to the present project manager of the Museum Village T. BAUDIS (pers. comm. August 2005) these newspaper articles refer to pollen analytical studies by C.-L. Klemm, who was pharmacist in Grevesmühlen and performed his impressive botanical research in his spare time (cf. BERG 1998). Since Klemm did not perform any palynological analyses, it can only be assumed that the articles refer to his summary of the Fukarek-diagram in his PhD-thesis (KLEMM 1977).

A combined occurrence of high values of *SALIX* and *CORYLUS* pollen is not recorded in the pollen diagram (cf. Fig. 4), whereas only two grains of *CARPINUS* pollen were found. Neither the dataset of Fukarek presented in the present paper, nor the text of the lecture given by Fukarek in 1970 (C.-L. KLEMM pers. comm. September 2005), nor the summary of the results of Fukarek presented by KLEMM (1977) present any data or conclusions that justify the statements in the newspaper articles. This indicates either very clumsy research of the people responsible for the scientific background of the Museum Village, or bad journalism.

After confronting the management of the Museum Village with this knowledge, no reaction reached the present author.

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