CLIMATE MODELING ACTIVITIES AT DEPARTMENT OF ENVIRONMENTAL SCIENCES

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Contributors:
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Research areas

- Arctic warming and feedbacks
- Ice sheet mass balance
- Short-lived climate forcers
- Terrestrial ecosystem and carbon cycle modeling
- Machine learning for downscaling

Tools

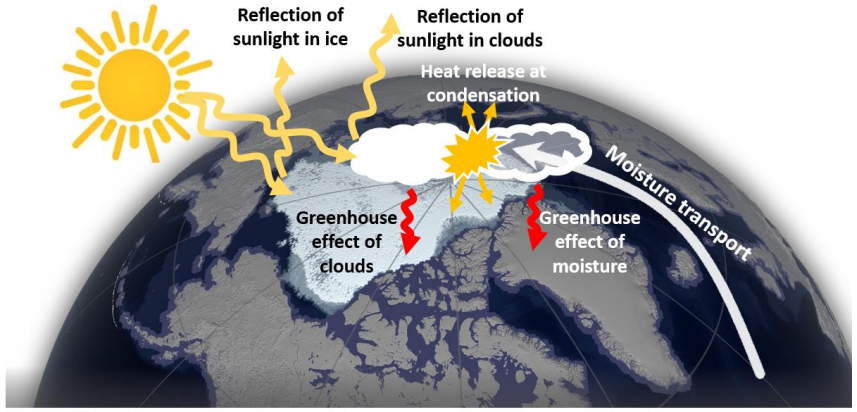
- Earth system models
- Regional climate model
- Process models
  - Ecosystem/carbon cycle models
  - Ice sheet surface models

Team

- Peter Langen, Professor
- Anne Sofie Lansø, Assoc. Professor
- Ulas Im, Assoc. Professor
- Jesper H. Christensen, Sen. Scientist
- Maher Sahyoun, post doc
- Mathias Larsen, PhD student
- Thea Quistgaard, PhD student
- Xiafeng Wang, Guest PhD
- Jiemei Liu, Guest PhD

- New PhD starting May 1st
- New Post doc being hired (fall 2023)

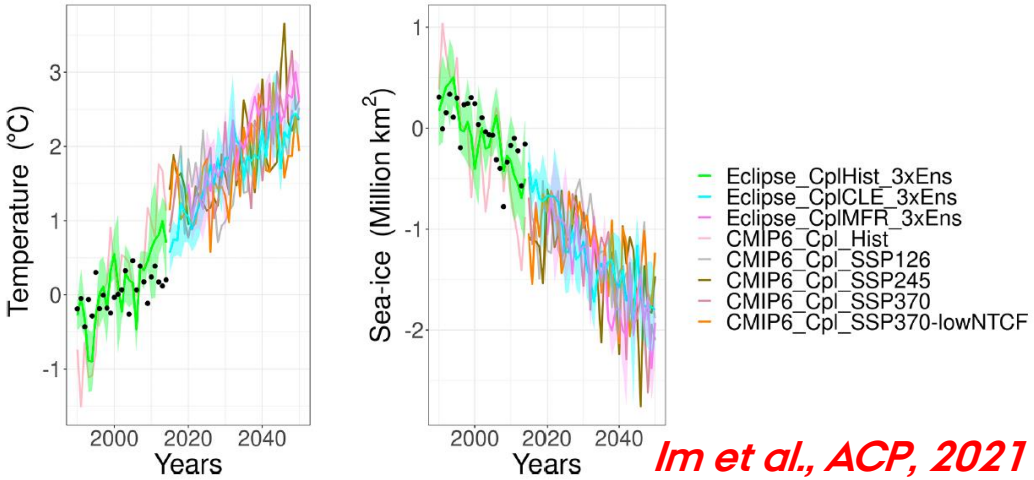
ARCTIC WARMING AND FEEDBACKS



Heat and moisture transport feedbacks on Arctic warming

- EC-Earth3
- NASA GISS-E2

SLCF and their climate impacts over the Arctic



Im et al., ACP, 2021

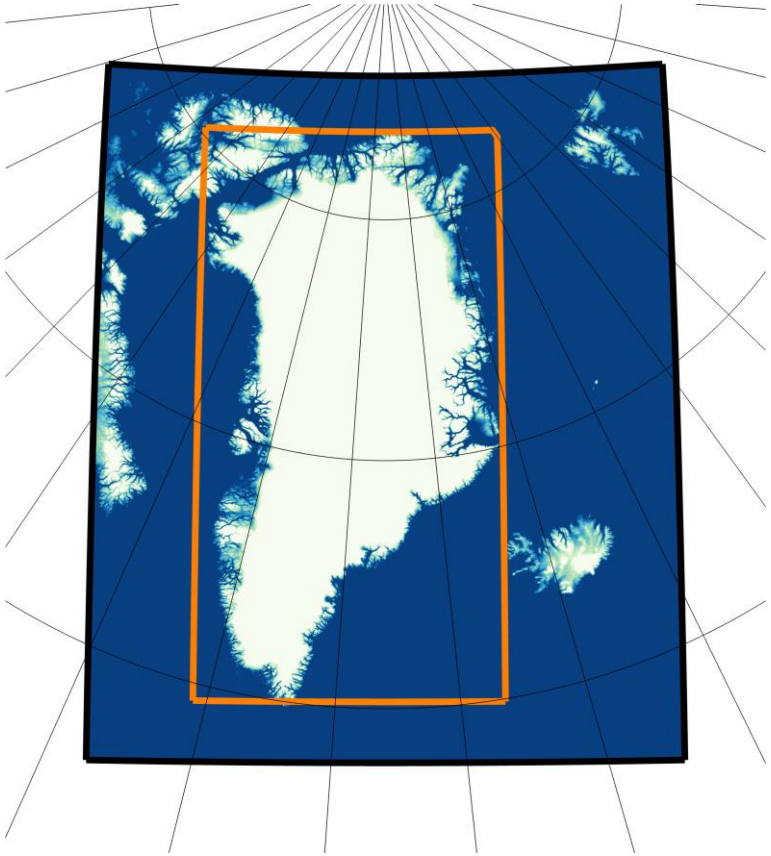
Aerosols and other short-lived climate forcers

- NASA GISS-E2

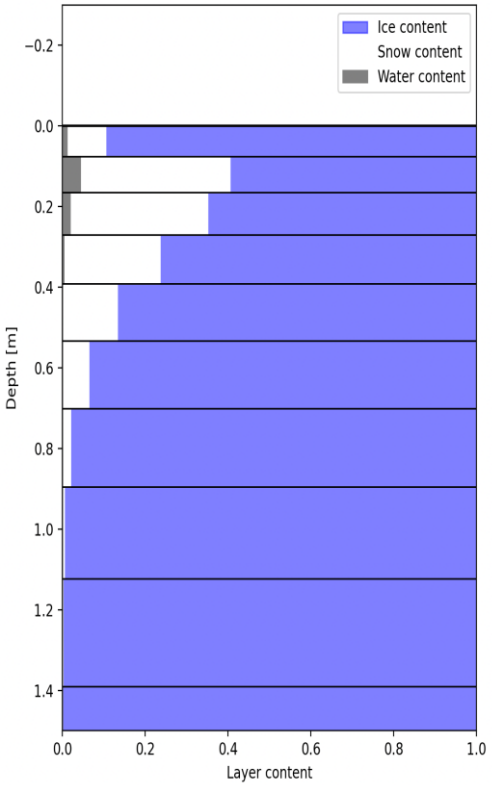
Peter Ulas

ICE SHEET SURFACE MASS BALANCE

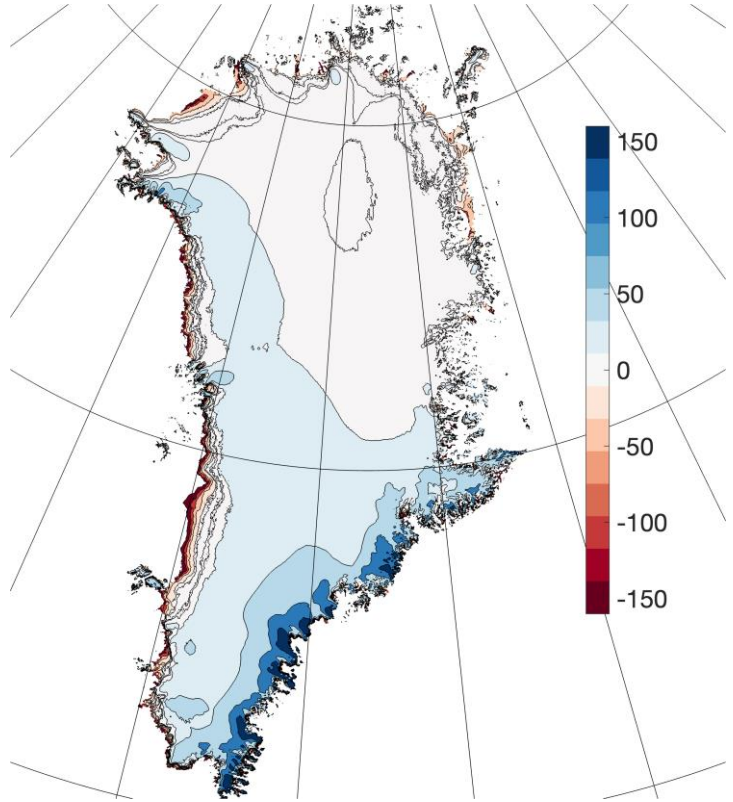
RCM



Subsurface model



Surface mass balance



Peter
Mathias
Xiaofeng

SHORT-LIVED CLIMATE FORCERS

Collaboration with NASA-GISS: GISS-E2

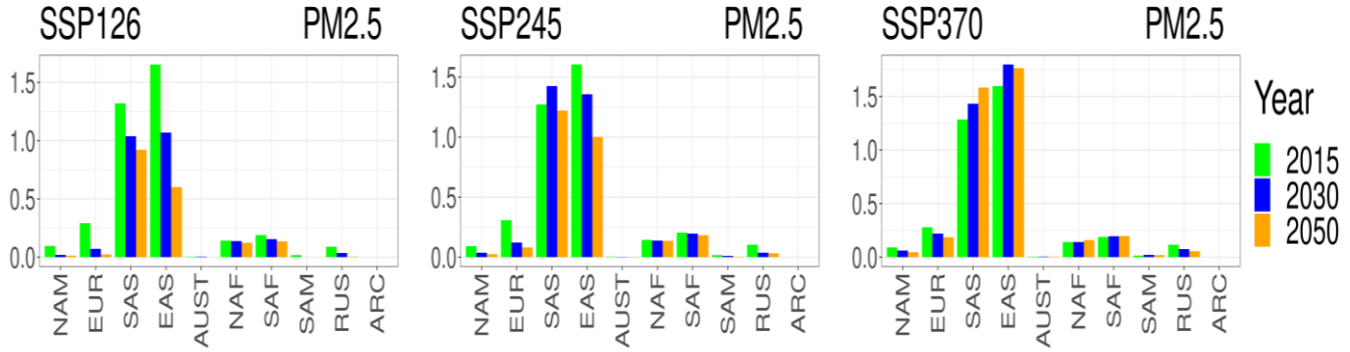
- Sources of aerosols and their precursors
- Radiative forcing of SLCFs

Contribution to AMAP-SLCF Assessment:

- Climate impacts
- Health impacts

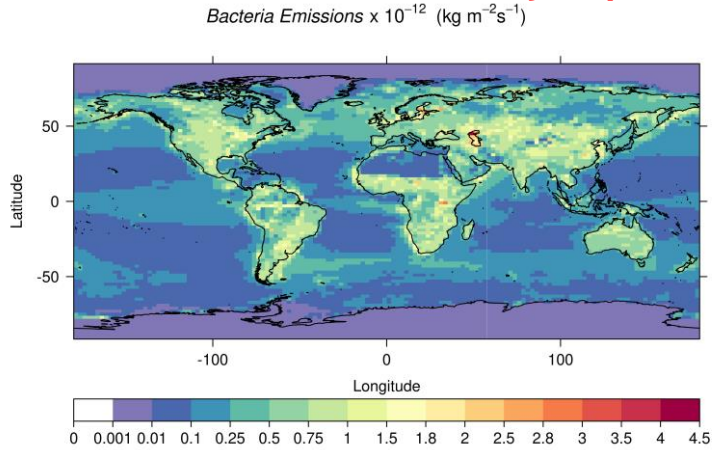
Marie Curie project – bioaerosols and radiative impacts

SLCF and their global and regional health impacts



Im et al., EnvRes, 2022

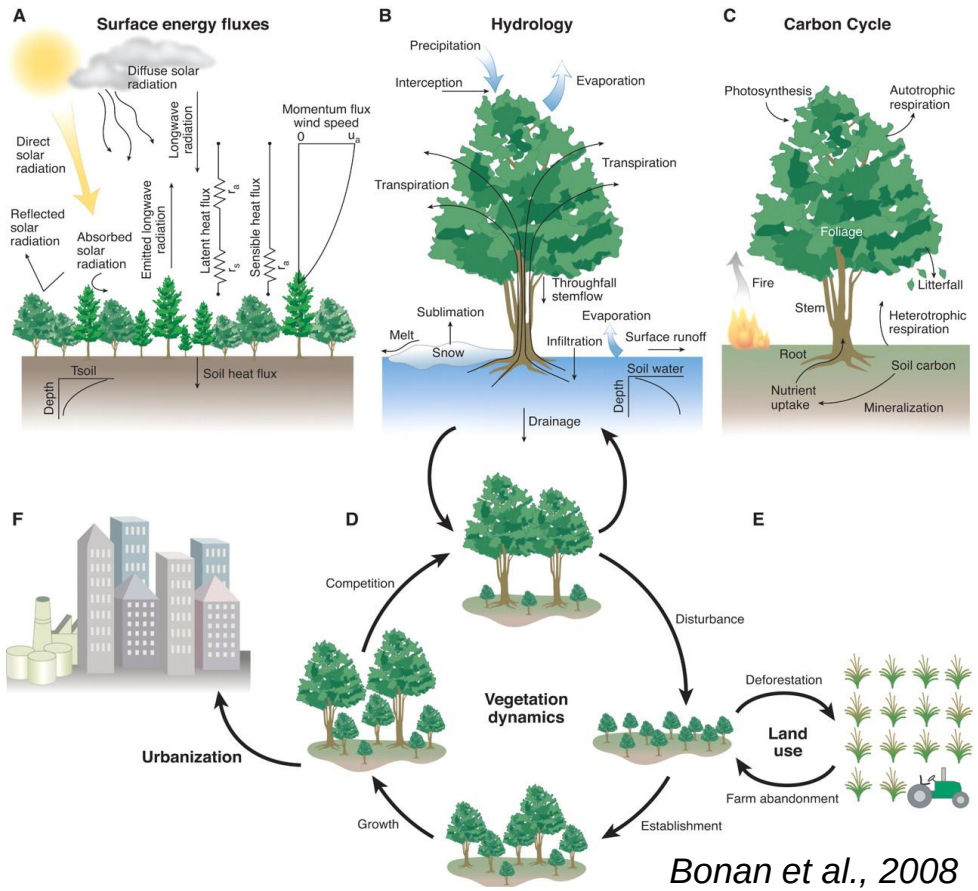
Bioaerosols (bacteria, fungal spores)



Sahyoun et al., in Preperation

Ulas
Maher
Jiemei

TERRESTRIAL ECOSYSTEM AND CARBON CYCLE MODELING



Bonan et al., 2008

ORCHIDEE

- Arctic terrestrial ecosystem and carbon cycle processes

EC-Earth3 (incl LPJ-Guess)

- Arctic-global carbon cycle feedbacks

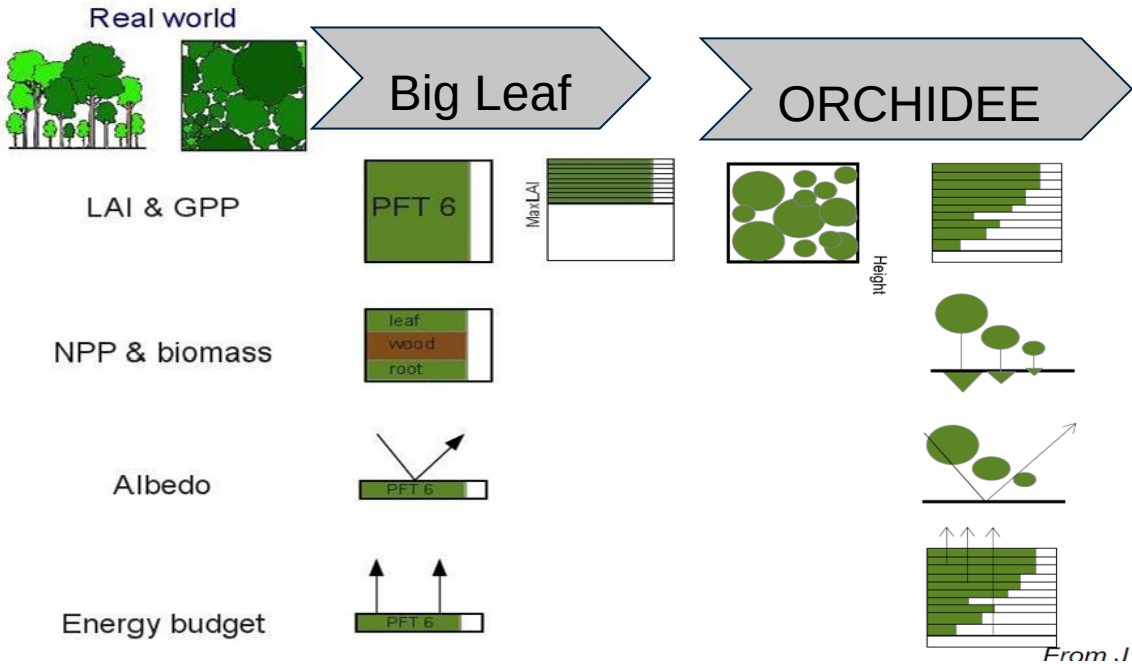
Anne Sofie
Peter
New post doc
New PhD

LAND SURFACE MODELING WITH ORCHIDEE

ORCHIDEE is the Land surface model used by the IPSL earth system model

ORCHIDEE-CN-CAN

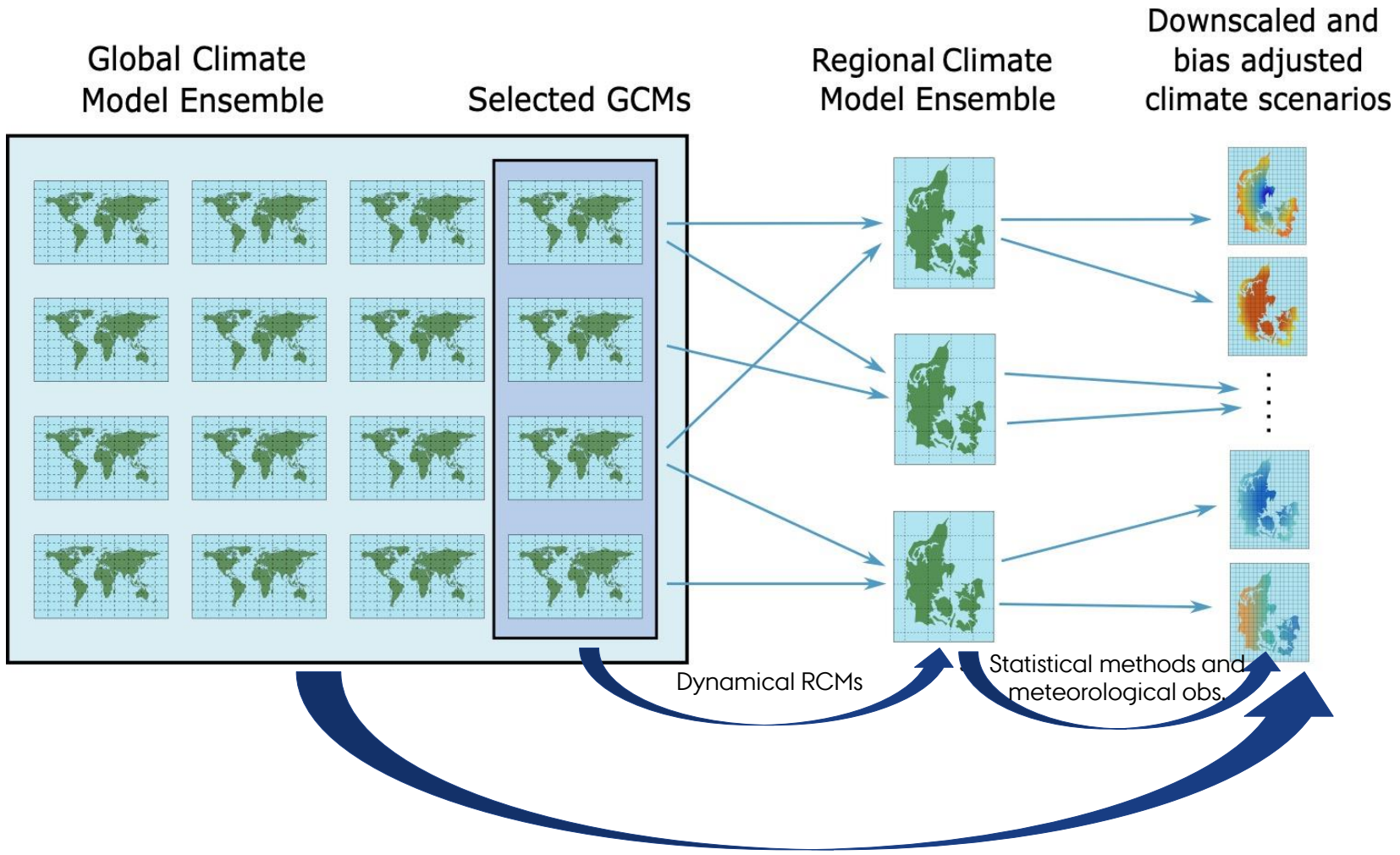
- CN: Carbon-Nitrogen coupling
- CAN: Dynamic canopy structure



ORCHIDEE
LAND SURFACE MODEL

Anne Sofie
New PhD

MACHINE LEARNING METHODS FOR DOWNSCALING CLIMATE PROJECTIONS



Peter
Thea