Alfred-Wegener-Institut
für Polar- und Meeresforschung
in der Helmholtz-Gemeinschaft

Work Plan, 29. 08 2012

Coupled atmosphere-land model of the Arctic: Hirham5-CLM

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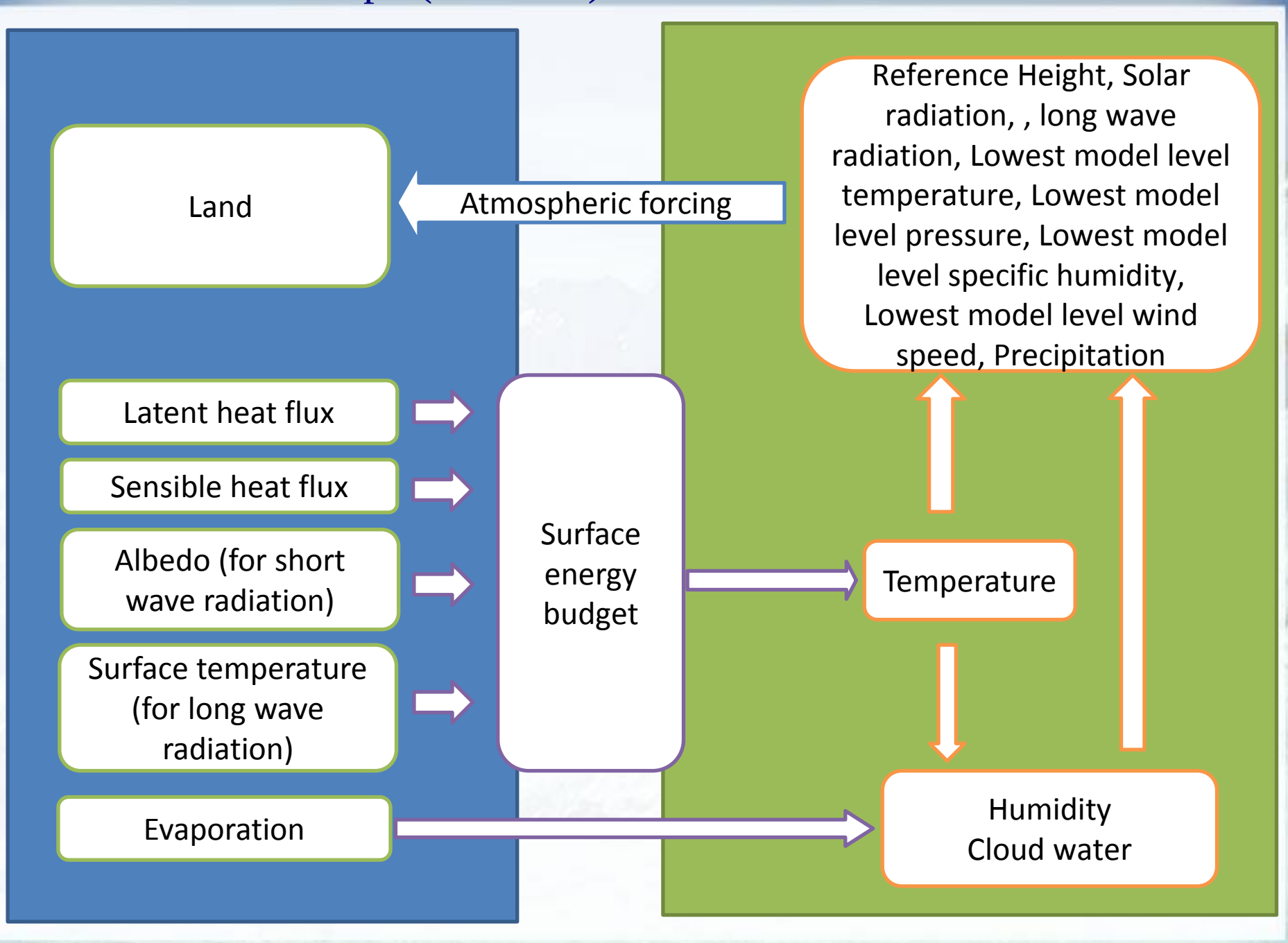
Motivation

- Improve land surface and atmosphere interactions in arctic region.
- Understanding and representation of land surface processes. (permafrost and frozen ground affection to atmosphere circulation, atmospheric impacts on land)
- CLM (Community land model): More sophisticated biogeophysical and hydrological processes.

Improved vegetation dynamics.

Hirham5-CLM couple(structure)



Model setup for Hirham5 and Hirham5-CLM (HCLM)

- Geographic location: Arctic region
- Run time period: 1989-2011
- Resolution: 25 km
- Boundary forcing (EraInterim): Surface pressure, Wind, Temperature, Specific humidity, Cloud water, Cloud ice, Sea surface temperature, sea ice fraction
- Surface data (for HCLM): Plant functional type (MODIS), Soil color (MODIS), Organic matter (WISE, HWSD), lake and wetland (GLWD).....

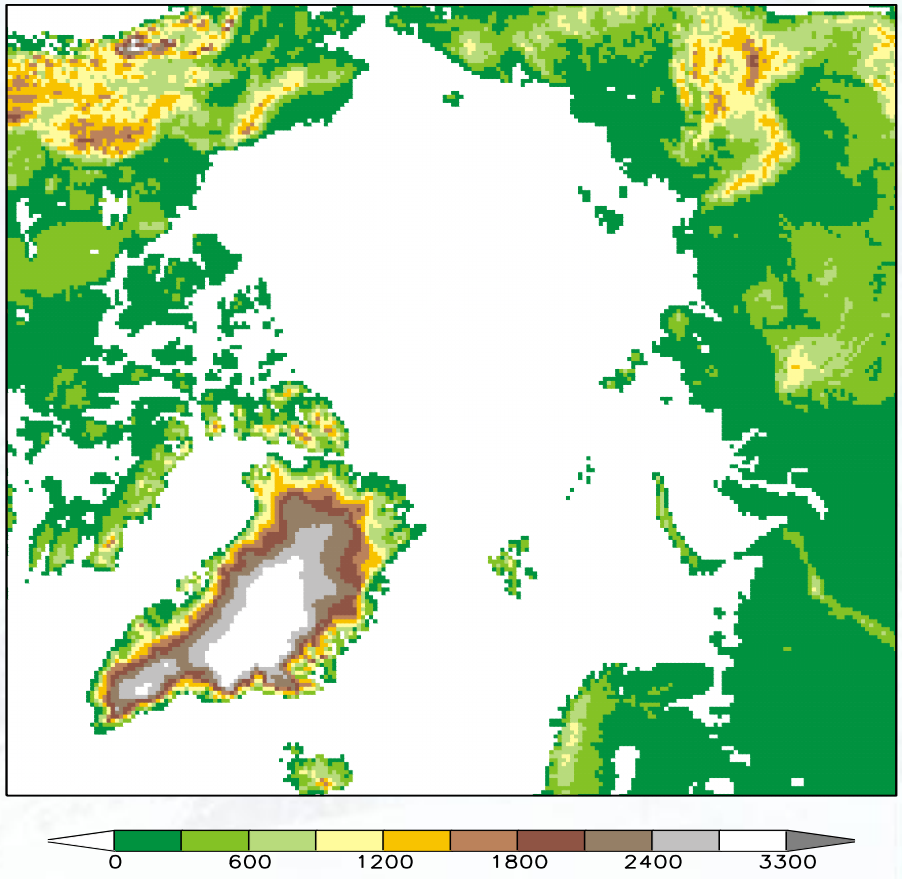
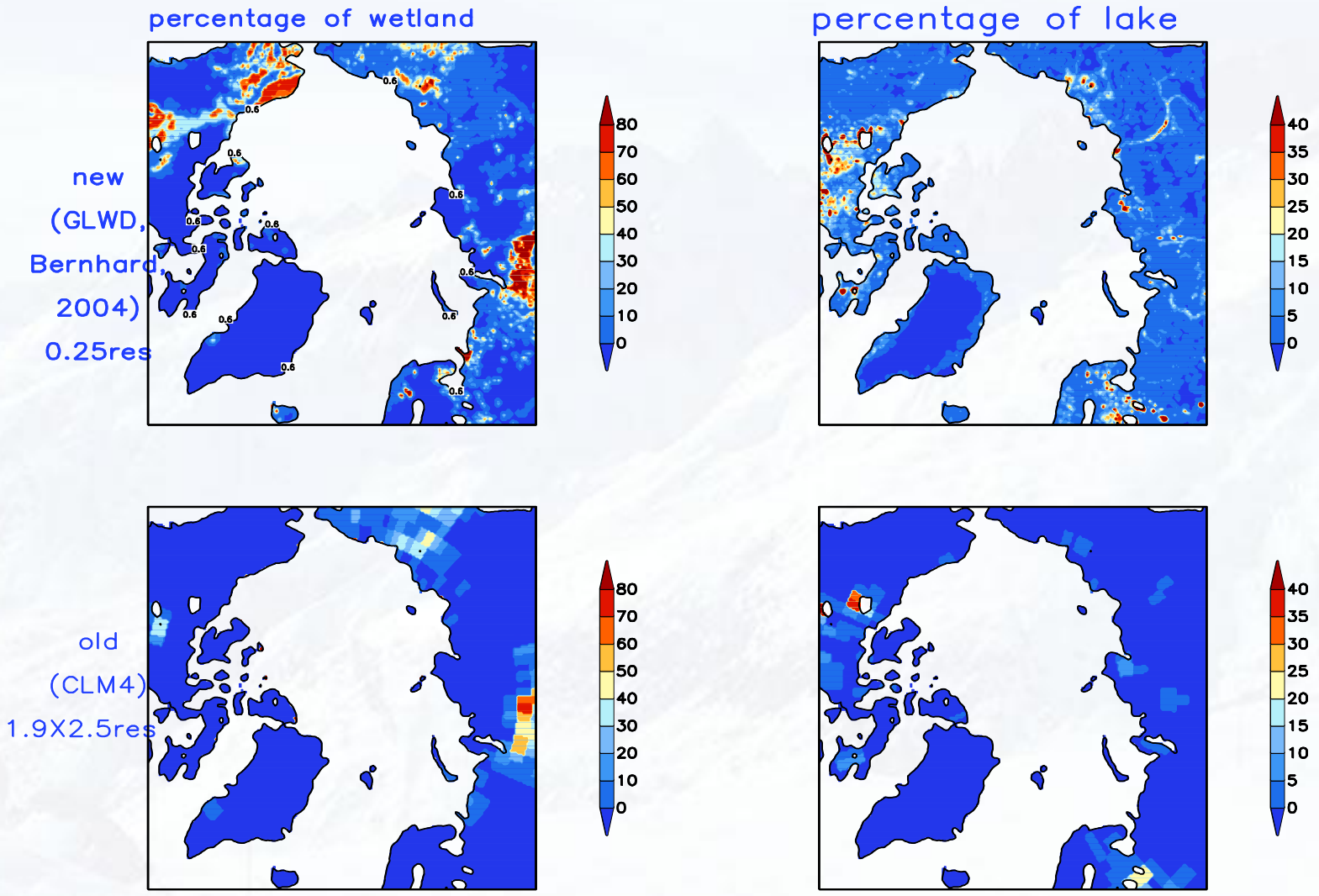


Fig. 1. Integration area and orography [m]

Improvement of land surface data: lake and wetland (from Global Lakes and Wetlands Database)

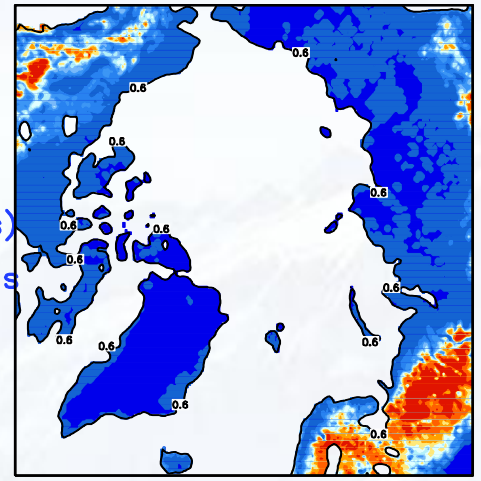


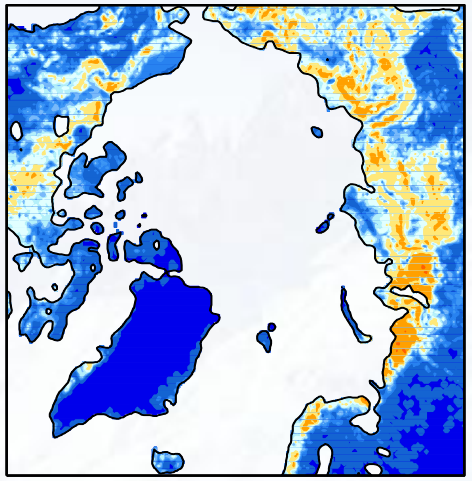
Improvement of land surface data: Plant functional type (from Ncar, unreleased)

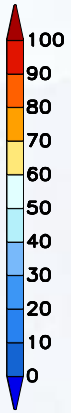
needleleaf evergreen tree

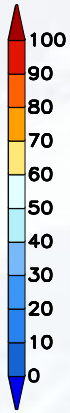
broadleaf deciduous shrub

new (Modis) 0.25res

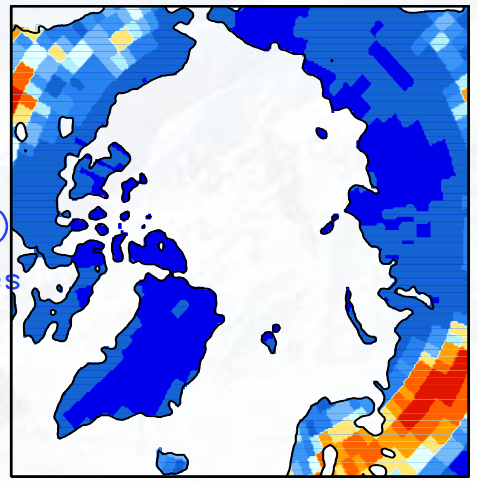


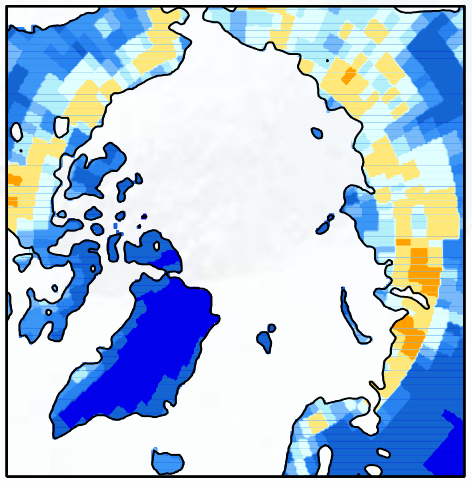


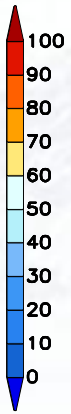


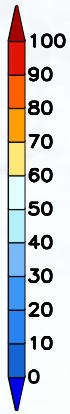


old (CLM4) 1.9X2.5res



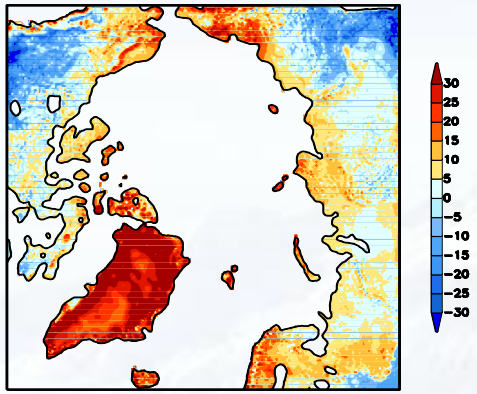




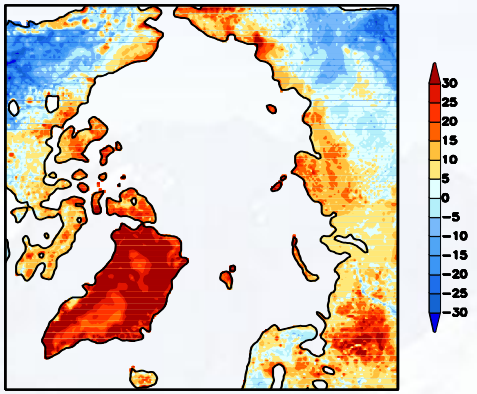


Comparison of Hirham5 with HCLM for test run (monthly mean of 2002 March)

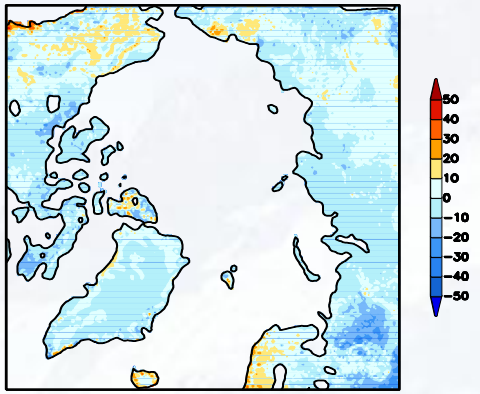
SHF [W/m^2]



Hirham5

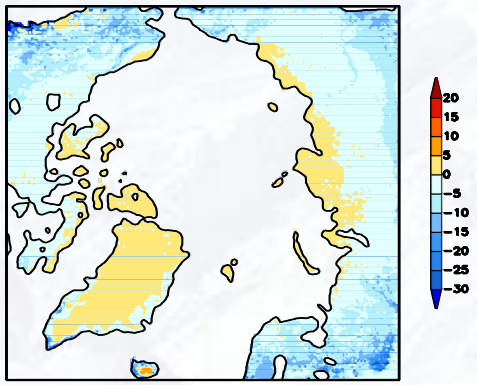


HCLM

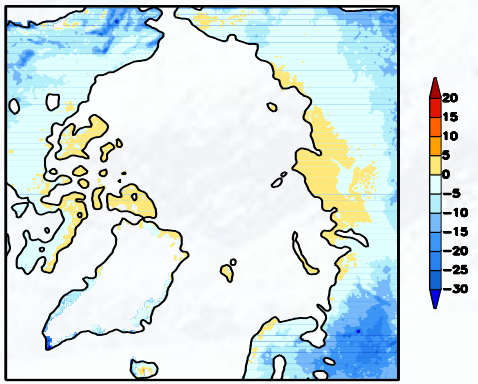


Hirham5−HCLM

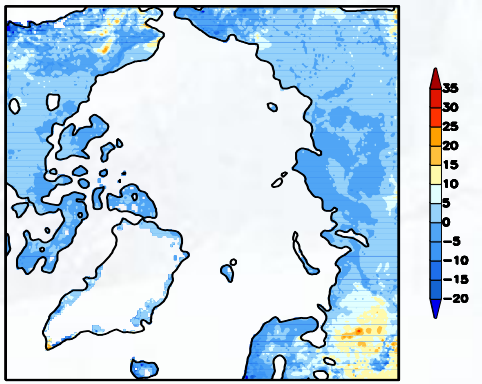
LHF [W/m^2]



Hirham5



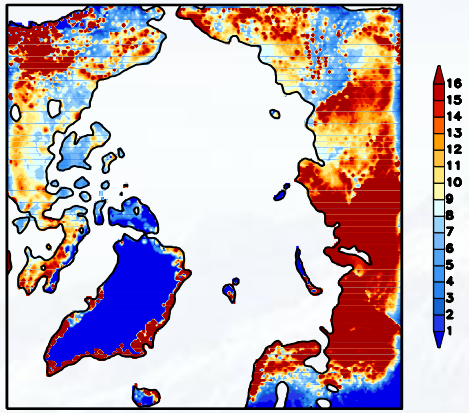
HCLM



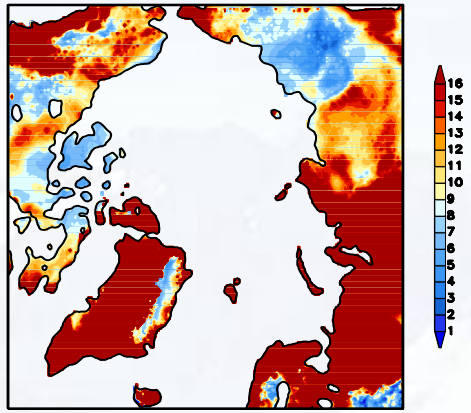
Hirham5−HCLM

Comparison of Hirham5 with HCLM for test run (monthly mean of 2002 March)

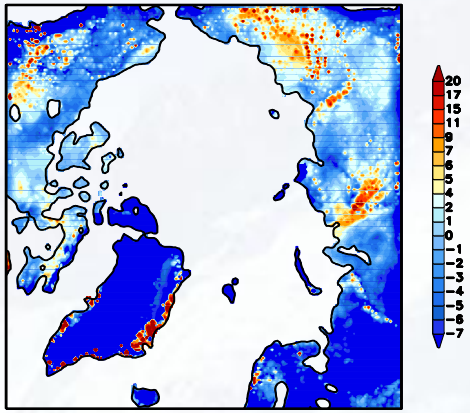
snow depth [cm]



Hirham5

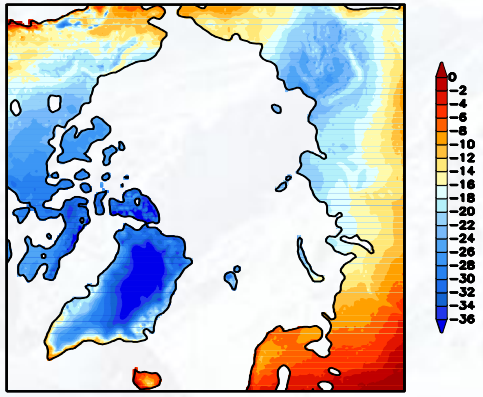


HCLM

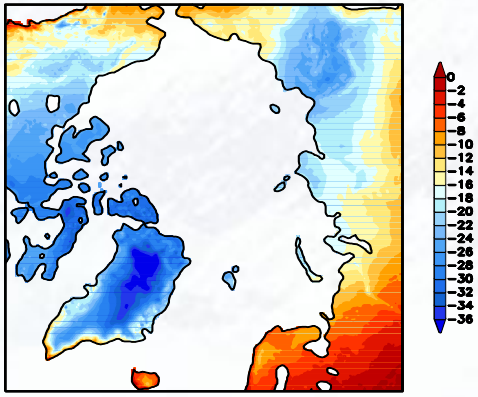


Hirham5−HCLM

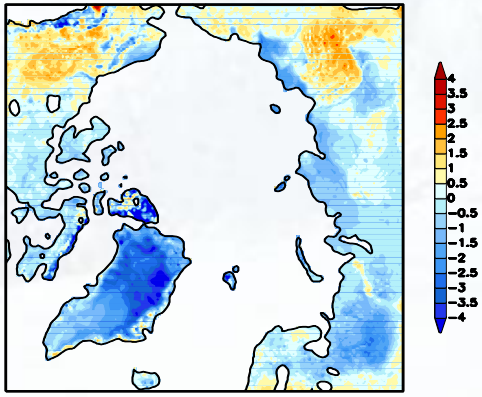
T2 [C]



Hirham5



HCLM



Hirham5−HCLM

Summary

- Code of the Hirham5-CLM coupling finished.
- New land surface data created. (Pfts, Percentage of Glacier, Lake and wetland, Soil color, Percentage of sand and clay, Organic matter)
- Current work: Model restart.
- Next step: Take longer (1 year) test run as soon as we finish model restart.
- Evaluating the coupling by comparison with EraInterim data and observation data.

The End!

Thank you!