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INITIATING A GLOBAL DATABASE FOR PEATLAND DEPOSITS

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SUMMARY

The sequence of different peat types and often also gyttja types delivers important information on the original hydrological and ecological formation conditions of a peatland, which is a basic prerequisite for successful restoration. Therefore, the authors aim at enhancing the knowledge of the existence, characteristics and distribution of different peatland deposits by initiating a global database for peatland deposits. As first step, a data sheet with instructions for the standardized recording of relevant information and production of significant photographs has been designed and will be implemented and evaluated in some countries. Parallel to this, scientists worldwide are invited to contribute to the global database by mapping peatland deposits in their countries, promoting the constant expansion of the collection over the coming years.

Keywords: *peat, gyttja, macrofossil*

INTRODUCTION

A basic prerequisite to ensure a successful peatland restoration is the knowledge of the peatland‘s stratigraphy. The sequence of different peat types and often also gyttja types delivers information on the original hydrological and ecological formation conditions. Admittedly, the precise determination of different peat and gyttja deposits is mainly reserved to experts. To facilitate and enhance the investigations of peatland‘s stratigraphy, the Eberswalde University of Sustainable Development (HNEE) has issued a catalogue with portraits of the 24 most common peatland deposits in Germany including detailed descriptions and meaningful photographs in German language (Meier-Uhlherr *et al.,* 2013). In a second step, the classification systems and distribution of different peatland deposits in the Central European countries are investigated, aiming at a proposal for a generalized deposit classification for this geographic region and an extended catalogue with the most common peat and gyttja types.
Parallel to this, the authors aim at enhancing the knowledge of the global situation of peatland deposits. The World Reference Base for Soil Resources 2014 (IUSS Working Group WRB, 2015) describes global soils by means of diagnostic horizons, properties and materials but does not differentiate botanical peat types, which is a common approach when classifying peatland deposits (*e.g.* Ad-hoc-AG Boden, 2005, Tolpa *et al.,* 1967). Nevertheless, national classification systems, of course, differ or are inexistent, which impedes the comparability between different countries or regions.

APPROACH

In order to enhance the knowledge of the global situation of peatland deposits, a database for peatland deposits is initiated. As first approach, a data sheet with instructions for the standardized recording of relevant information and production of significant photographs has been designed. Besides general information such as precise localization of a sample or general characteristics of the peatland, the data collection focuses on detailed description of the deposit characteristics as macroscopic habitus of macrofossils, particular features of the peat/ gyttja type as well as important physical and chemical parameters, such as dry bulk density and pH-value. The draft of the complete data sheet, exemplarily filled in for a sample of Phragmites peat in Germany, is illustrated in figure 1. Examples for standardized photographs are given in figure 2.

INTENDED AIMS

Scientists worldwide are invited to contribute to the global database by mapping peatland deposits in their countries, hoping to constantly expand the collection over the coming years. The data sheets are intended to be published as portraits of the different peat and gyttja types, reviewed by a group of international experts. An accompanying aim is the attempt of creating a hierarchic systematization of global peatland deposits to facilitate the

comparability between different countries and regions. The success of this conception, of course, greatly depends on the possibilities and willingness of scientists worldwide to contribute to the global database. Additionally, a major challenge will be the different state of knowledge as well as different or inexistent classification systems for peatland deposits in the various countries.

If the portrayed project progresses, it will considerably contribute to enhance the state of knowledge regarding the existence, characteristics and distribution of peatland deposits.

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Data sheet for recording peatland deposits contributing to the „Data base of global peatland deposits“

Data sheet number (filled in by HNEE):

Annotations:

- The “Data base of global peatland deposits” aims at collecting data and photos of peatland substrates all over the world in order to generate an overview of global peat and gyttja types as it has already been done for Germany and is planned for Central Europe (see: www.mire-substrates.com). Furthermore, the data base aims at facilitating and enhancing the correct determination of peatland deposits and enabling comparisons between different regions of the earth. The classification system for peats is based on the dominant plant group which formed the peat. The classification system for gyttjas is based on the substantial material which formed the gyttja.
- The “Eberswalde University for Sustainable Development” coordinates and collects the data sets. Any data and photos will only be published with explicit permission of contributors and precise reference to the contributors.
- Please use one data sheet for each different deposit type and fill in your data in the grey lines. Complete datasets are most valuable but if you cannot give all information just leave correspondent lines blank. Numbers 1, 2a, 2c, 2d, 2e, 3a, 3b, 3c, 3f, 4a, 4b, 4c, 6a, 6b, 6d, 6e (underlined) are essential to be filled in.
- A deposit sample as well as a sample of the part of the living plant, which forms the peat, would be very valuable for further analysis, too. In this context, please be aware of restrictions by CITES.
- Please send the digitally completed data sheets to vera.luthardt@hnee. If available, please attach a complete stratigraphy of the peatland, the deposit was found in.
- A guideline in order to achieve a collection of standardized photos is given in appendix 3 with examples. Please send any photos on CD-ROM to the postal address given in the header.

Data sheet:

Type of peat/gyttja: *Phragmites* peat

1. Contributor: (full name, institution, postal address, e-mail address)
Corinna Schulz, Eberswalde University of Sustainable Development, Schicklerstraße 5, 16225 Eberswalde, Germany, corinna.schulz@hnee.de
2. Date and location of survey of deposit sample: (multiple nominations possible)
2a. Date
09.09.2010
2b. State:
Germany
2c. Landscape type peatland is located in (e.g. lowland, river valley, high-altitude mountain)
lowland
2d. Coordinates of sample (or peatland) and geodetic reference system:
33U418572, 5876661, UTM (WGS84)
2e. Depth of sample within peatland [m]:
0,8-1,4
3. Deposit characteristics - peat
3a. Main botanical component of peat (either species, e.g. *Cladium mariscus* or genus, e.g. *Pinus* or non-systematic plant group, e.g. brown mosses, dwarf shrubs or amorphous peat):
Phragmites australis (Cav.) Trin. ex Steud.
3b. Detailed verbal description of macroscopic features of peat (color, structure, fraction of amorphous matter or matrix, fraction of macrofossils of main botanical component etc.):
- fraction of macrofossils of Phragmites australis in peat about 70% (partly stolons, partly roots) - stolons embedded in light greyish-brown and soft matrix as mixture of very fine roots and amorphous matter

Figure 1: Standardized data sheet, exemplarily filled in for a sample of *Phragmites* peat in Germany

3c. Detailed verbal description of macroscopic habitus of macrofossil(s) of main botanical component (plant part, e.g. root, stolon, size [cm or mm], color, surface structure etc.):
- plant remains well preserved, clearly recocnisable and present abundantly - stolons: vibrantly shiny, yellowish or bright grey to olive coloured, mostly about 1 - 3 cm wide, sleek or wavy, mostly splitable into two parchment-like layers, nodes 6 - 10 cm apart and glabrous - roots: very fine, mostly smaller than 1 mm thick, pale yellowish, occasionally tangled
3d. Botanical constituents from other plants than the main botanical component:
few stolons of sedges (Carex)
3e. Plant community that presumably formed the peat:
reed bed (Phragmitetum australis Schmale 1939)
3f. Degree of humification according to Von Post (see appendix 1):
H 4
3g. Physical and chemical parameters:
3g1. Dry bulk density [g cm^{-3}] (if more than 1 sample: range and number of samples; additionally drying temperature):
0,12
3g2. Total C [% of dry mass] (if more than 1 sample: range and number of samples; additionally method of derivation, e.g. elemental analyser):
42,1 (elemental analyser)
3g3. Organic C [% of dry mass] (if more than 1 sample: range and number of samples; additionally method of derivation, e.g. elemental analyser):
42,1 (elemental analyser and Scheibler gadgetry)
3g4. Total N [% of dry mass] (if more than 1 sample: range and number of samples; additionally method of derivation, e.g. elemental analyser):
42,1 (elemental analyser)
3g4. Total P [% of dry mass] (if more than 1 sample: range and number of samples; additionally method of derivation, e.g. elemental analyser):
3g5. pH-value (if more than 1 sample: range and number of samples; additionally method of derivation, e.g. field measurement or laboratory, measurement in water or KCl etc.):
5,5 (in KCl)
4. Deposit characteristics - gyttja
4a. Detailed verbal description of macroscopic features of gyttja (color, structure etc.):
4b. Degree of gyttja consistency (see appendix 2) :
4c. Composition:
4b1. Fraction of organic matter [% of dry mass] (if more than 1 sample: range and number of samples; additionally method of derivation, e.g. laboratory measurement or field estimation):
4c2. Fraction of lime ($CaCO_3$) [% of dry mass] (if more than 1 sample: range and number of samples; additionally method of derivation, e.g. laboratory measurement or field estimation):
4c3. Fraction of silicate [% of dry mass] and main silicate component (sand, silt or clay) (if more than 1 sample: range and number of samples; additionally method of derivation, e.g. laboratory measurement or field estimation):
4d. Organic macrofossils incorporated in gyttja (term and description):
5. Deposit classification:
5a. Classification according to national classification system including hierarchic levels (if existing):
botanical peat type unit: herbaceous peats → botanical peat type subunit: reed peats → botanical peat type: Phragmites peat (common reed peat)
5b. References relating to national classification system:
Ad-hoc-AG Boden (2005): Bodenkundliche Kartieranleitung. 5. Aufl., Schweizerbart´sche Verlagsbuchhandlung, Hannover

Figure 1: Continuance

6. Peatland characteristics:

6a. Recent condition of peatland (pristine, near-natural, drained, degraded, under agricultural or silvicultural use etc.):

drained, degraded, under agricultural use (meadow)

6b. For pristine or near-natural peatlands: recent dominating plant species (or communities):

6c. For drained, degraded and /or used peatlands: assumed dominating plant communities under natural conditions:

reed bed (Phragmitetum australis Schmale 1939)

6d. For pristine or near-natural peatlands: ecological mire type (trophic conditions and acidity) as given in Joosten & Clarke, 2002, pp. 25-27* (free download: http://www.peatsociety.org/sites/default/files/files/WUMP_Wise_Use_of_Mires_and_Peatlands_book.pdf):

6e. Hydrogenetic mire type according to Joosten & Clarke, 2002, pp. 26-31 (free download: http://www.peatsociety.org/sites/default/files/files/WUMP_Wise_Use_of_Mires_and_Peatlands_book.pdf):

immersion mire

7. Further annotations: (e.g. further hints facilitating the determination of deposit type, possible confusion with other deposit types or other known areas of occurrence)

- further hints facilitating the determination of substrate type:
  - Phragmites peat often with smell of hydrogen sulphide
  - Phragmites peat often in mixture with Magnocarex peat, occasionally with Bryales peat and Alnus peat
- possible confusion with other substrate types:
  - Magnocarex peat: radicels of Phragmites usually yellower than radicels of Carex, stolons of Carex considerably less wider than stolons of Phragmites

8. National or international references already describing the deposit type:

national references already describing the substrate type (selection):

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Figure 1: Continuance

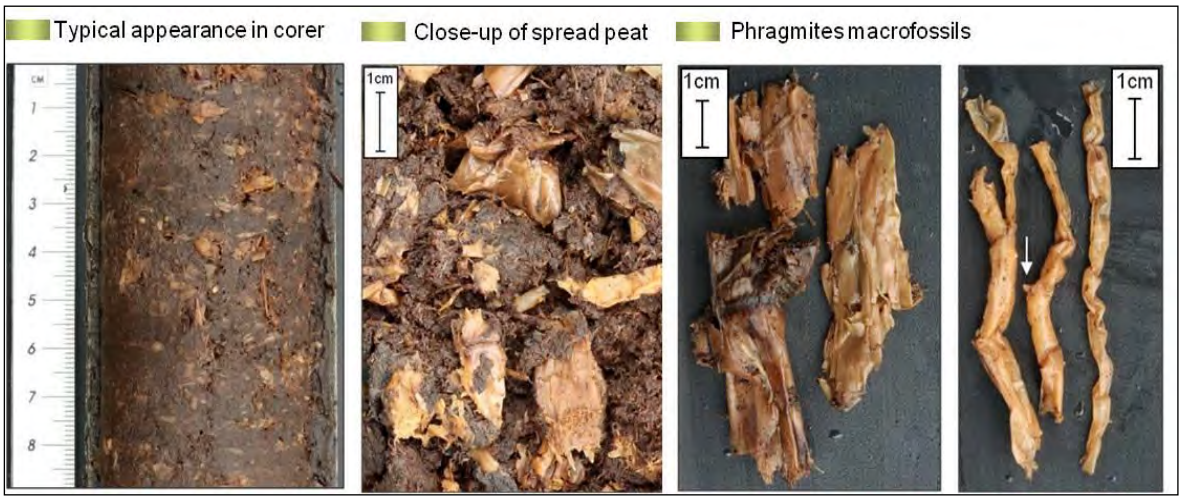

Figure 2: Examples for standardized photographs according to guidelines of the data sheet for a sample of *Phragmites* peat in Germany

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