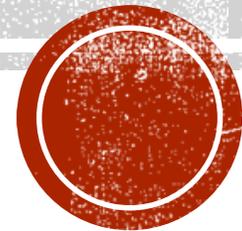


MY JOURNEY TO BECOME AN INDEPENDENT RESEARCHER

Nitin Chaudhary
Physical Geography Department
Lund University



BACKGROUND

- Bachelors in Environment Sciences (2004)
- Masters in Environmental Management (2006)
- M.Phil in Natural Resource Management (2007)

- 2 Year work experience (2007-2009)

- Second Master's – Lund (2009-2011) – **ERASMUS MUNDUS**

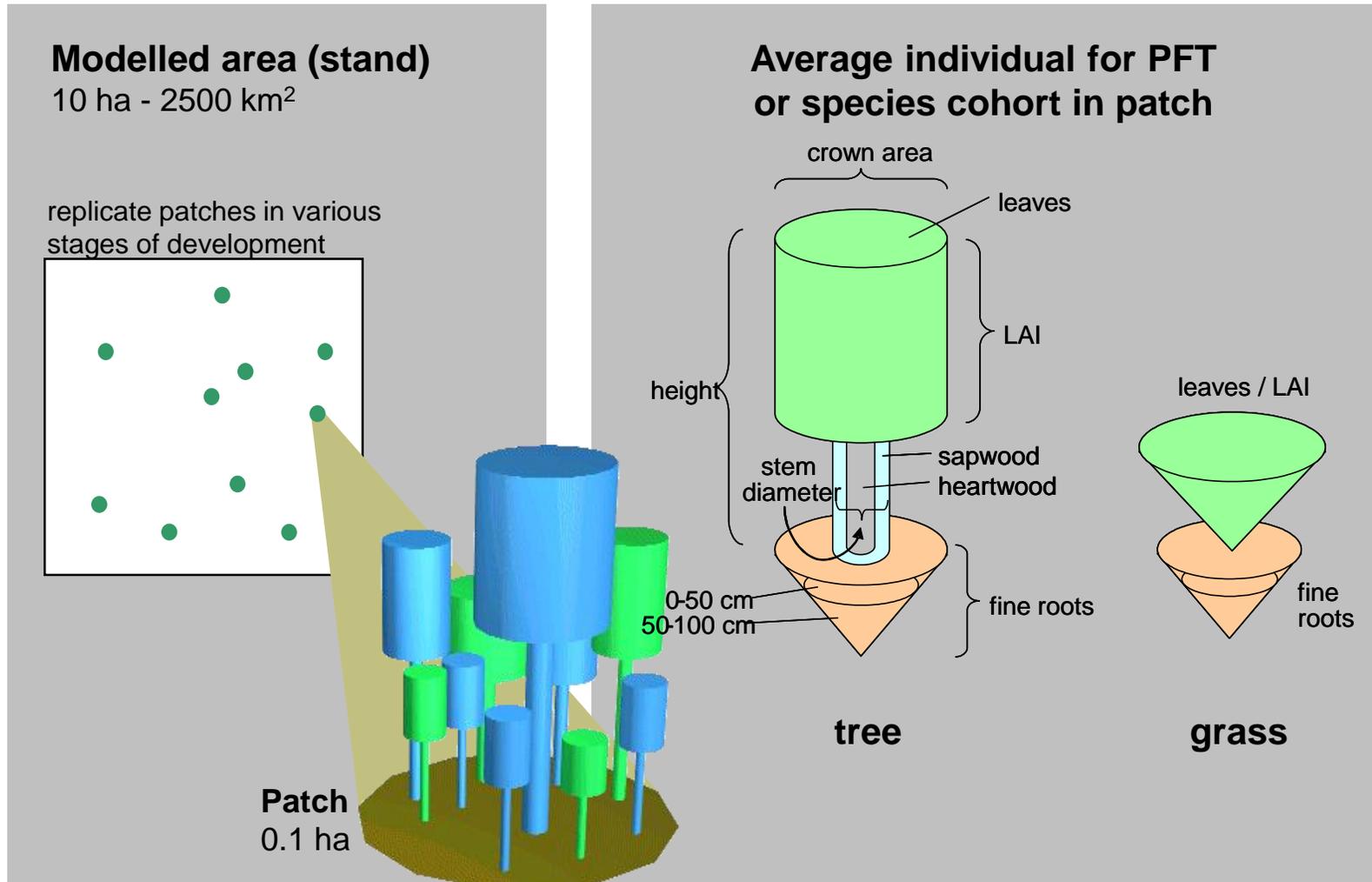
- PhD position Lund (2011-2017)
- Postdoc in Oslo (2018-2020)
- Researcher in Lund (ongoing) – awarded **FORMAS ECR** grant



COMPUTE PHD STUDENT



LPJ-GUESS – DGVM

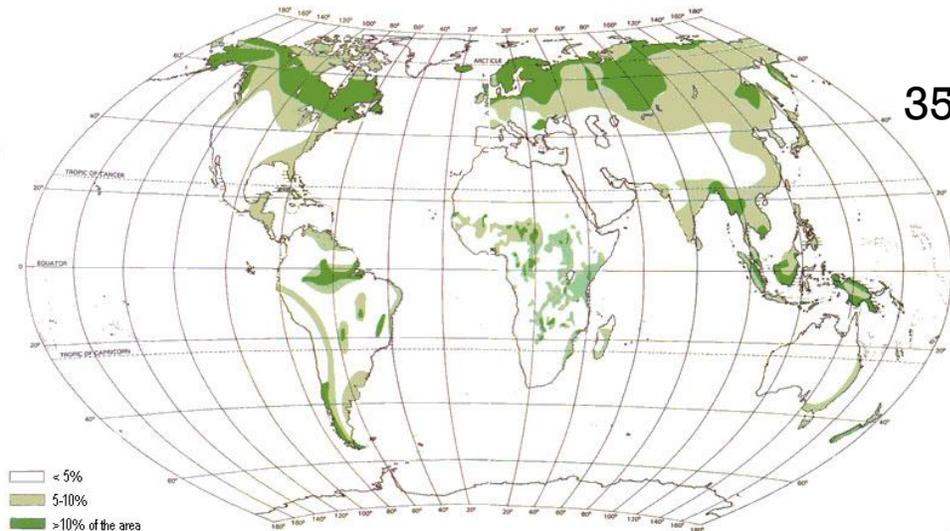


MY RESEARCH

- LPJ-GUESS- integrate peatland and permafrost functionalities
- To enhance the current understanding of the processes involved in the long-term peat accumulation and its internal dynamics
- how these systems are influenced by small-scale heterogeneity, vegetation dynamics and underlying permafrost.



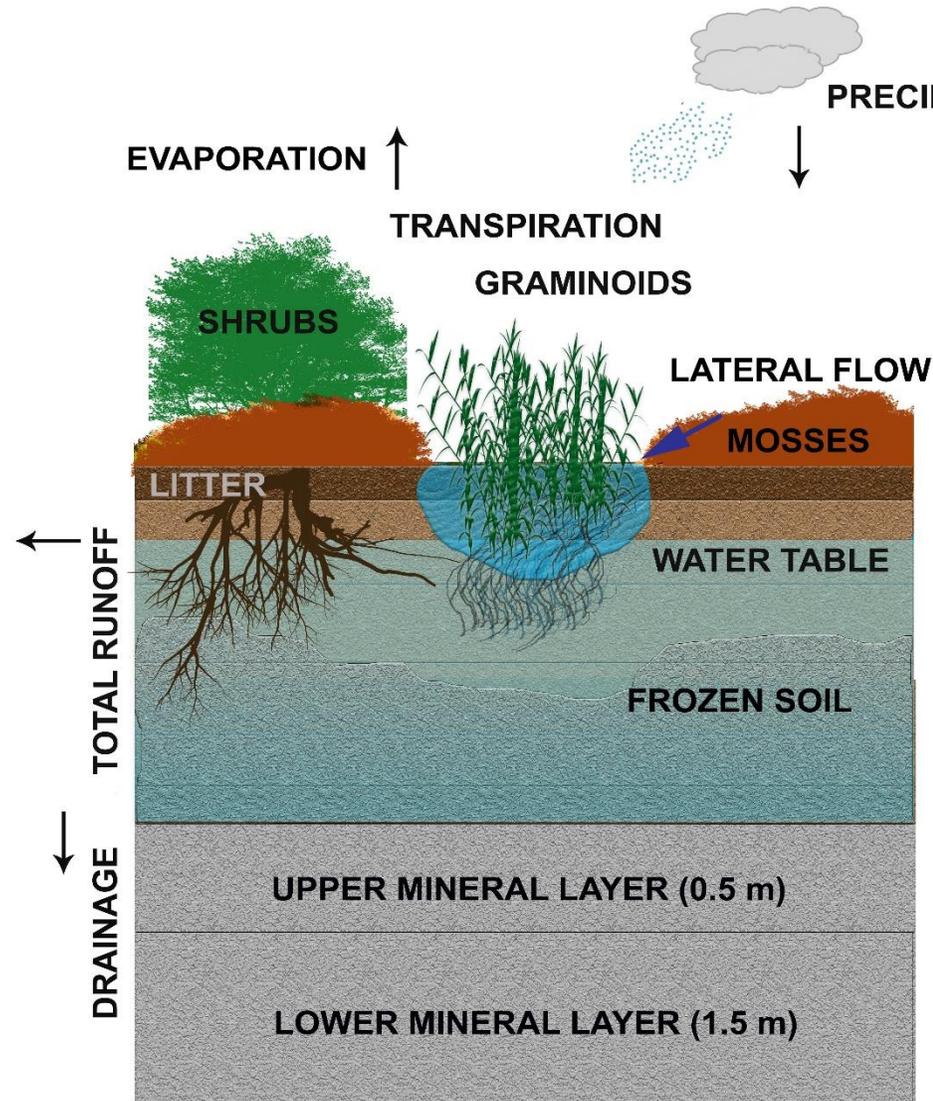
Stordalen Mire, Sweden



350-500 PgC



LPJ-GUESS PEATLAND



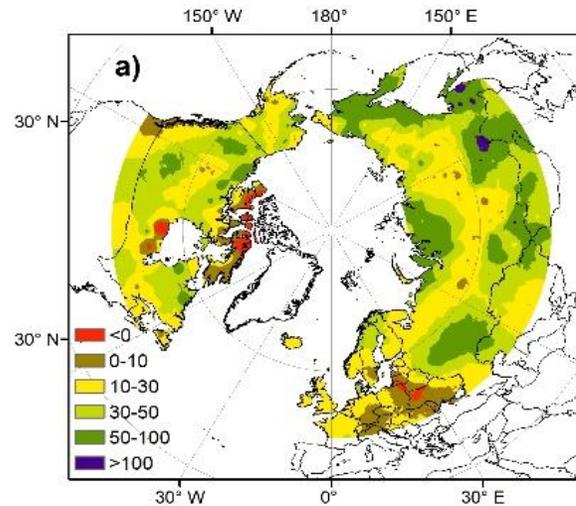
- Differential rate of peat accumulation
- Spatial heterogeneity
- Multiple peat layers
- Peat hydrology
- Frozen soil
- Lateral flow

(Chaudhary et al. 2017)



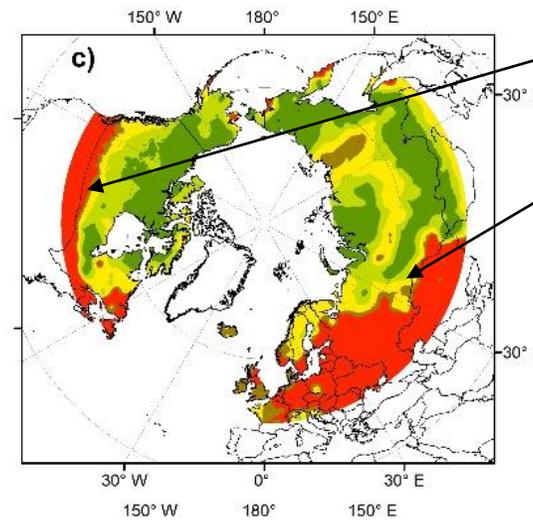
CARBON ACCUMULATION RATES

2000



Similar to observed range

2100



Northward
shift in C
uptake

RCP8.5

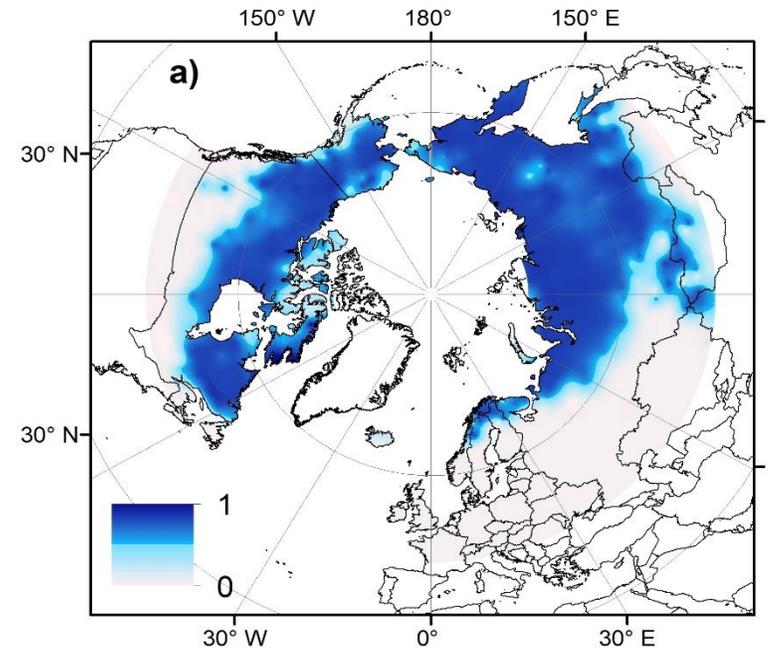
(Chaudhary et al. 2020)



PERMAFROST DISTRIBUTION



Modelled - 2000



Source: IPA

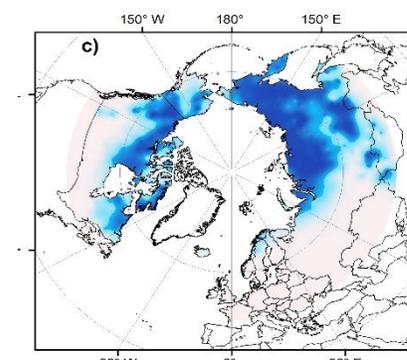
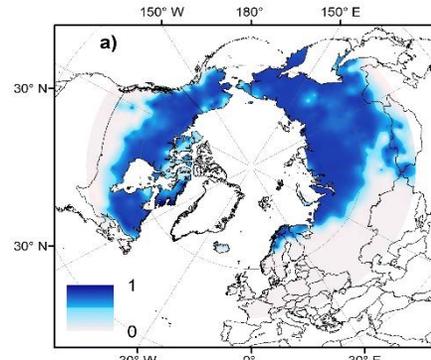


PERMAFROST DISTRIBUTION

(A) 2000

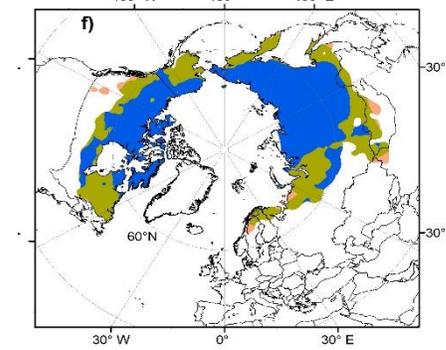
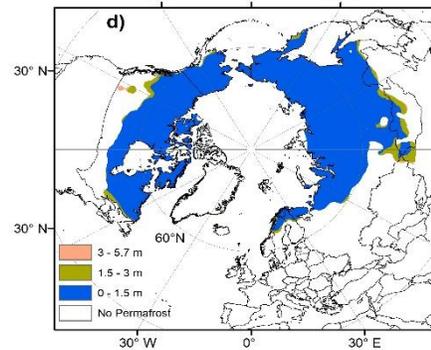
(B) 2100

Ice-fraction



RCP8.5

ALD



MY MODEL UNIQUELY COMBINES THE REPRESENTATION OF SPATIAL HETEROGENEITY

Models \ Schemes	Peatland	Permafrost	DGVM	Multiple annual peat layers	Spatial heterogeneity	Single site	Global/Regional application
Our Model	✓	✓	✓	✓	✓	✓	✓
Wu et al. (2016)	✓	✗	✗	✗	✗	✓	✓
Alexandrov et al. (2016)	✓	✗	✗	✗	✗	✗	✓
Tang et al. (2015b)	✓	✓	✓	✗	✗	✓	✓
Stocker et al. (2014)	✓	✗	✓	✗	✗	✗	✓
Morris et al. (2012)	✓	✗	✗	✗	✓	✓	✗
Schuldt et al. (2013)	✓	✗	✓	✗	✗	✓	✓
Kleinen et al. (2012)	✓	✗	✓	✗	✗	✓	✓
Heinemeyer et al. (2010)	✓	✗	✗	✓	✗	✓	✗
Frolking et al. (2010)	✓	✗	✗	✓	✗	✓	✗
Wania et al. (2009a)	✓	✓	✓	✗	✗	✗	✓
Ise et al. (2008)	✓	✗	✗	✗	✗	✓	✗
Bauer (2004)	✓	✗	✗	✓	✗	✓	✗
Hilbert et al. (2000)	✓	✗	✗	✗	✗	✓	✗
Clymo (1984)	✓	✗	✗	✗	✗	✓	✗
Ingram (1982)	✓	✗	✗	✗	✗	✓	✗



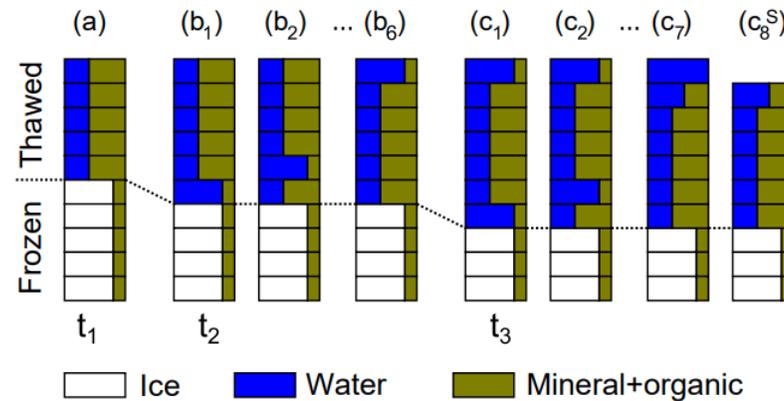
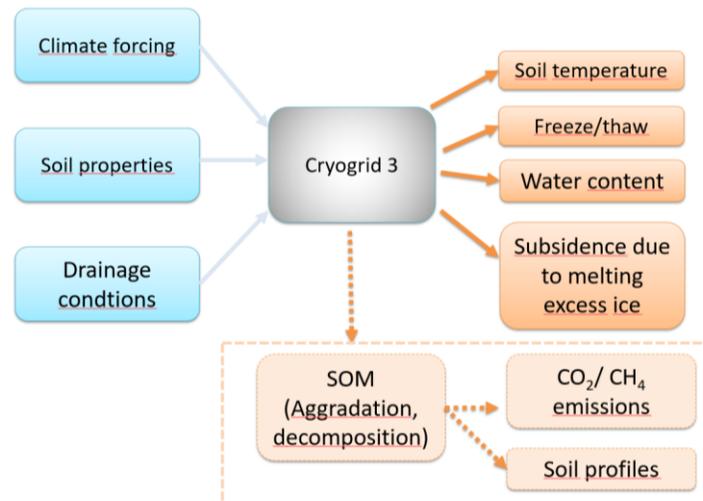
MY JOURNEY AS COMPUTE PHD STUDENT

- Getting a PhD position is not easy and passing it with good grades is also a uphill task especially for international students
- Adapt to a new cultural and educational environment
- Lack the support system – family and friends
- A constant hidden pressure of producing research articles which make you sometime feel stressful
- Then there are skill issues – programming, writing etc.
- COMPUTE – Seminars, courses, workshops, travel grant etc.



POSTDOC IN OSLO

- 2 OPTIONS -
- Permafrost Modelling and Regional ESM
- **CRYOGRID PERMAFROST MODEL**



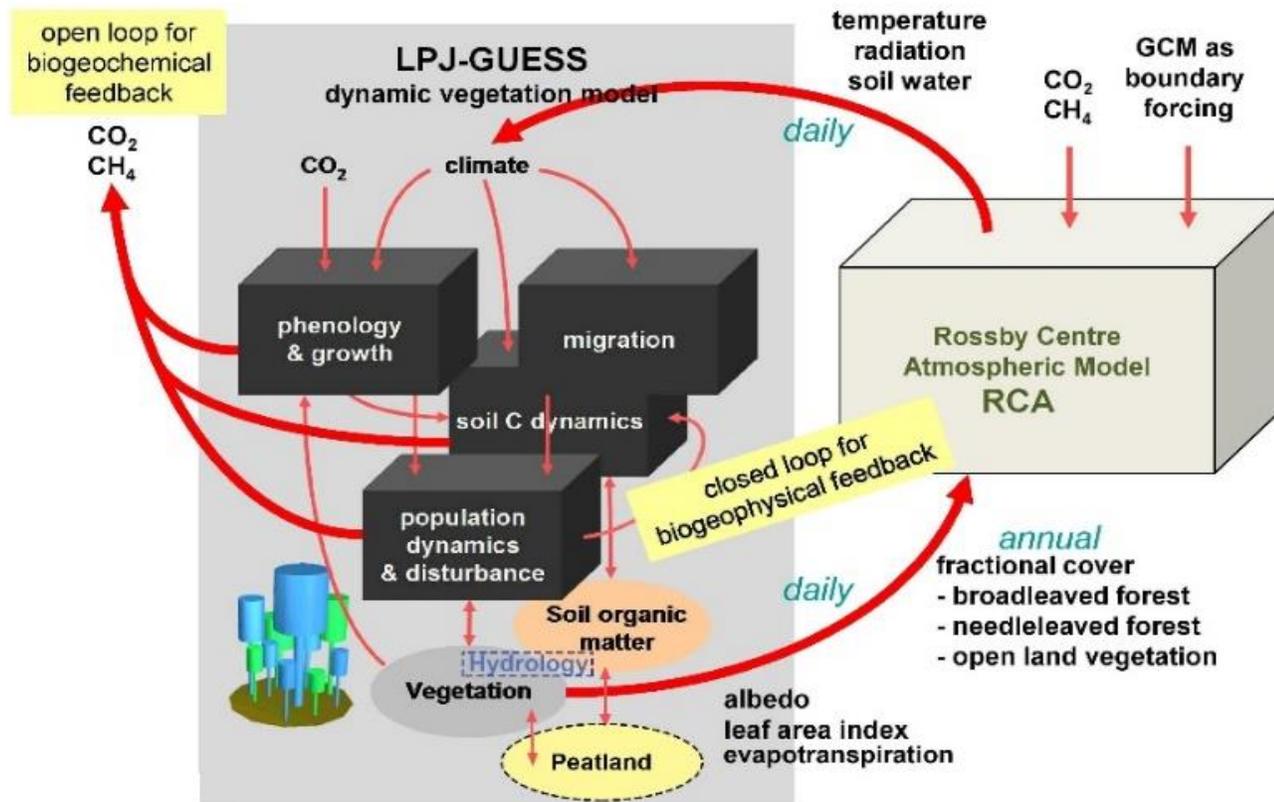
OUTCOME

- New environment gives you new outlook
- You can learn new skills
- Make new contacts
- Good support system for early career researcher
- Sharpen my proposal making skills
- Networking and career workshops



MY RECENT FORMAS PROJECT IN LU

Integrating peatland dynamics in Regional ESM – RCA-GUES



- LPJ-GUESS is now ready to couple with Earth System Models (ESMs) – (RCA-GUESS and EC-EARTH) to examine the role of peatland-mediated (biogeochemical and biogeophysical) feedbacks to climate change



CONCLUSIONS

- Our model has **the most comprehensive representation** of peatland structure and function for the large scale applications
- The model captures realistic **vegetation, physical and hydrological dynamics** essential for peatland functioning
- The model has **a unique representation of the small-scale spatial heterogeneity**
- LPJ-GUESS can predict reasonable **long-term carbon accumulation rates** and the **permafrost distribution** across the pan-Arctic
- Peatlands could become strong **C source** in some regions while **C sink in some other** in the future but overall the peatland continue sequestering C at reduce rates



THANK YOU

