## Biomes/Permafrost/Fire/Peat meeting -Peat sector contribution

Sector coordinators: Angela Gallego-Sala, Noah Smith, Sarah Chadburn, Michel Bechtold



# Previous peat model intercomparison

• High ensemble spread in future projection of carbon balance



LPJ-MPI

- LPX-Bern
- LPJ-GUESS
- LPJ-GUESS\_dynP

How have the models improved since then?

# Status of simulations

currently no group III simulations with managed peatlands (drainage and rewetting)

MODELS	ISIMIP3a		ISIMIP3b
	obslim	counterclim (default and 1901CO2)	pre-industrial control (RCP 2.6/ 8.5/ CO2 sensitivity RCP8.5
ORCHIDEE-MICT-PEAT	completed	completed	
LPX-Bern	completed	completed	
LPG-GUESS_dynP	completed	in progress	
PEATCLSM	partly	pending	
LPJ-GUESS	in progress	pending	
JULES-PEAT	planned	planned	
CLASSIC	?	?	
JSBACH-HIMMELI	?	?	
CLM5 (peat?)	?	?	

## What are the current gaps in the peat sector?

- Currently no simulations of managed peatlands (drainage and rewetting)
  - No past and future datasets on land use and drainage intensity over peatlands
  - Group III simulations would be limited to N fertilization impact on peatlands
- Limited in situ data ( integration of satellite observations in performance assessments
- Challenges hydrological modeling: Groundwater/Surface water influence
- Permafrost peatlands and sub-grid-scale permafrost distribution
- Impact of fires on peat and permafrost
- More peatland-specific PFTs needed
- Peatland resilience to drying (self-regulation)
- Tropical peatlands

## Peatland fire modeling study

# Paper lead needed !

#### Ignition source

• Lightning drives northern fires



© predictions of lightning frequency needed

#### Fuel properties

· Peatlands only burn when 'dry'



using peatland soil moisture / water
 level data from new peatland sector

## Peatland water level (Undrained peatlands only)

• Example: Western Siberian Lowlands





~ 44 undrained peatlands with in situ water level data, after cross-masking with model output © only 6 left (~ 20 monitoring well)



## Performance assessment

### (Undrained peatlands only)

• For groundwater table depth, growing season mean

