PEATLANDS AND ECOSYSTEM FUNCTIONS

International Peatland Science Conference (iPSC)
18.09-21.09.2024
Freising, Germany

Descriptions of the Session

1) PEATLAND MATTER FLUXES

Keynote: Dr. Bärbel Tiemeyer, Thünen Institute of climate-smart agriculture

1.1 & 1.2 Exchange of greenhouse gases from organic soils (ENG)

Dr. Tim Eickenscheidt, PSC-HSWT

- With the revision of the Federal Climate Protection Act on June 21, 2023, Germany has committed to being greenhouse gas (GHG) neutral by 2045. The land use, land use change and forestry (LULUCF) sector is to play a key role by gradually expanding the sink function to at least minus 40 million tons of carbon dioxide equivalents by 2045. In 2021, organic soils caused around 54 million tons of CO2-eq and thus contributed 7% to the total national emissions in Germany (NIR, 2023). The largest share of emissions is attributable to the agriculture and forestry use of drained organic soils. A transformation, especially of arable land and intensive grassland, towards wet and adapted management (e.g. paludiculture) or restoration could lead to a significant reduction in total GHG emissions. However, up to date it has not been sufficiently clarified which GHG reduction potentials actually result from sustainable management. Furthermore, it is not known to what extent pristine peatlands or sustainably managed ecosystems on organic soils are resilient to the predicted climate changes (temperature increase, change in precipitation regime), or to what extent these changes alter matter fluxes and which adaptation strategies will exist in the future. The session addresses all aspects of GHG fluxes from both small-scale, process-oriented questions up to supra-regional and application-oriented field-scale studies on organic soils.

1.3 Role of peatlands for losses and retention of nutrients and pollutants (ENG)

Prof. Dr. Dominik Zak, Aarhus University

- Presently, there are major efforts to restore peatlands in order to address various environmental problems such as the loss of biodiversity, the emission of greenhouse gases due to organic matter mineralization, and the ongoing eutrophication of terrestrial and aquatic systems due to current land use management and related high nutrient losses. While much progress has been made in recent decades, it's fascinating to note

that some key insights into these processes date back over a century. From internal eutrophication mechanisms to the influence of water table fluctuations and nitrate or sulphate pollution, a holistic comprehension of peatland dynamics is essential for effective restoration strategies. However, the considerable heterogeneity of soil properties in space and time, coupled with the complex hydrology and knowledge gaps regarding microbial dynamics and functioning, still contribute to significant uncertainties in the assessment and prediction of nutrient and carbon dynamics upon rewetting of peat soils. In this session, we'll delve into the ecological intricacies governing nutrient and carbon cycling, explore the role of peatlands in water purification, and discuss innovative approaches to mitigate pollutant runoff. Don't miss this opportunity to gain deeper insights into the complex world of peatland restoration and sustainable management practices.

2) PEATLAND HYDROLOGY

2.4 Soil Properties of peat and organic soils: implications for biogeochemical processes and water management (ENG)

Dr. Haojie Liu, University of Rostock

- In this session, we will explore the essential soil properties of peatlands, encompassing their physical, hydrological, and biogeochemical aspects. Our primary focus will be an in-depth examination of soil parameters crucial to hydrological and biogeochemical processes. A key emphasis will be placed on understanding how peat properties respond to land management practices, such as drainage and rewetting, and to climate change factors such as droughts and freeze-thaw cycles. Topics exploring the intrinsic links between peat properties and ecosystem services, such as carbon and nitrogen cycling, as well as the sustainable management of water resources, are particularly encouraged.

2.5 Hydrological models for peatlands: processes, scales and applications (ENG)

Prof. Dr. Kristian Förster, HSWT

- This session brings together studies that show recent advances in modeling the water balance of peatlands, ranging from simple water balance approximations to physically based flow models and machine learning approaches. We specifically invite contributions related to (i) scrutinizing hydrological modeling hypothesis, (ii) adopting hydrological models to unobserved peatlands, and (iii) the incorporation of water management strategies and decisions in model experiments (e.g., modeling rewetting). Related case studies displaying the added value of hydrological models in peatlands are also welcome.

3) PEATLAND MAPPING AND CLASSIFICATION

3.6 Classification and mapping of organic soils including remote sensing (ENG)

Dr. Stefan Frank, Thünen Institute of climate-smart agriculture

- Topics include comparative approaches for peatland classification, innovative techniques for mapping of site characteristics at various spatial scales with e.g. up to date remote sensing developments

3.7 Global Peatland Assessment (ENG)

Dianna Kopansky, UN Environment Programme

- This session focuses on giving insight to the state of the Global Peatland Assessment. What is known through the initiative – specifically welcome, are country or regional reports. What is needed to further fill data gaps on relevant criteria like extension, landuse, landcover, degradation, biodiversity and GHG-emissions etc. to better assess the peatlands worldwide, Topics will include methodologies for advances in assessing peatland health and resilience, and the implications of peatland degradation for biodiversity conservation and climate change mitigation.

4) ECOLOGICAL RESILIENCE OF PEATLANDS TO CLIMATE CHANGE

Keynote: Prof. Dr. Chris Evans, UK Centre for Ecology & Hydrology

4.8 Peatlands under stress and their ecological resilience (ENG)

Prof. Dr. Matthias Drösler, PSC-HSWT

- This session centers on the examination of peatlands facing various stressors and their capacity for ecological resilience. Topics try to identifying stressors (like fire, climate warming, and changes in the water balance…) impacting peatlands, understanding mechanisms of ecological resilience, and exploring management strategies to enhance peatland resilience in the face of environmental challenges.

4.9 Mountain peatlands – least known, most threatened (ENG)

Prof. Dr. Juan Carlos Benavides Duque, Pontificia Universidad Javeriana

- This session sheds light on mountain peatlands, exploring their distinct ecological characteristics, specific vulnerabilities, and individual functions in comparison to lowland peatlands. Discussions will delve into the ecological significance of mountain peatlands, the threats they encounter, such as climate change and land use pressures, but as well their services like water supply and strategies for their conservation and sustainable management in mountaineous environments

5) PEATLAND BIODIVERSITY

Keynote: Prof. Dr. Gennadi Sushko, Vitebsk State University

5.10 Paludiculture as potential biodiversity hotspot (ENG)

Dr. Amanda Grobe and Lotta Zoch, Leibniz University Hannover

- This session focuses on paludiculture and its biodiversity potential. Topics include the ecological benefits of paludiculture, its role in fostering diverse habitats and species, and strategies for optimizing paludicultural practices to enhance biodiversity conservation efforts.

5.11 Role and Dynamics in near-natural peatlands (ENG)

Prof. Dr. Michael Steiner, University of Vienna

- In this session, the focus will be on characterizing near-natural peatlands as specific habitats and how they can serve as reference biotopes. Participants will gain valuable insights into the ecological importance of near-natural peatlands as indicators for habitat quality and ecosystem functioning. Insights from long-term studies, such as those on peatland habitants, will also be considered.

5.12 Renaturierte Moore – Hotspots der Biodiversität oder neuartige Lebensräume? (GER)

Dr. Theresa Lehmair et al., Bayerisches Landesamt für Umwelt

- Weltweit wurden Moore entwässert und bedürfen dringend einer Renaturierung. In dieser Session möchten wir beleuchten, welche Folgen eine Renaturierung für Tiere und Pflanzen haben kann, die diese entwässerte Moore als Sekundärlebensraum nutzen, und ob es möglich ist, durch eine Renaturierung einen naturnahen Zustand herzustellen. Zudem möchten wir aufzeigen, welche Auswirkungen verschiedene Maßnahmen auf die Biodiversität haben.

6) PEATLAND MANAGEMENT AND RESTORATION

6.13 Renaturierungspraxis in verschiedenen Moortypen und -landschaften (GER)

Cornelia Siuda, PSC-HSWT

- Ziel ist es dazu den aktuellen Sachstand von Moorplanungen und Maßnahmenumsetzungen vorzustellen. Schwerpunkt liegt dabei auf der Anpassung von notwendiger Tiefe von Ausarbeitungen zu moorökologischen und hydrologischen Fragestellungen und der Etablierung der dazu erforderlichen Technik.

6.14 & 6.15 Wet management and strategies in agriculture (ENG)

Dr. Annette Freibauer, Bavarian State Research Center for Agriculture &
Prof. Dr. Matthias Drösler, PSC-HSWT

- Drainage-based agriculture on peat soils is not a sustainable utilization option. This is why diverse wet utilization concepts are needed. This session is dedicated to innovative strategies and approaches to enable the sustainable use of peatland soils in agriculture.

Topics such as integrated management concepts (e.g. wet grassland and paludicultures) and political instruments will be discussed in order to strengthen synergies between agriculture and peatland protection.

6.16 Perspektiven für Wälder auf Moorböden (GER)

Dr. Stefan Müller-Kroehling, Bayerische Landesanstalt für Wald und Forstwirtschaft

- Es gibt von Natur aus und durch Menschenhand vielfältige Wälder auf Moorböden, von strukturarmen Nadelforsten auf entwässerten Torfen bis hin zu naturnahen, nassen Bruch- und Moorwäldern. Welche Entwicklungen laufen in diesen Wäldern in den letzten Jahrzehnten und aktuell ab? Welche Rolle können und sollen Wälder sie in zukünftigen Moorschutzkonzepten spielen? Welche Funktionen für Klimaschutz und Moorbodenschutz, Schutz der moortypischen Biodiversität und den Hochwasserschutz sowie die Erzeugung marktfähiger Produkte nehmen sie in ihren heute war, und welche können sie spielen, wenn sie zukünftig, wo immer möglich, wieder so nass wie örtlich möglich gemacht werden? Die Session will diese Aspekte aus vielfältigen Untersuchungen zusammenführen und diskutieren.

7) PIONEERING PRODUCTS AND UTILIZATION OPTIONS FROM PALUDICULTURE

7.17 Stoffliche und energetische Nutzung von Paludikultur-Biomasse (GER)

Raphael Burkhardtsmayer, Donaumoos-Zweckverband

- Es werden Potenziale, Herausforderungen und innovative Ansätze zur Nutzung dieser nachhaltigen Ressource erörtert. Themen umfassen die Produktion von Biokraftstoffen, die Gewinnung hochwertiger Materialien für verschiedene Anwendungen sowie Strategien zur effizienten Nutzung von Paludikultur-Biomasse zur Reduzierung von Treibhausgasemissionen und zur Förderung der regionalen Entwicklung.

8) SOCIOECONOMY AND PROGRAMME DIMENSION

Keynote: Prof. Dr Gerald Jurasinski, Greifswald University / Greifswald Mire Centre

8.18 Rechtliche Herausforderungen und Anpassungsbedarf (GER)

Prof. Dr. Jose Martinez, & Anna Kiermeier, Georg-August Universität Göttingen

- Diese Session konzentriert sich auf die rechtlichen und organisatorischen Rahmenbedingungen und Herausforderungen für die Moorentwicklung. Hier soll der Bogen von z.B. Wasserrecht, Naturschutzrecht, Eingriffsregelung, bis hin zu Erfahrungen mit Landtitel (Pacht, dingliche Sicherung, Erwerb…). Möglichkeiten zur Anpassung und Verbesserung dieser Rahmenbedingungen sollen aufgezeigt werden.

8.19 Social and economic challenges and impacts of peatland transformation (ENG)

Prof. Dr. Harald Grethe, Agora Agrar & Humboldt University of Berlin

- Experts will explore the social and economic implications of peatland rewetting and restoration, including regional employment and income of land users as well as community wellbeing. The session aims to shed light on the complex interplay between peatland management decisions and social and economic outcomes, facilitating informed decision-making and sustainable peatland development strategies.

8.20 Peatland conservation, restoration and management policies and programmes (ENG)

Maria Nuutinen, Food and Agriculture Organization of the United Nations

- Experts will discuss existing conservation frameworks, legislative measures, and management strategies implemented at local, national, and international levels to safeguard peatland biodiversity and ecosystem services.