



Terrestrial DOC and carbon cycle modelling

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Baltic-C meeting
Warnemünde, 9 November 2009



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DOC modelling within Baltic-C

Aim:

To simulate past, present and future dissolved organic carbon (DOC) transport into the Baltic Sea, thereby linking the terrestrial and marine carbon cycle.

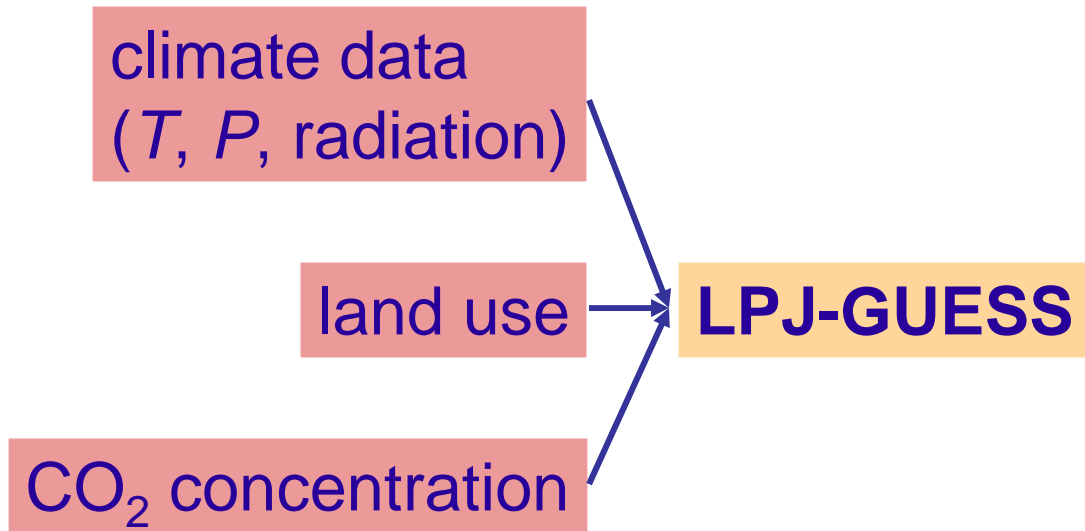
Model simulations and setup

- LPJ-GUESS with DOC model included
- forcing with RCA (ERA40/climate scenario) data
- accounting for land use, and land use change in the future
- simulations for past and present-day (1961-2005) using RCA (ERA40) climate data
- simulations with climate scenario for 21st century

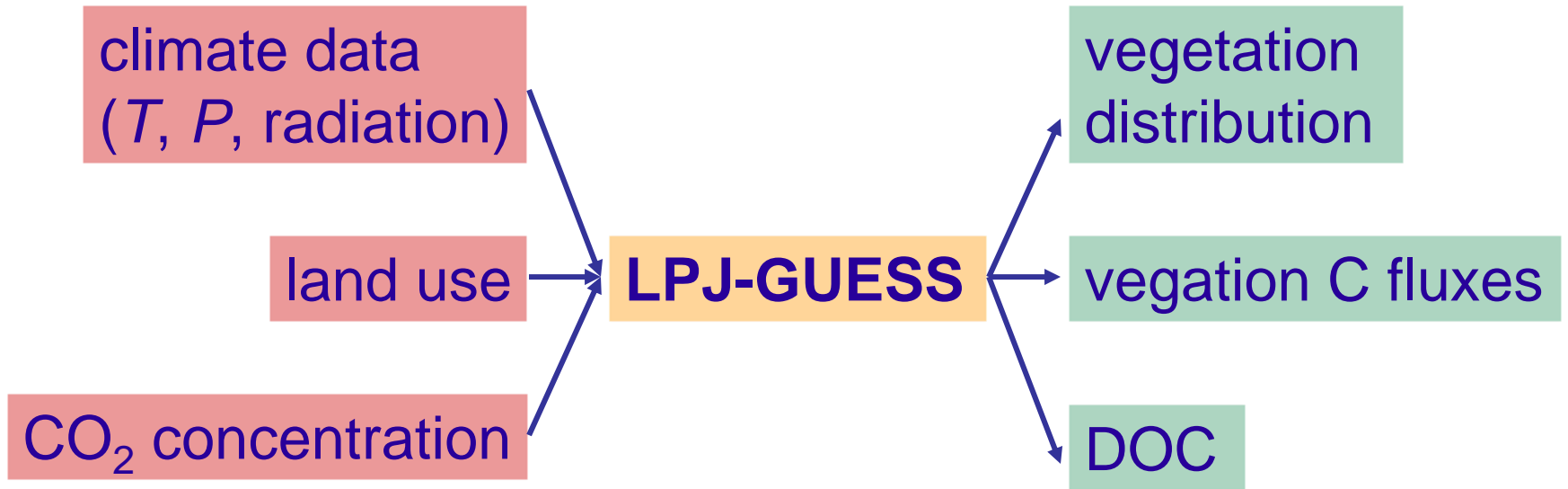
Model simulations and setup

LPJ-GUESS

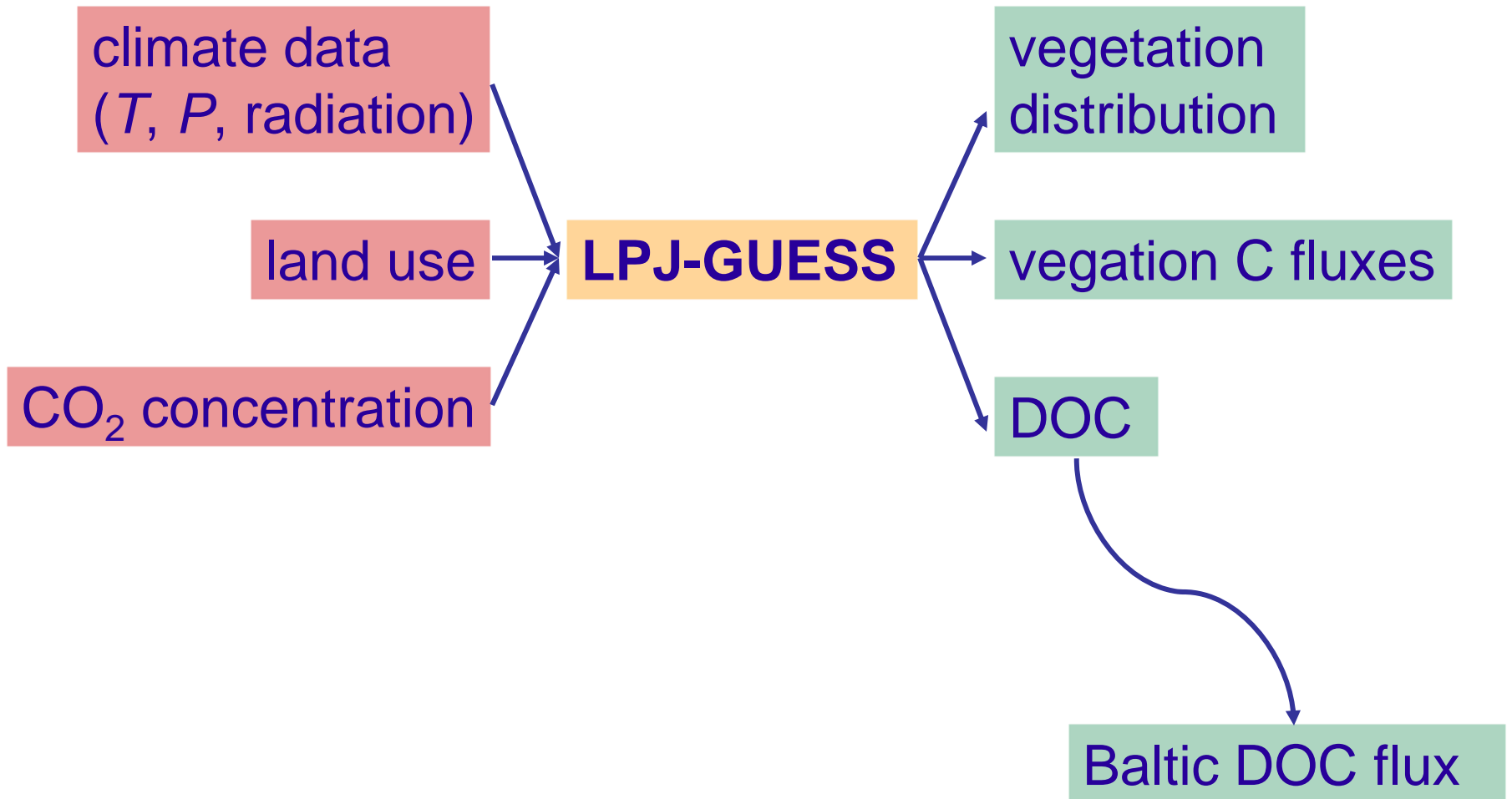
Model simulations and setup



Model simulations and setup



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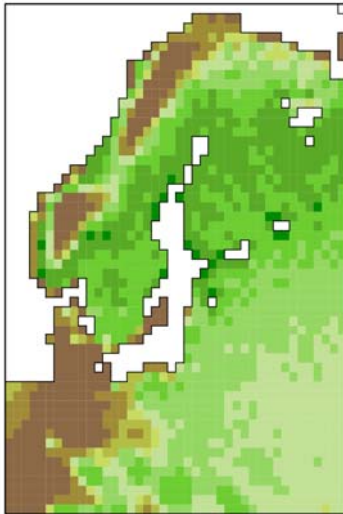
Preliminary simulations and results

- LPJ-GUESS
- forcing with RCA (ERA40) data and observed CO₂ concentrations
- no land use (present-potential vegetation)
- simulation setup
 - 1200 years spinup
 - 1901-1960 CRU data corrected with the difference between RCA and CRU (for 1961-1990)
 - 1961-2005 RCA (ERA40 driven) climate

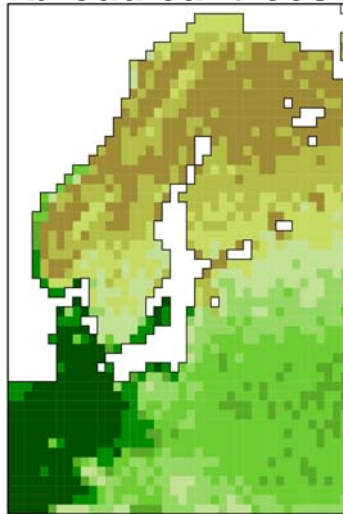
The terrestrial carbon cycle under present-day conditions

Leaf area index ($\text{m}^2 \text{m}^{-2}$) averaged for 1986-2005

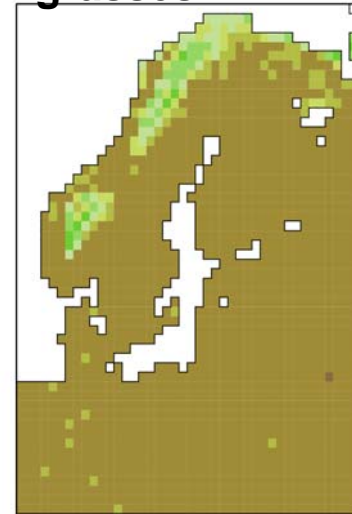
coniferous trees



broadleaf trees

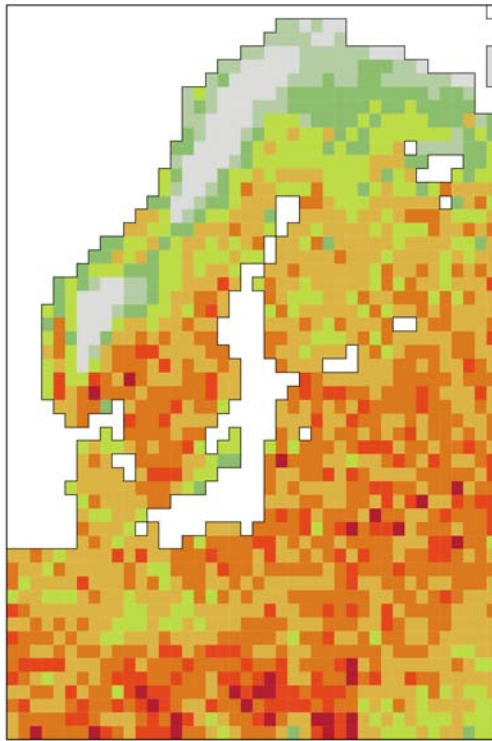


grasses

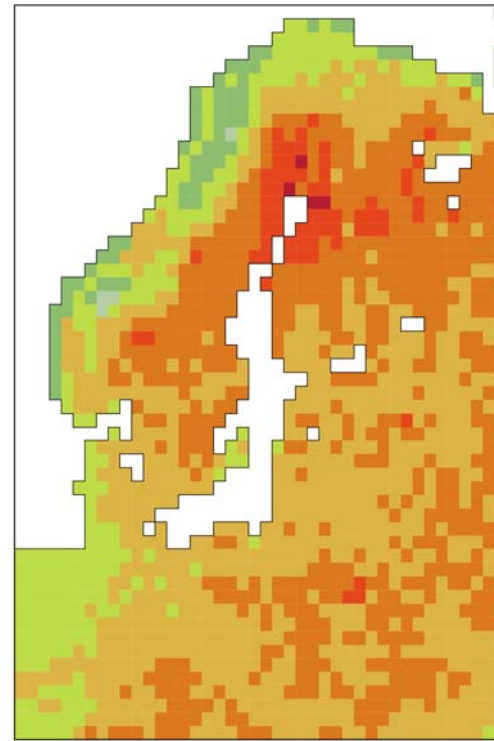


Carbon storage in vegetation and soil (kg m⁻²) averaged for 1986-2005

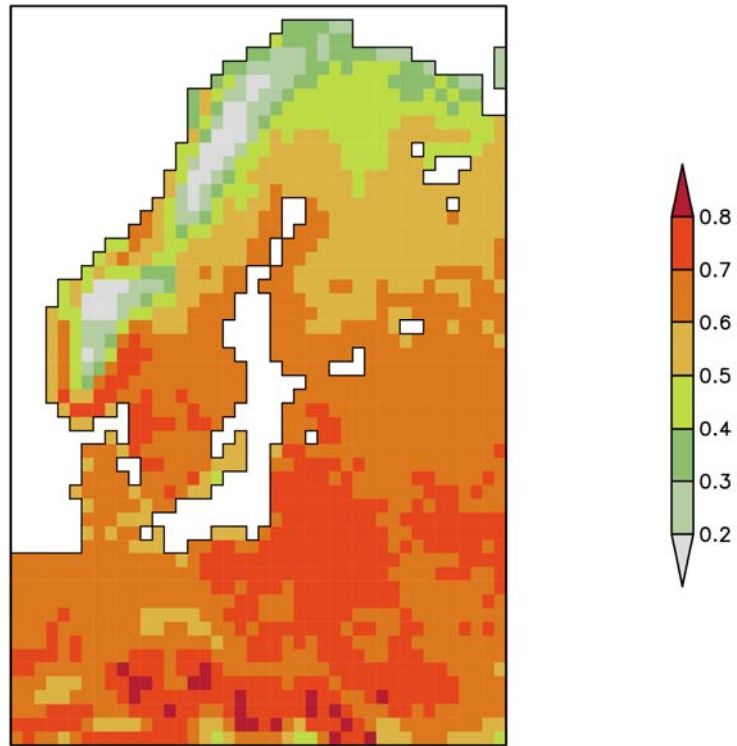
vegetation C



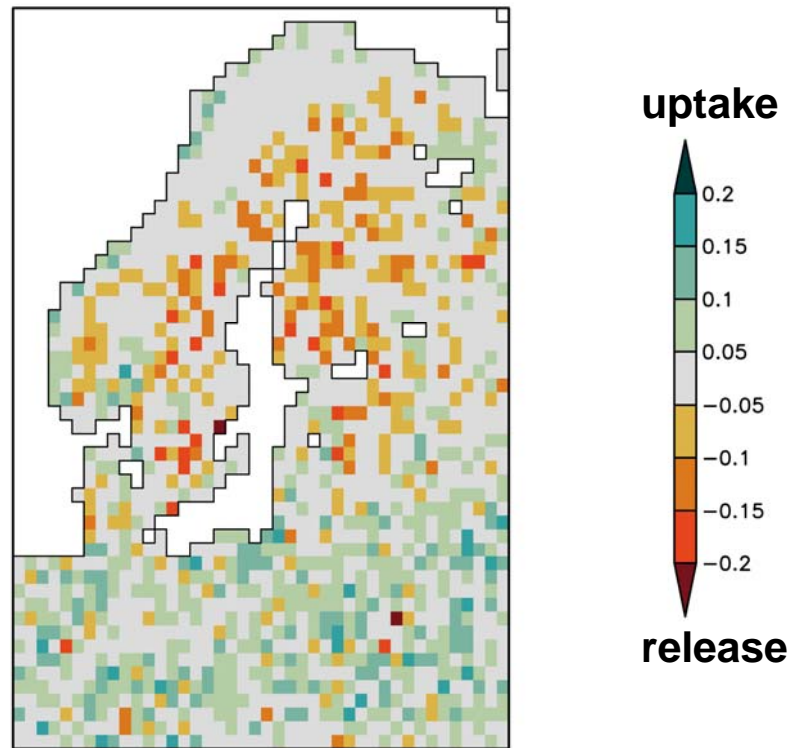
litter and soil C



Net primary production ($\text{kg m}^{-2} \text{y}^{-1}$) averaged for 1986-2005

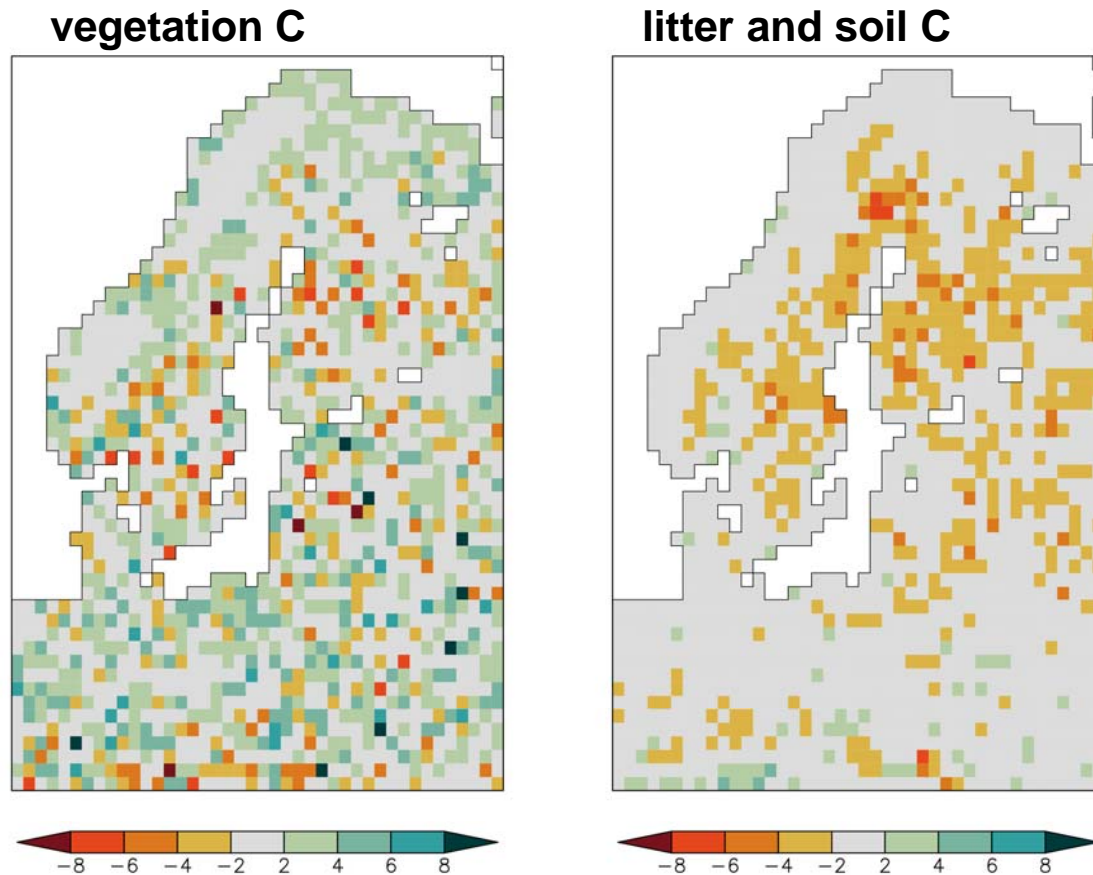


Net ecosystem exchange ($\text{kg m}^{-2} \text{y}^{-1}$) averaged for 1986-2005

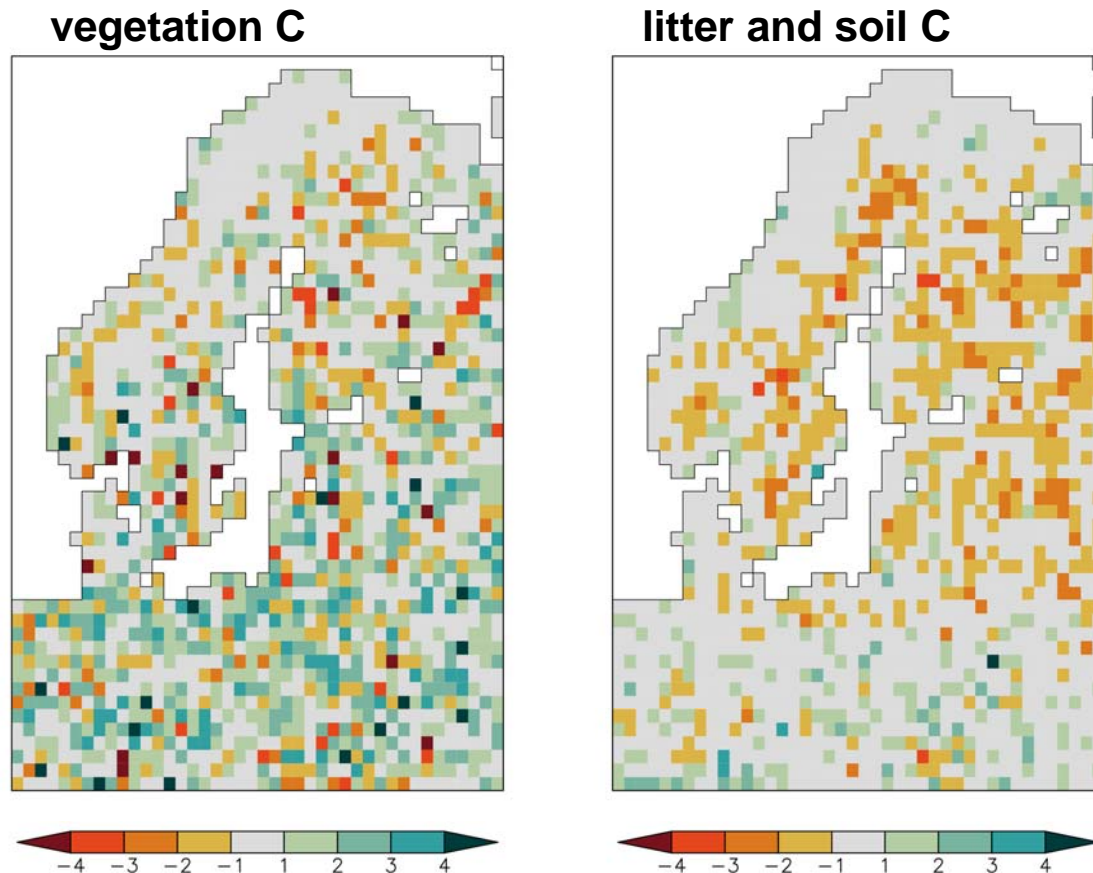


Changes in the terrestrial carbon cycle during the 20th century

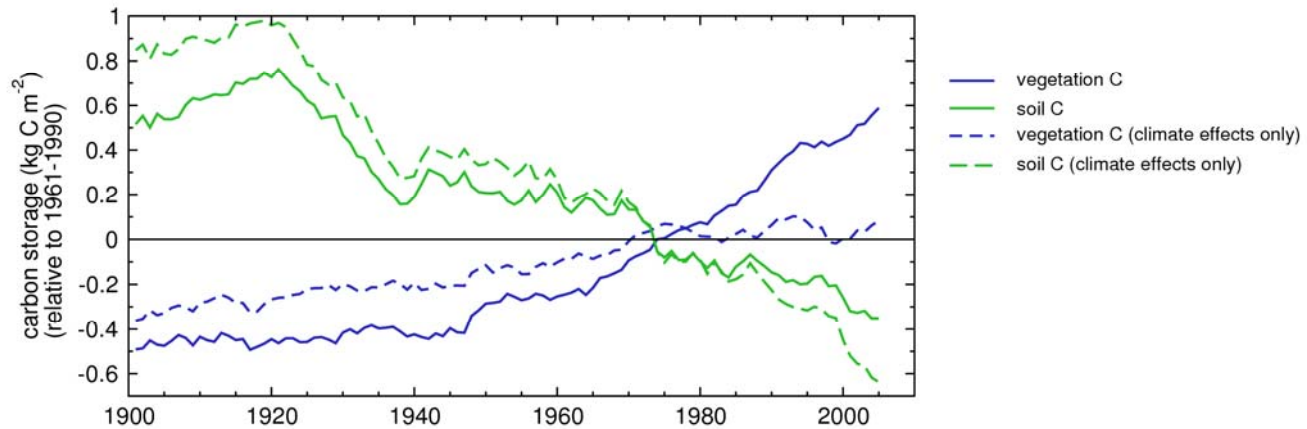
Change in carbon storage in vegetation and soil (kg m⁻²) for 1986-2005 compared to 1901-1920



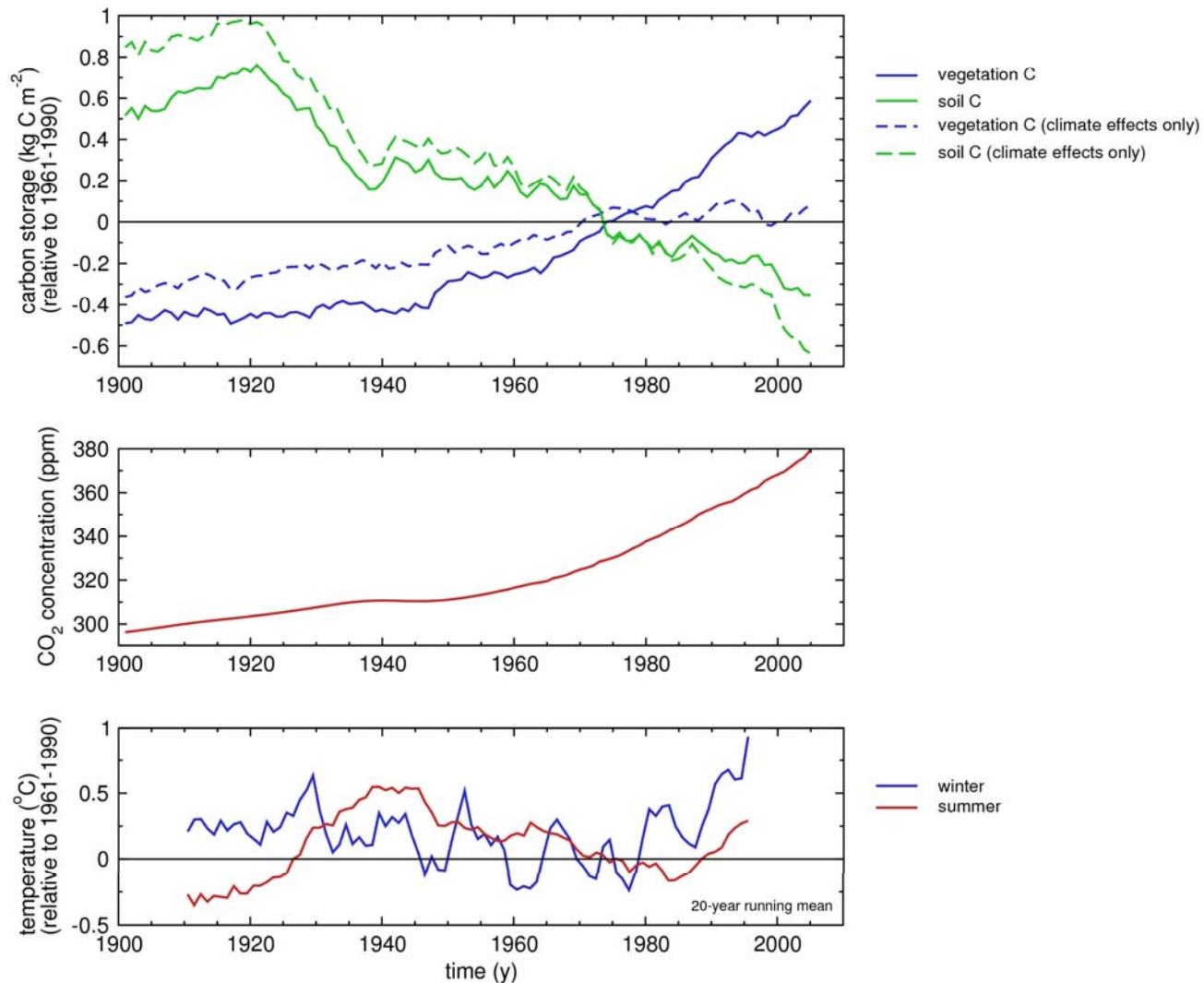
Change in carbon storage in vegetation and soil (kg m⁻²) for 1986-2005 compared to 1961-1980



Change in carbon storage in vegetation and soil averaged for Baltic Sea region



Change in carbon storage in vegetation and soil averaged for Baltic Sea region



Outlook

- run LPJ-GUESS with DOC model for Baltic
- adopt land use by using land cover map
- simulations with climate scenario for 21st century