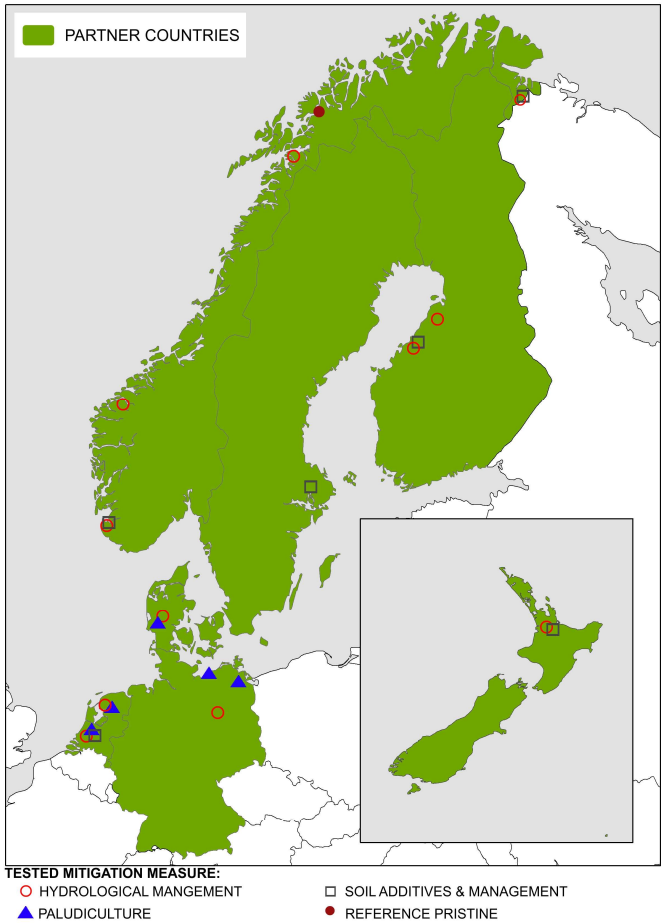
FACCE ERA-GAS

MONITORING & MITIGATION OF GREENHOUSE GASES FROM AGRI- AND SILVI-CULTURE

PEATWISE

Case study, Germany



NIBIO NORSK INSTITUTT FOR BIOØKONOMI

SLU

zalf

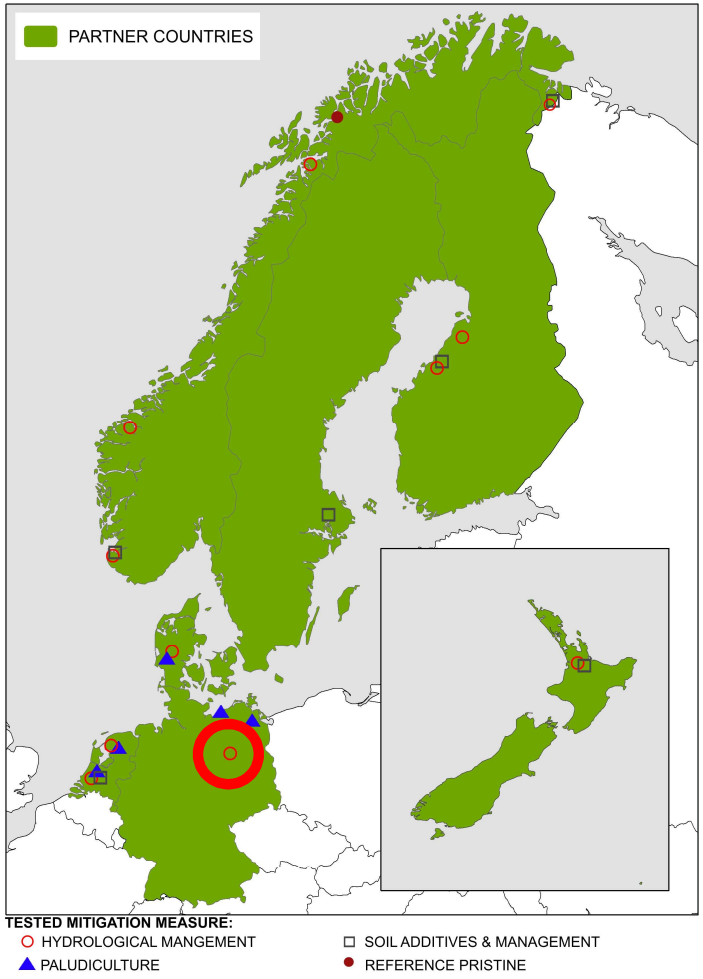
AARHUS UNIVERSITY

UNIVERSITY OF OULU

UNIVERSITY OF EASTERN FINLAND

Radboud Universiteit Nijmegen

THE UNIVERSITY OF WAIKATO



Paulinenaue, Germany

Site type:
Grassland on organic soil

Mitigation measures tested:
WTL elevation and management intensity

Photo: © Jan Windszus

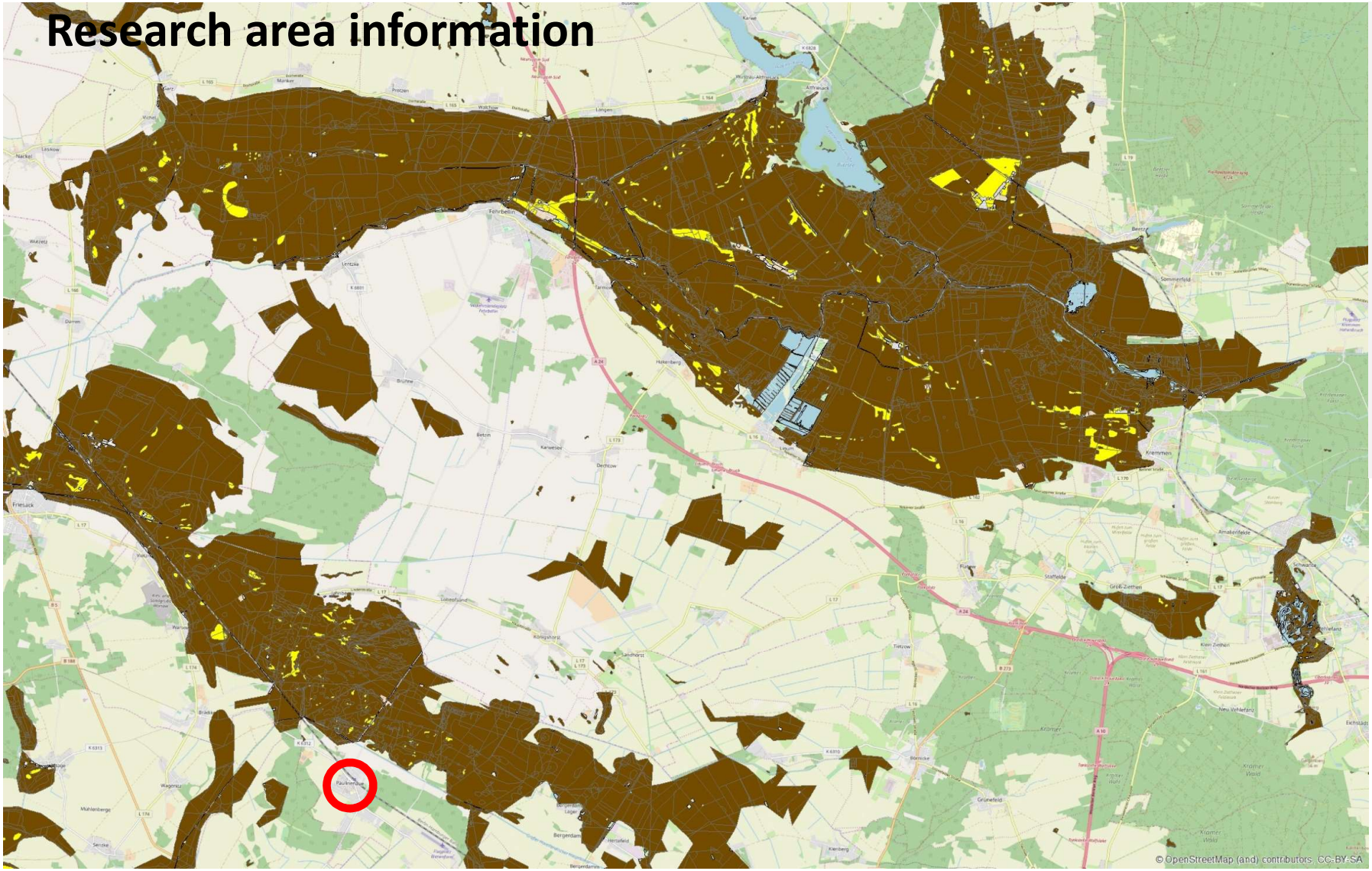
Paulineaue, Germany

Contact person: Nahleen Lemke (Nahleen.Lemke@zalf.de)

Description, land use history: Shallow, drained fen complex (60 ha) on grass cultivation at Havelländisches Luch in NE Germany. Due to its genesis (delta formed by last glacial period), characteristics of the peatland are very heterogeneous: WTL and peat layers are variable.

Climate		Soil quality and agronomy		Hydrology and drainage	
Location	52°68'N 12°72'E	**Peat depth**	0-3m, mean: 0.5-0.7m	**Drainage started**	Before 1990's
Mean annual precipitation (mm y^{-1})	534	**Crops**	Grassland, parts on forage maize	**Drain depth past (cm)**	30-40
Mean annual T (° C)	9,2	**Rotation**	No rotation	**Drain depth present (cm)**	30-150
		Fertilization (Kg N ha y^{-1})	160	**Drain spacing (m)**	100
		Harvests	2-3 per year		

Research area information



ZALF – Experimental Station Paulinenaue

- Heterogenous landscape
- Delta formed by last glacial period
- Varying water levels and peat layers
- Heterogeneous soils
- Organic soils (**brown**) and mineral soils (**yellow**)

Agriculture and land use

(Photo: N. Lemke)

Land use information:

- Formerly used as cropland
- Today mainly used as grassland
- Maize production on research plots
- Also extensive grazing with deer ruminants

Behrendt, A., Fischer, A. und Kaiser, T.

Research carried out

Photo: © Norbert Stein

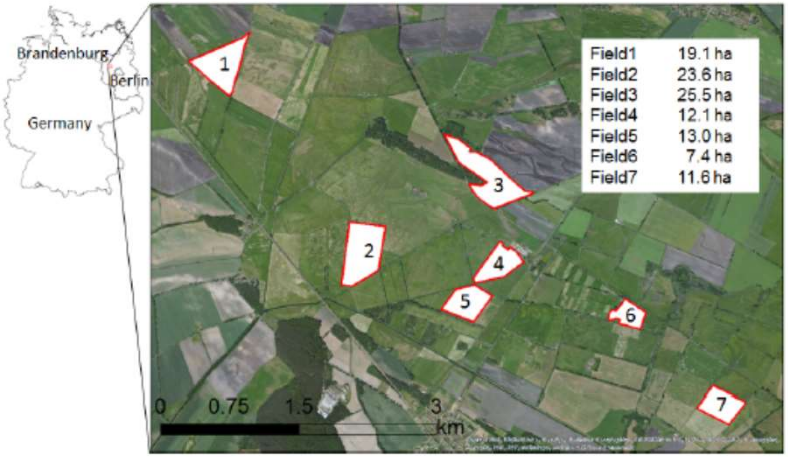
Longterm experiments at Lysimeter station Paulinenaue; Head of experimental station: Dr. Axel Behrendt

Studies on sustainable fodder production on fen grasslands (Pickert&Kannemann 2017)

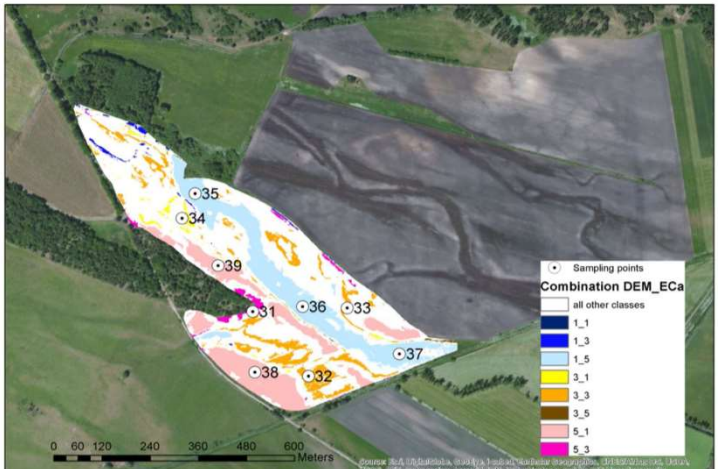
Photo: © Jan Windszus

Research carried out:

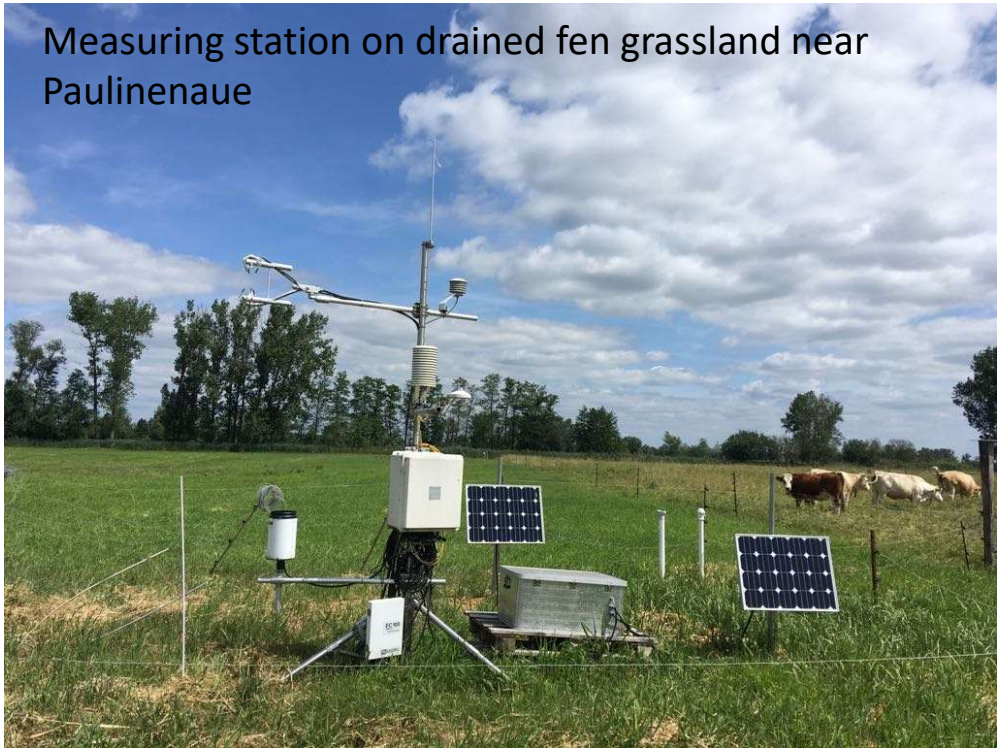
Spatial modelling of organic carbon (Koszinski et al. 2015)



Studied grassland fields (Koszinski et al. 2015)



Slope model and sampling design for grassland field (Koszinski et al. 2015)



(Photo: N. Lemke)

Further:

- Modeling of N_2O emissions and NO_3^- leaching using Landscape DNDC (Molina-Herrera et al. 2016)
- Dynamic C and N stocks – key factors controlling the C gas exchange of maize in heterogeneous peatland (Pohl et al. 2015)

Literature

Behrendt, A.; Fischer, A.; Kaiser, T.: Attraktive Grünlandnutzung mit Wildwiederkäuern in Paulinenaue. In : Pickert, Kannemann (Hg.) 2017 – Nachhaltige Futterproduktion auf Niedermoorgrünland, 41-44.

Koszinski, S.; Miller, B.; Hierold, W.; Haelbich, H.; Sommer, M. (2015): Spatial Modeling of Organic Carbon in Degraded Peatland Soils of Northeast Germany. In - Soil Sci. Soc. Am. J. 79:1496–1508. doi:10.2136/sssaj2015.01.0019

Molina-Herrera, Saúl; Haas, Edwin; Klatt, Steffen; Kraus, David; Augustin, Jürgen; Magliulo, Vincenzo et al. (2016): A modeling study on mitigation of N2O emissions and NO3 leaching at different agricultural sites across Europe using LandscapeDNDC. In The Science of the total environment 553, pp. 128–140. DOI: 10.1016/j.scitotenv.2015.12.099.

Pickert, Jürgen; Kannemann, Viola (Eds.) (2017): Nachhaltige Futterproduktion auf Niedermoorgrünland. 61. Jahrestagung der Arbeitsgemeinschaft für Grünland und Futterbau der Gesellschaft für Pflanzenbauwissenschaften e.V. in Berlin/Paulinenaue vom 24. - 26. August 2017. Gesellschaft für Pflanzenbauwissenschaften; Leibniz-Zentrum für Agrarlandschafts- und Landnutzungsforschung; Albrecht Daniel Thaer-Institut für Agrar- und Gartenbauwissenschaften; Jahrestagung. Arbeitsgemeinschaft für Grünland und Futterbau. Berlin: Pro BUSINESS (Mitteilungen der Arbeitsgemeinschaft Grünland und Futterbau, Band18). Pohl, M.; Hoffmann, M.; Hagemann, U.; Giebels, M.; Albiac Borraz, E.; Sommer, M.; Augustin, J. (2015): Dynamic C and N stocks – key factors controlling the C gas exchange of maize in heterogenous peatland. In Biogeosciences 12 (9), pp. 2737–2752. DOI: 10.5194/bg-12-2737-2015.

Pohl, M.; Hoffmann, M.; Hagemann, U.; Giebels, M.; Albiac Borraz, E.; Sommer, M.; Augustin, J. (2015): Dynamic C and N stocks – key factors controlling the C gas exchange of maize in heterogenous peatland. In *Biogeosciences* 12 (9), pp. 2737–2752. DOI: 10.5194/bg-12-2737-2015.