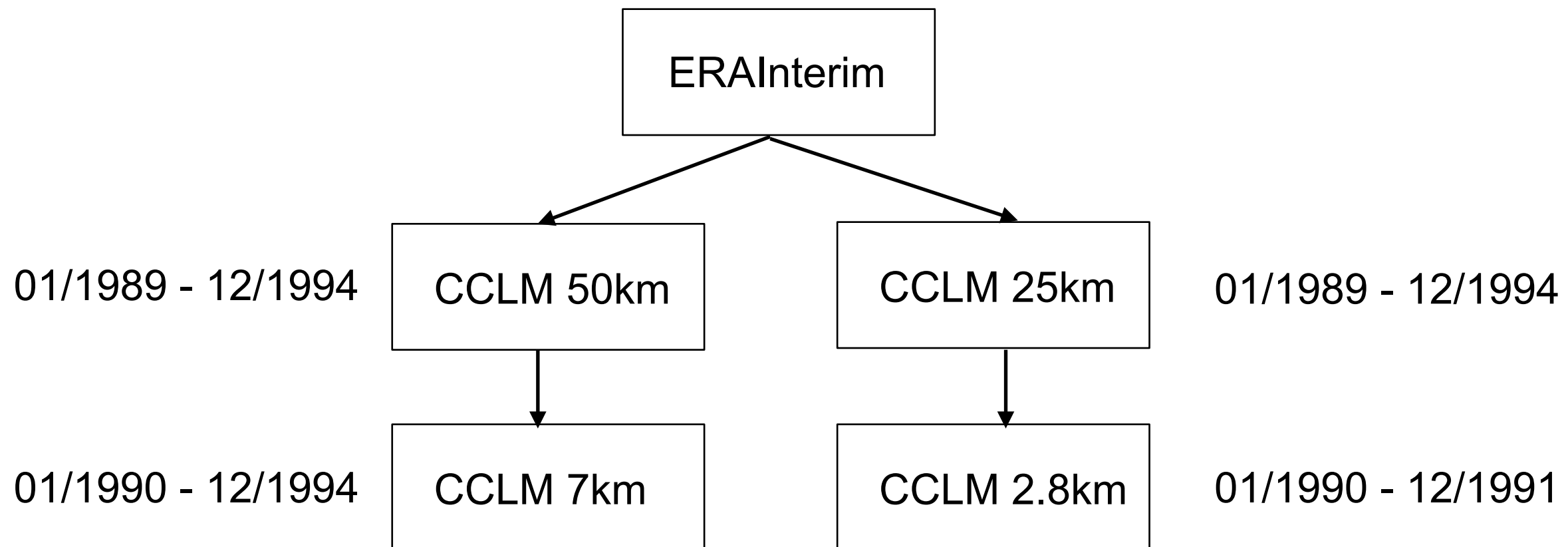


Effects of LST initialisation in long-term simulations with COSMO-CLM performed with and without Flake

Burkhardt Rockel

- ➔ How large is the effect of prescribed lake surface temperature vs. calculated ones via FLake?
- ➔ Does grid size matter?

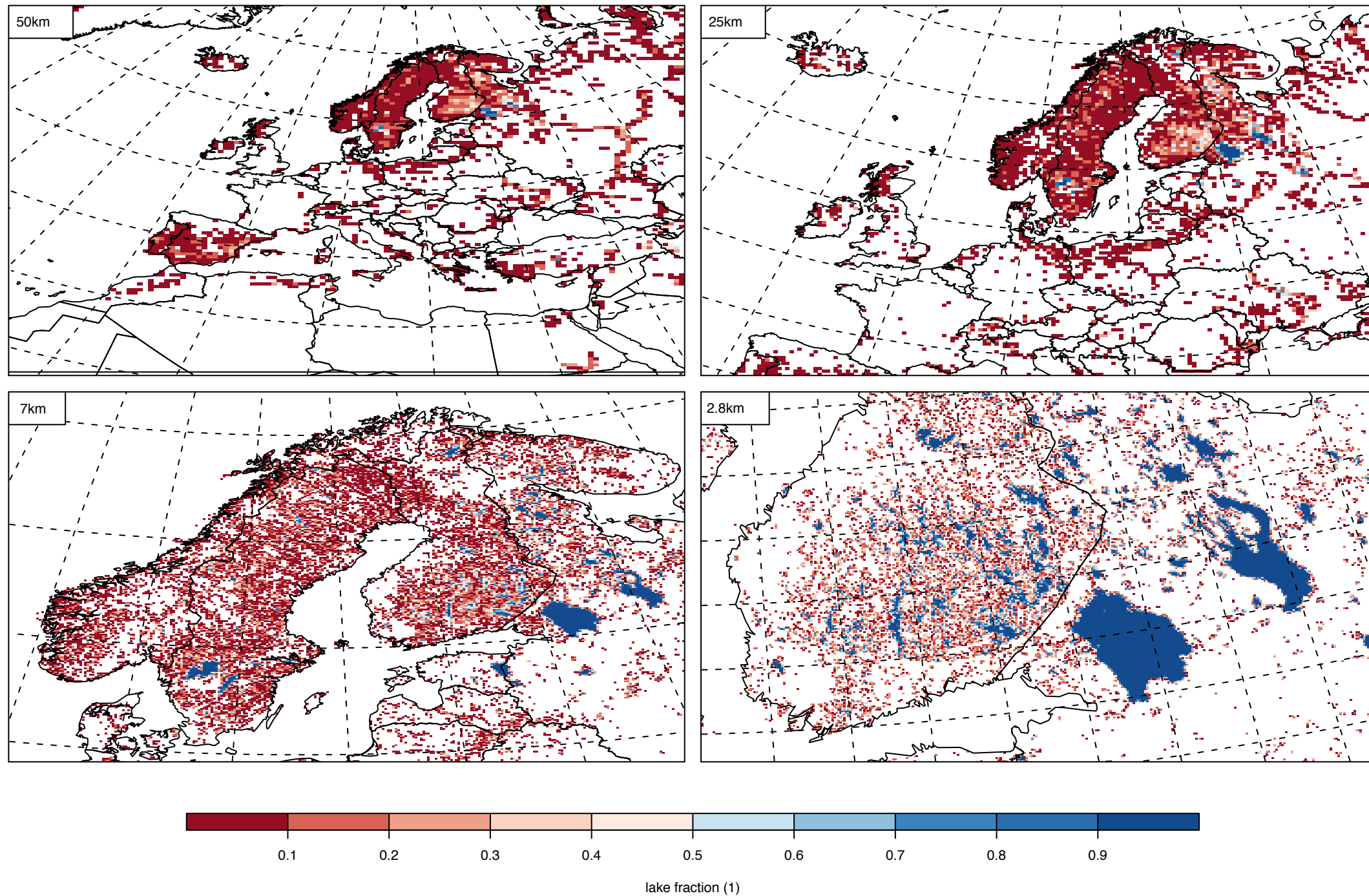
Tests are performed with the COSMO model in climate mode (COSMO-CLM) and the implemented FLake



Lake fraction and depth from 1km data set (Ekaterina Kourzeneva)

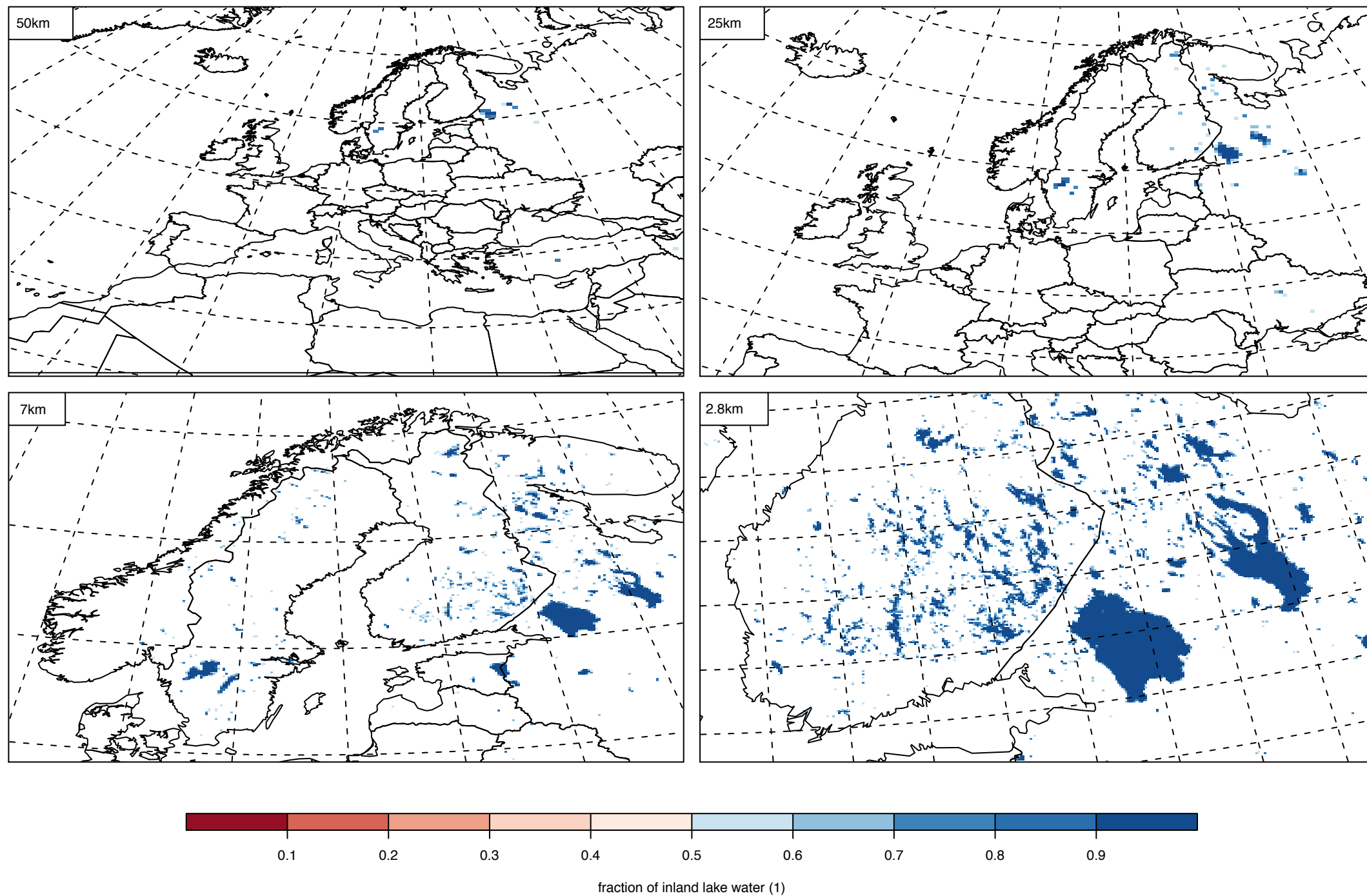
Lake Fraction and computation domain

Lake Fraction



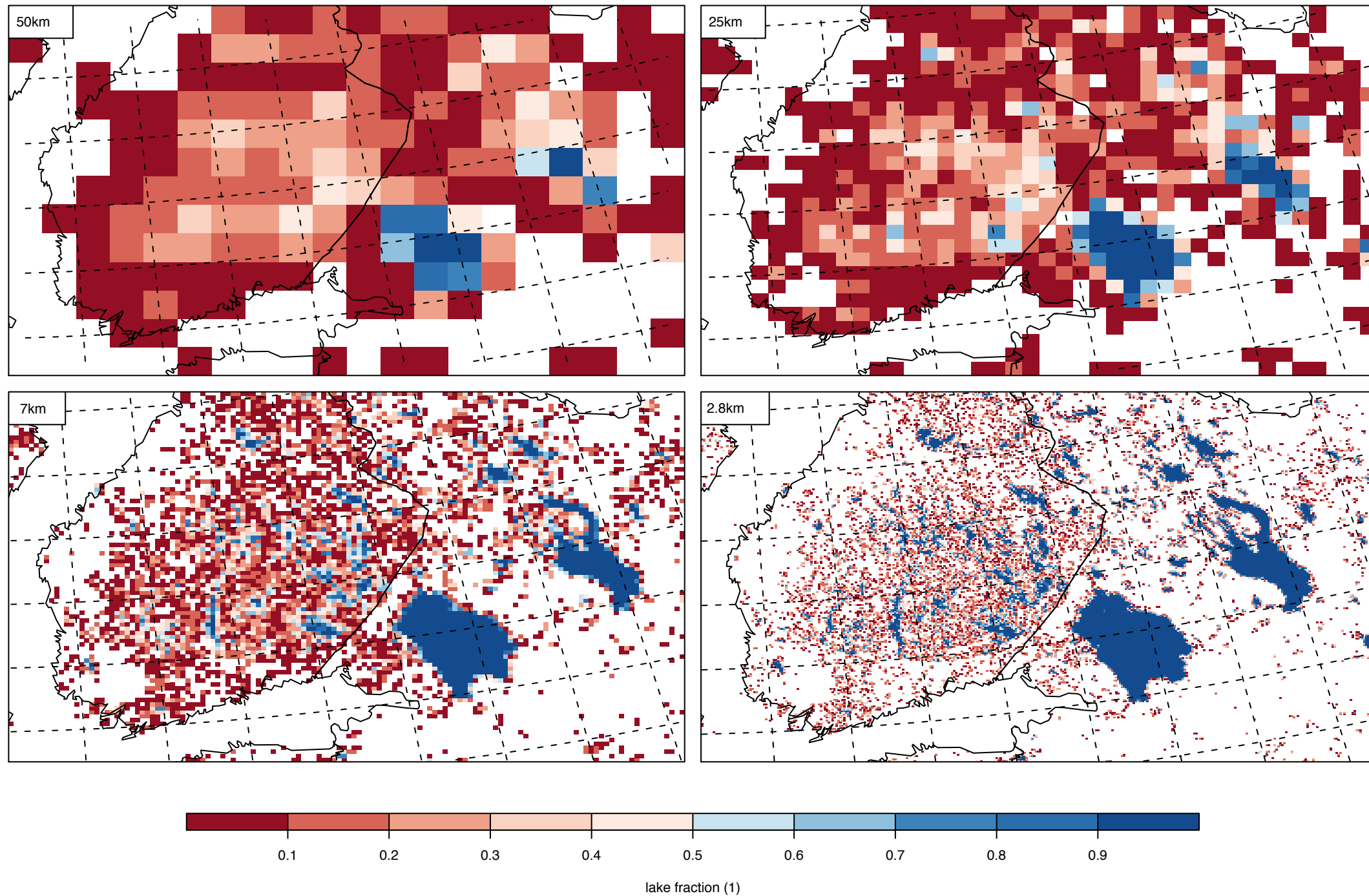
and as CCLM sees it

Lake Fraction



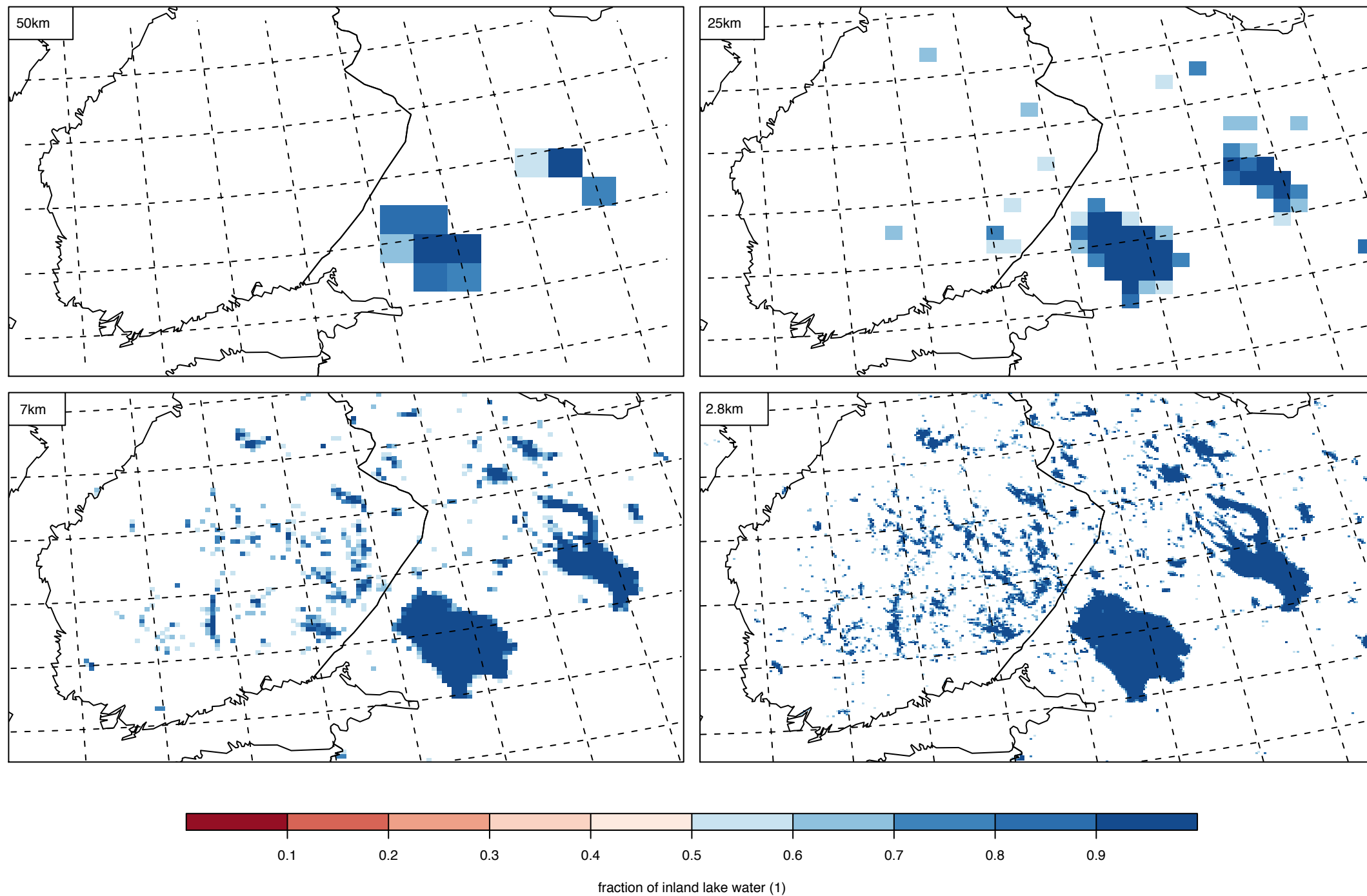
Lake Fraction zoomed in over subdomain

Lake Fraction

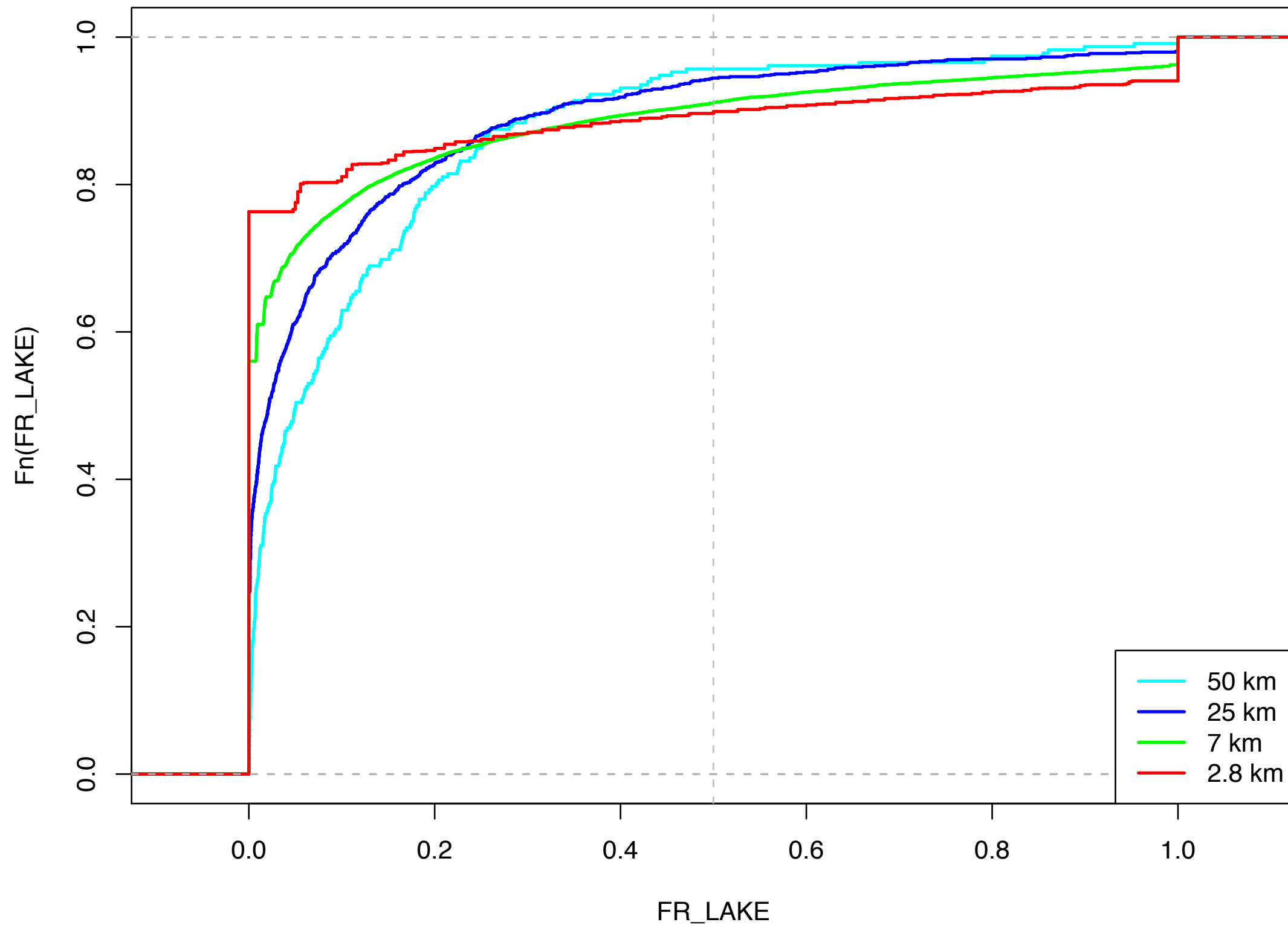


and as CCLM sees it

Lake Fraction

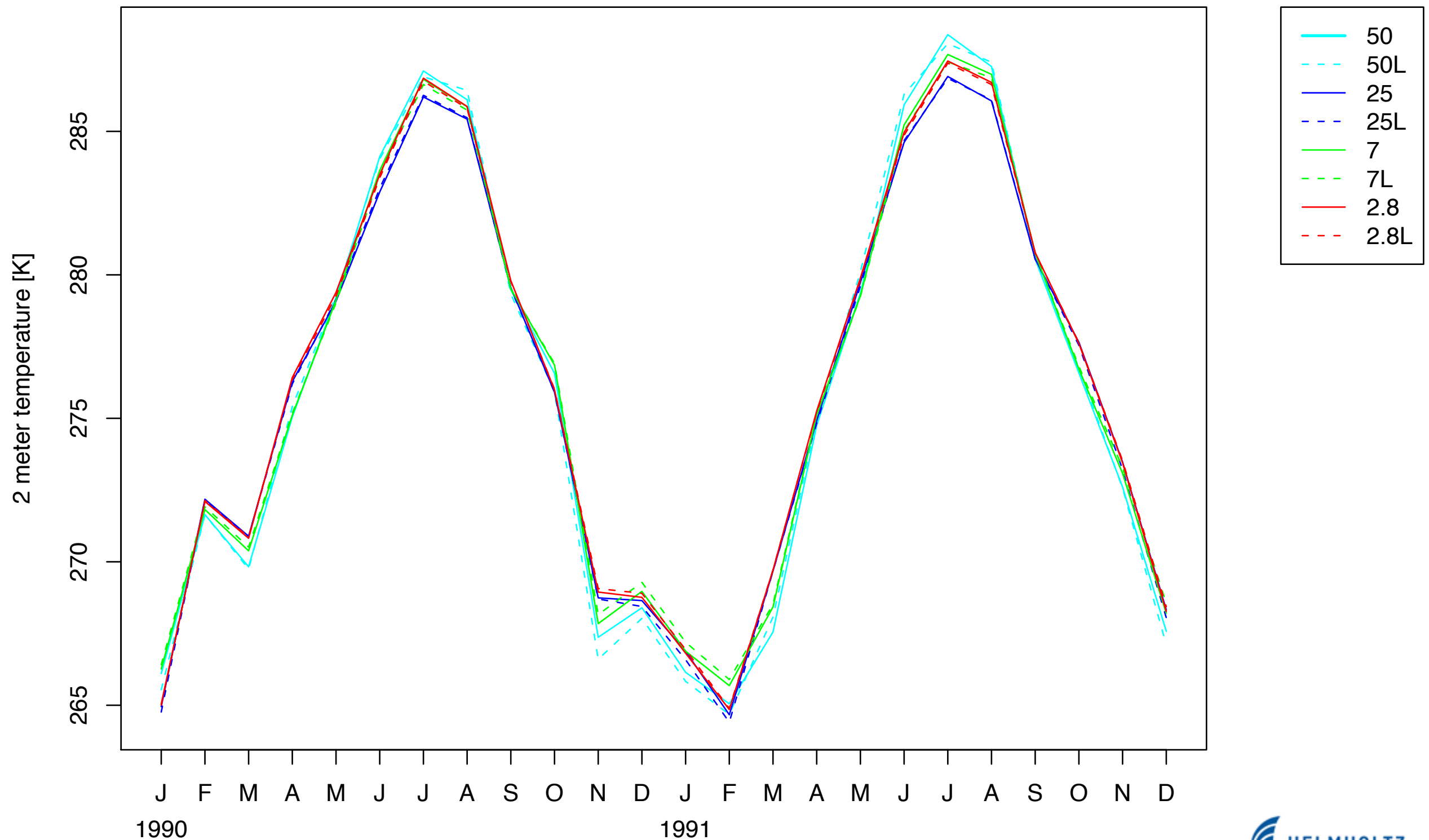


Empirical Cumulative Distribution Function

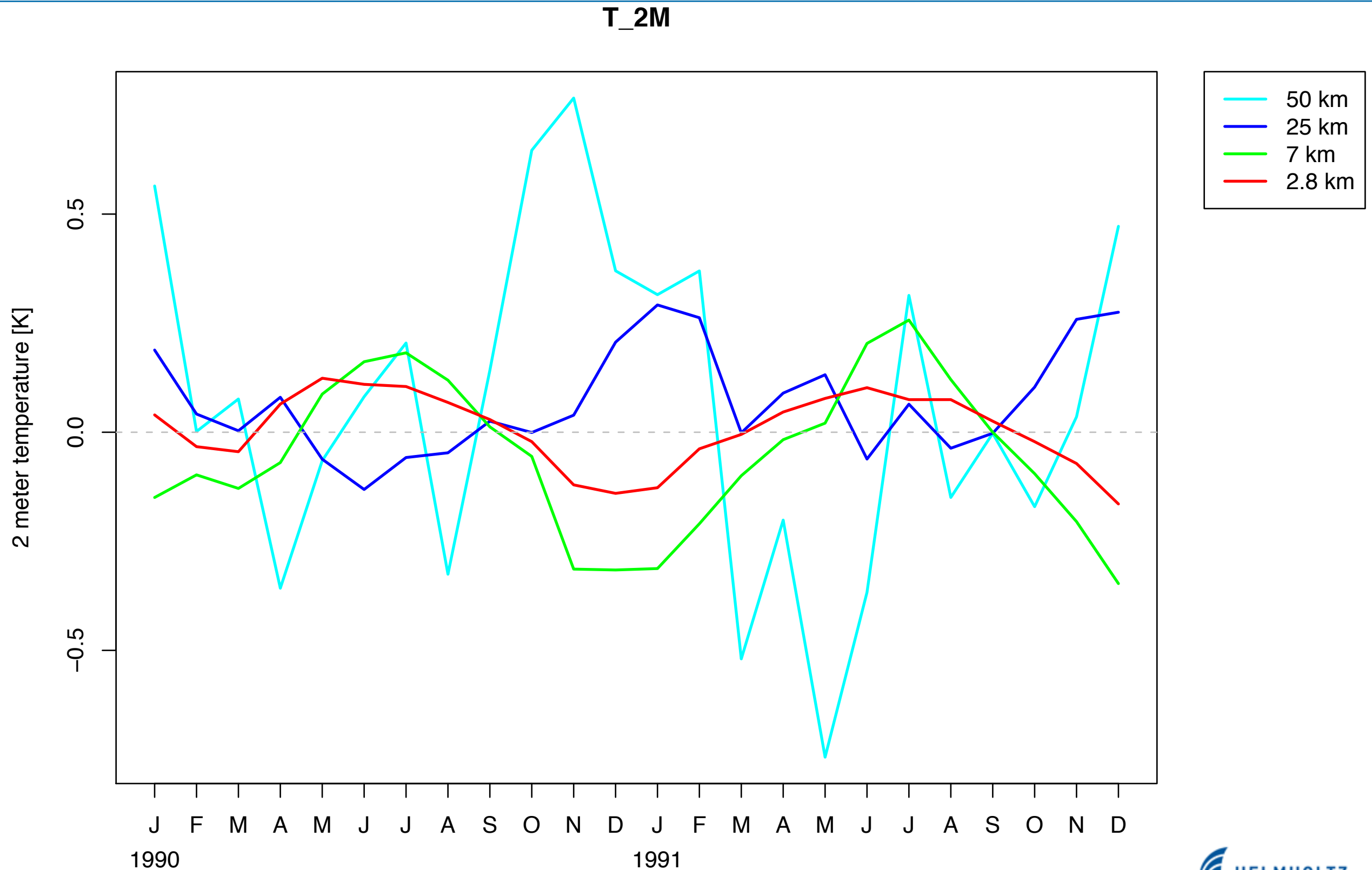


2m Temperature subdomain

T_2M

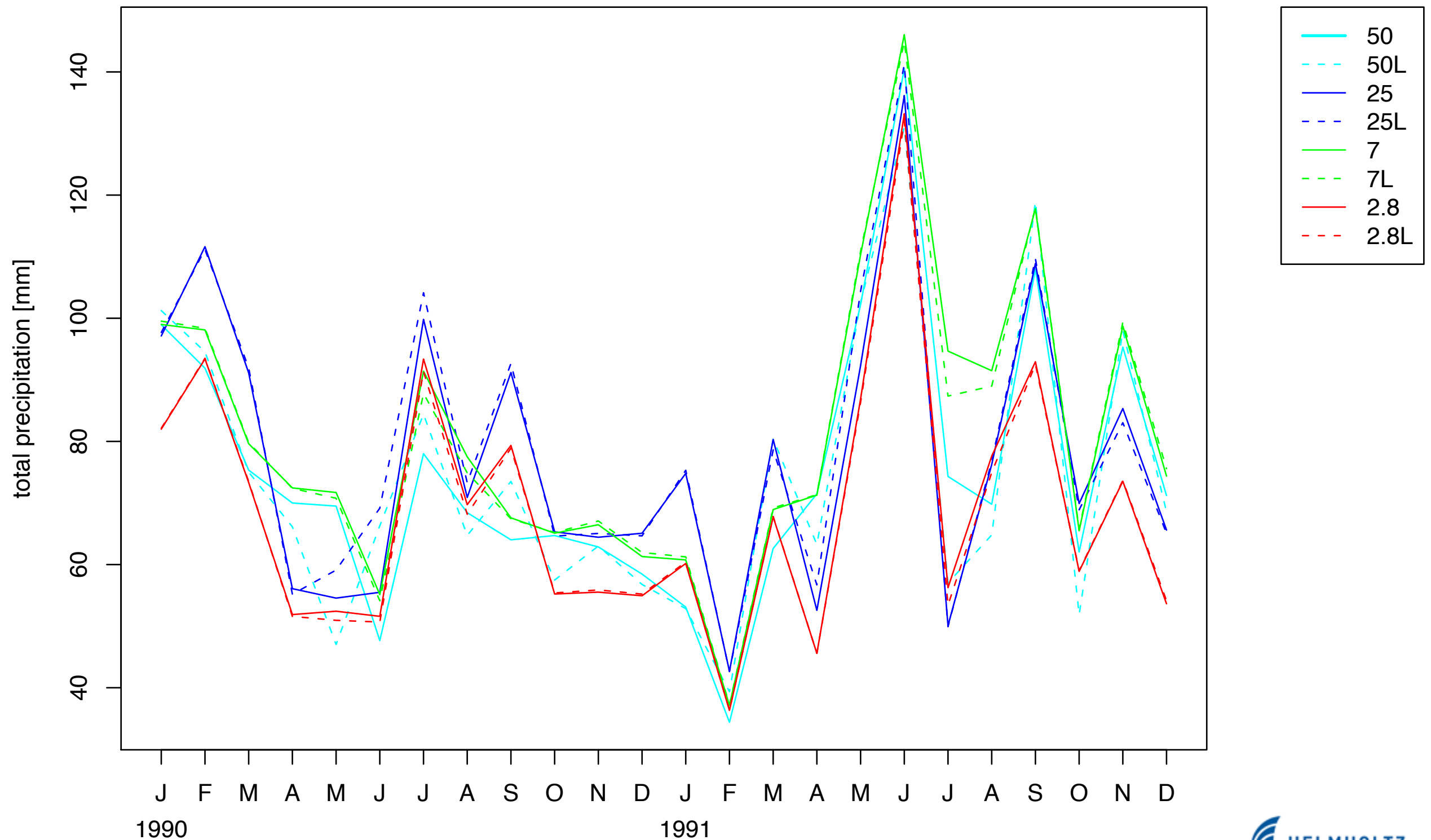


2m Temperature difference (noFL - FL) over subdomain

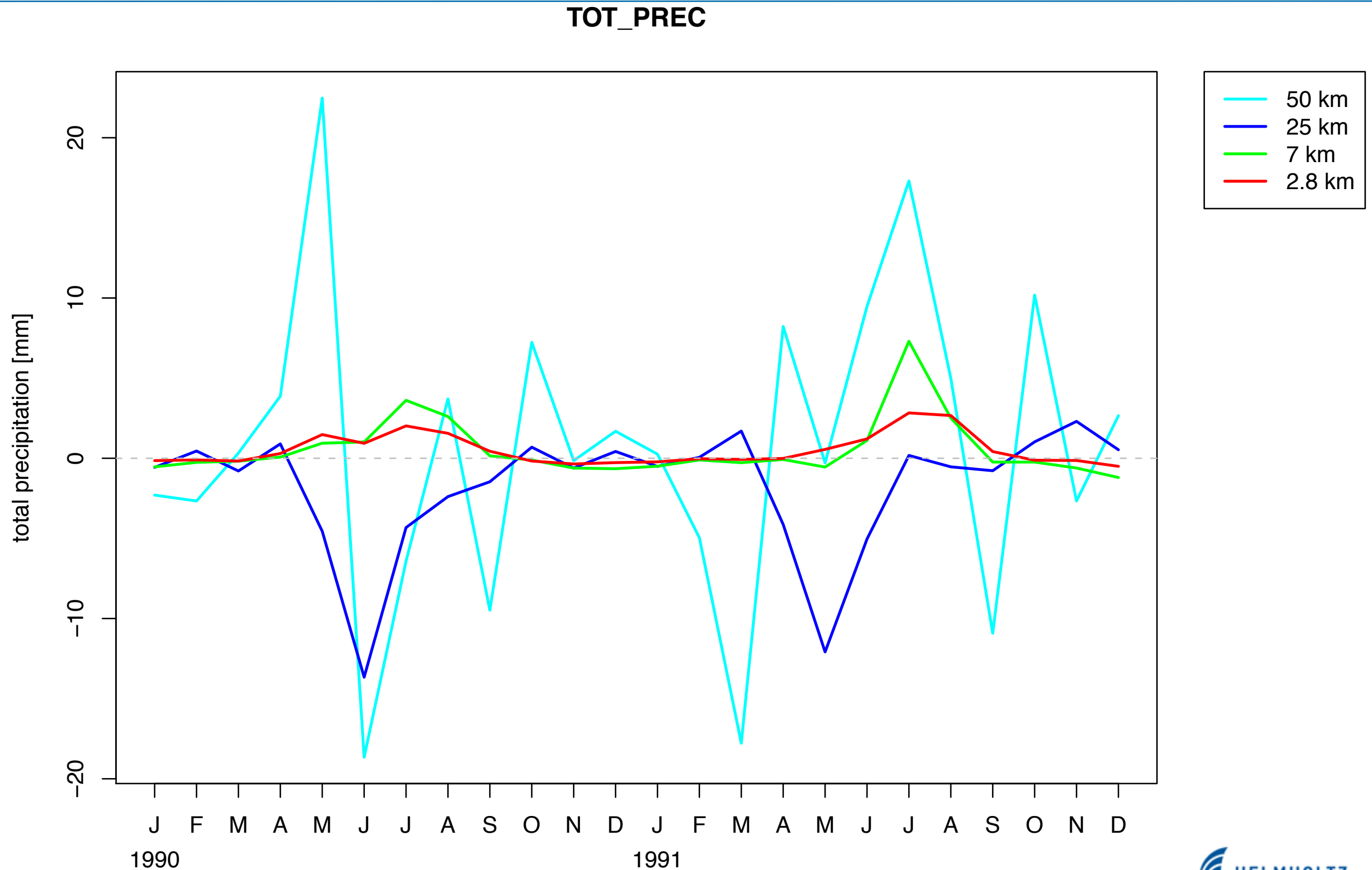


Precipitation subdomain

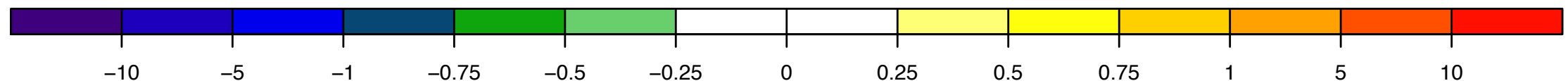
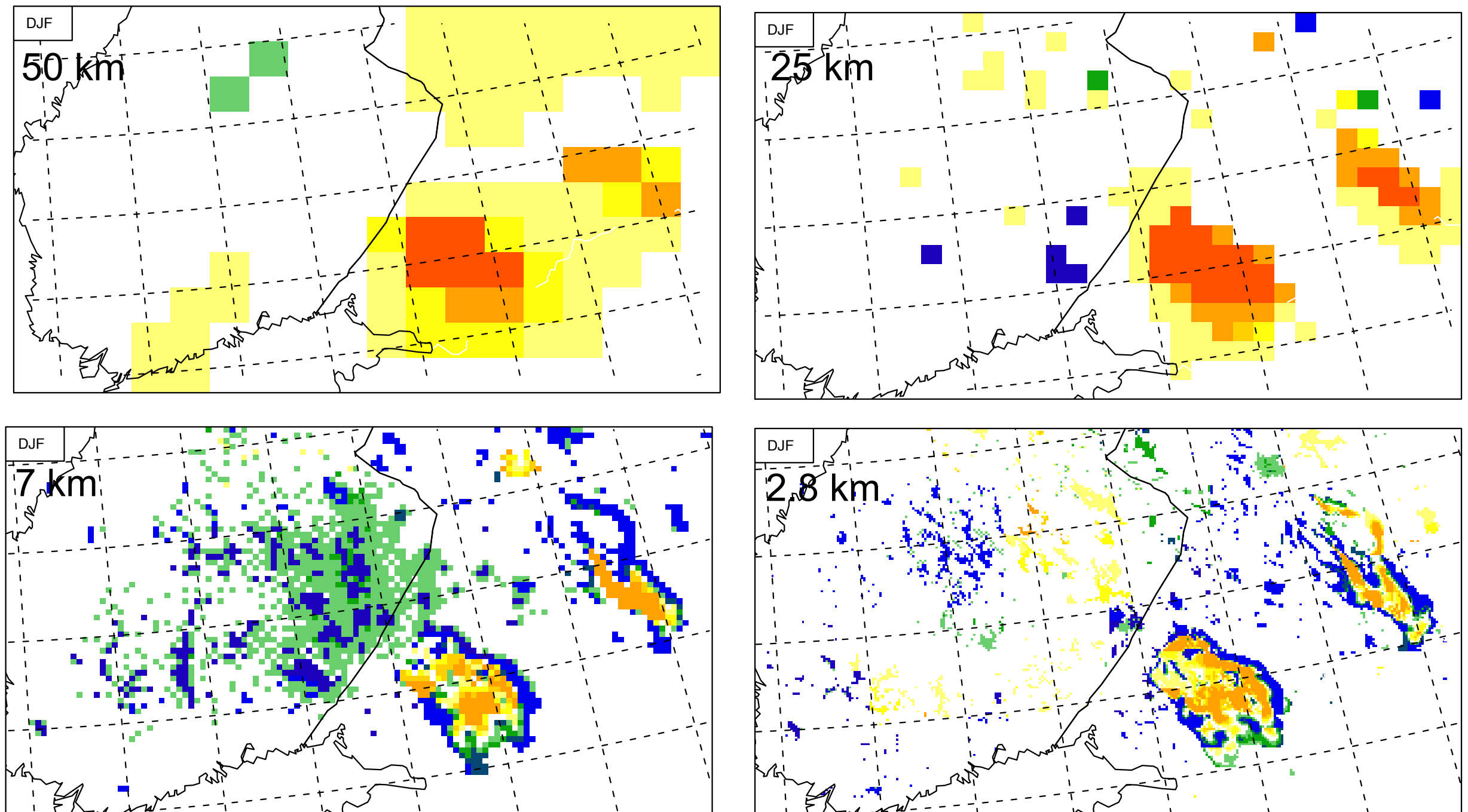
TOT_PREC



Precipitation difference (noFL - FL) over subdomain

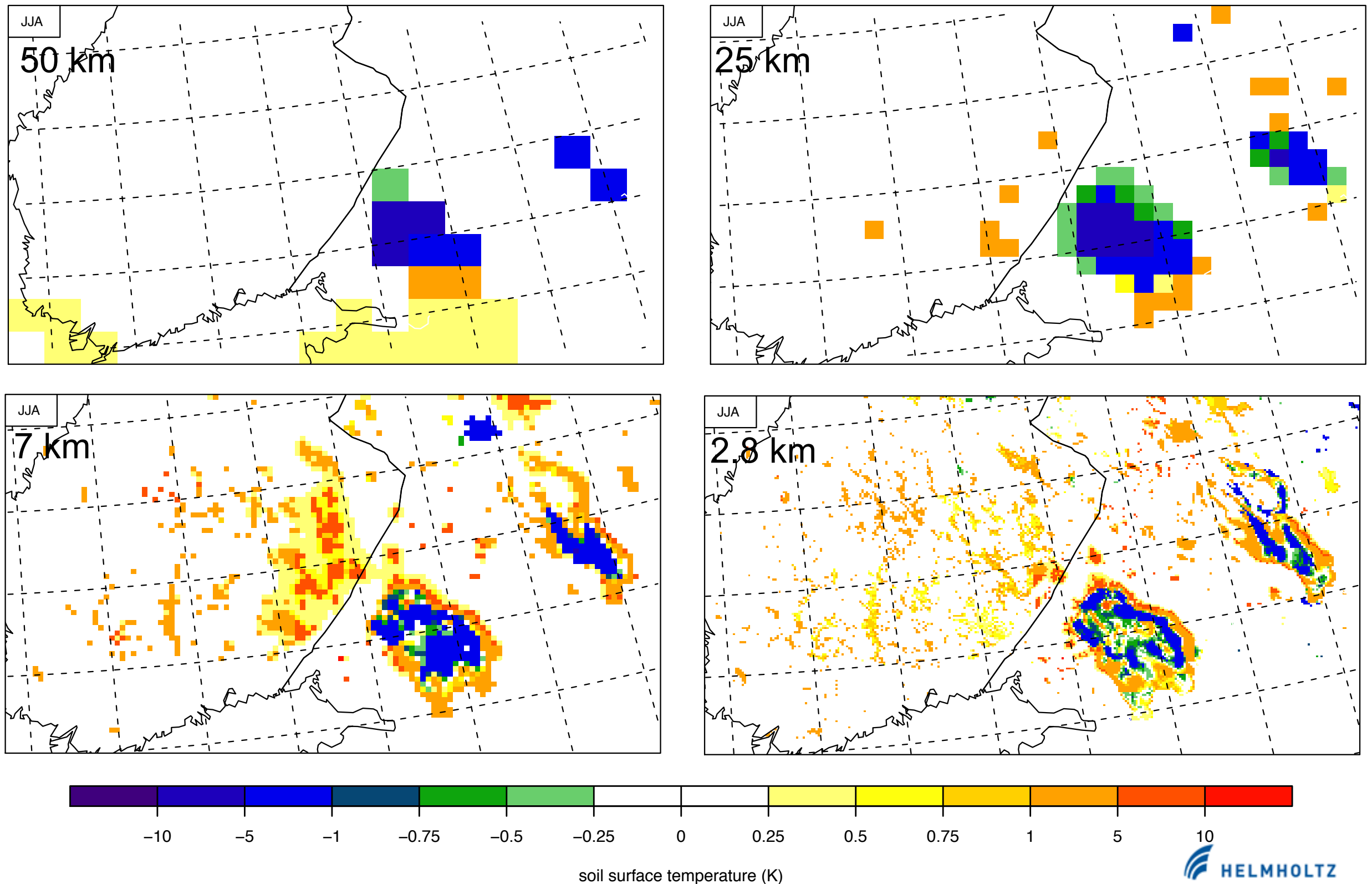


Difference in Surface Temperature in Winter (no FLake - with FLake)



soil surface temperature (K)

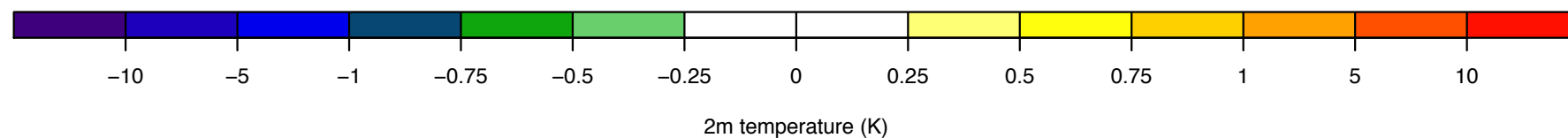
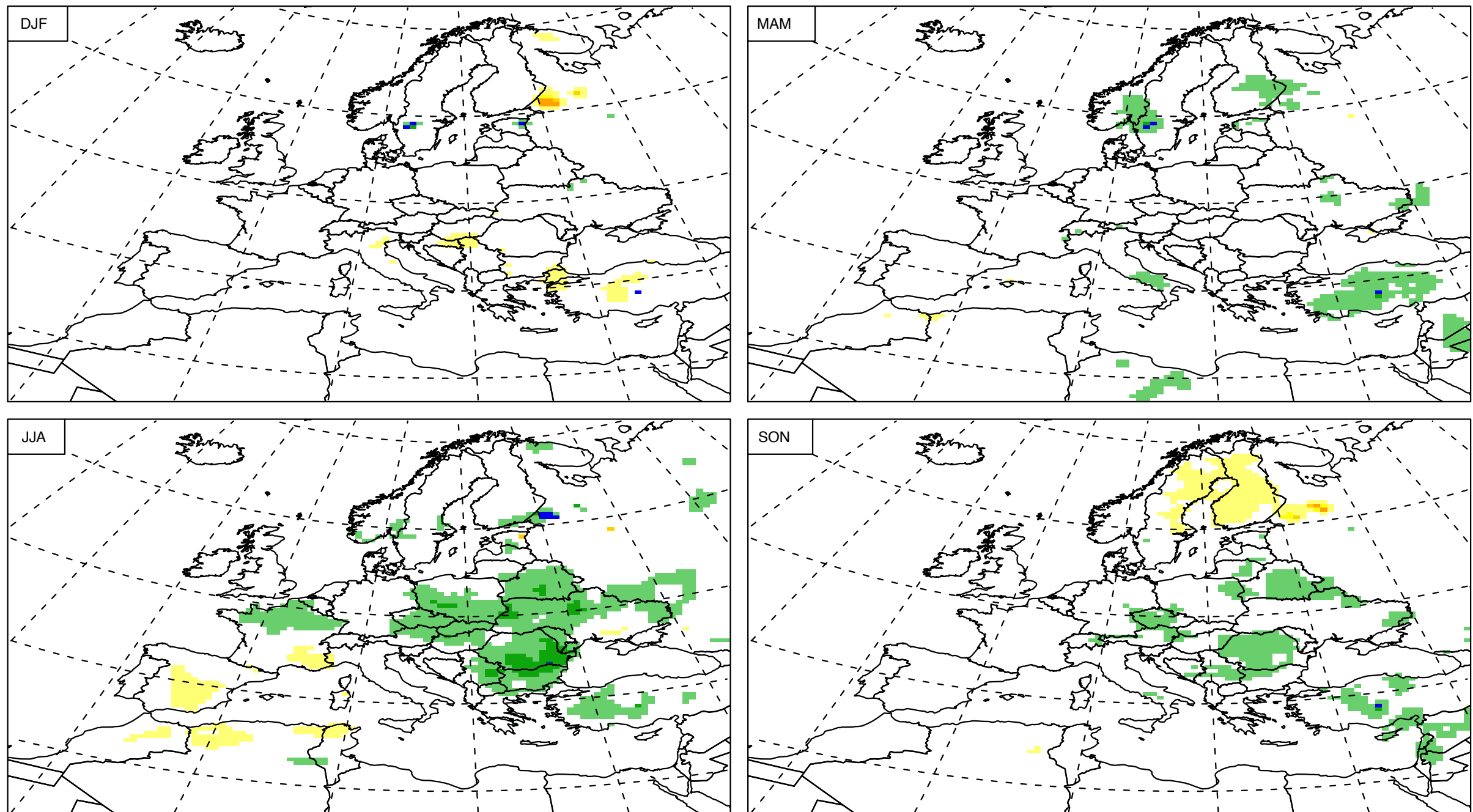
Difference in Surface Temperature in Summer (no FLake - with FLake)



2m Temperature difference (noFL - FL) seasonal means

50 km

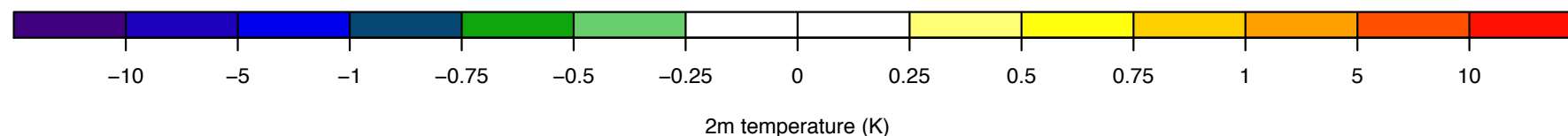
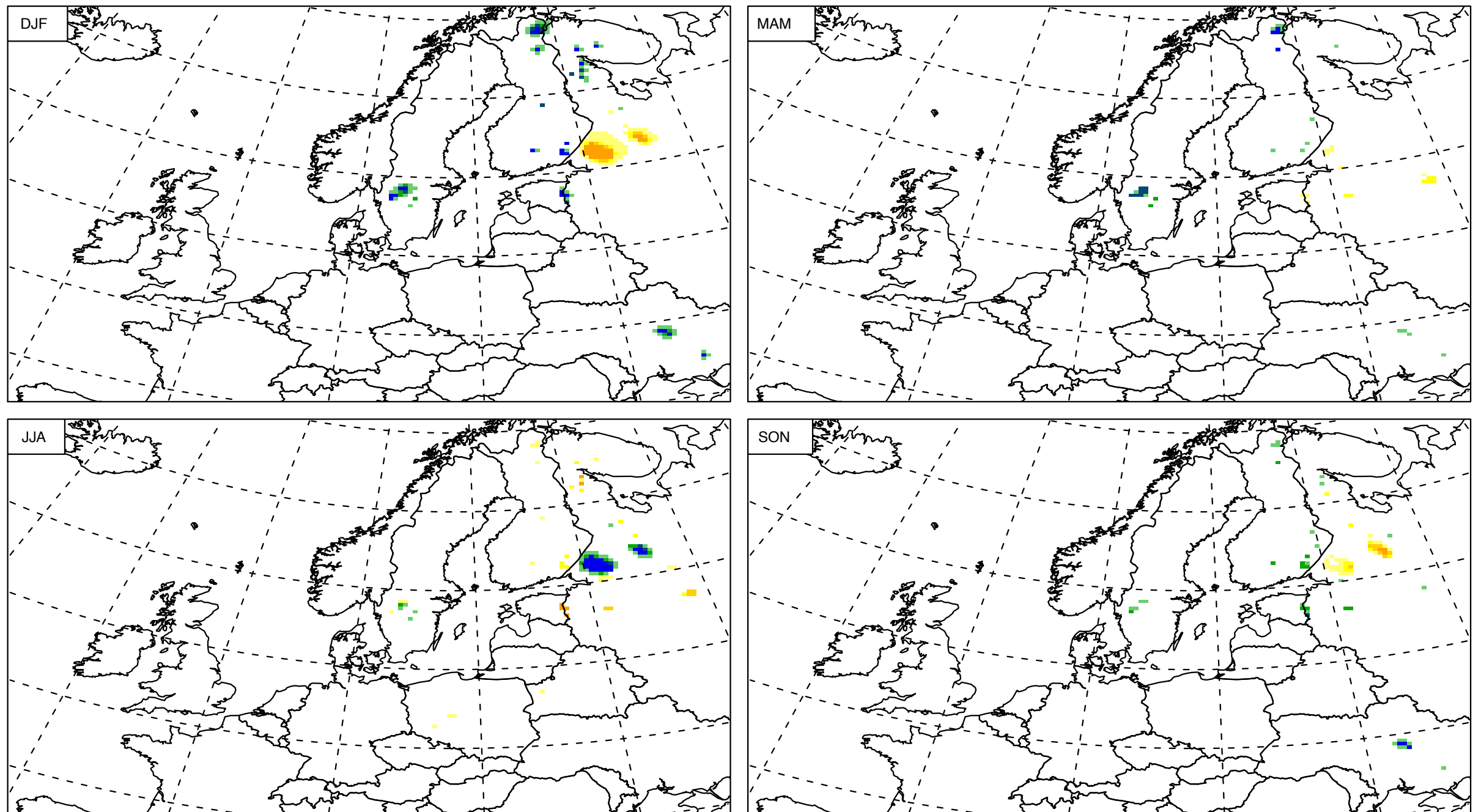
2m temperature difference (no FLake – with FLake) 044



2m Temperature difference (noFL - FL) seasonal means

25 km

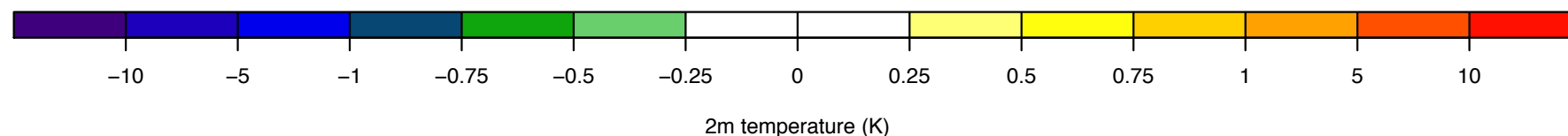
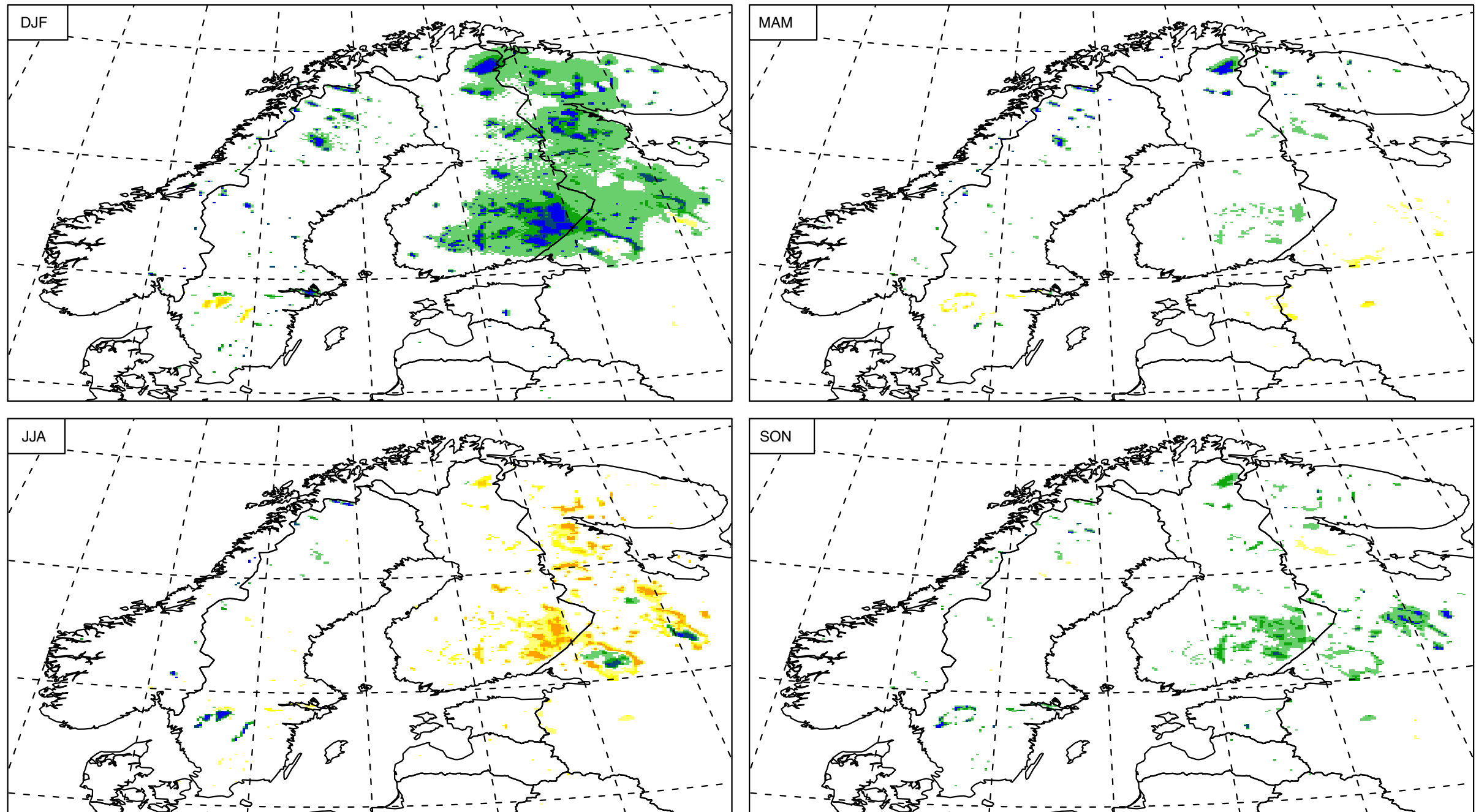
2m temperature difference (no FLake – with FLake) 022



2m Temperature difference (noFL - FL) seasonal means

7 km

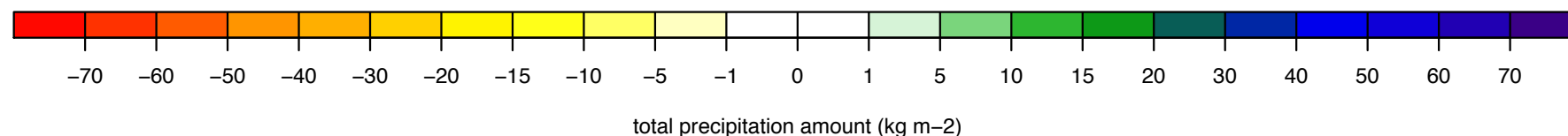
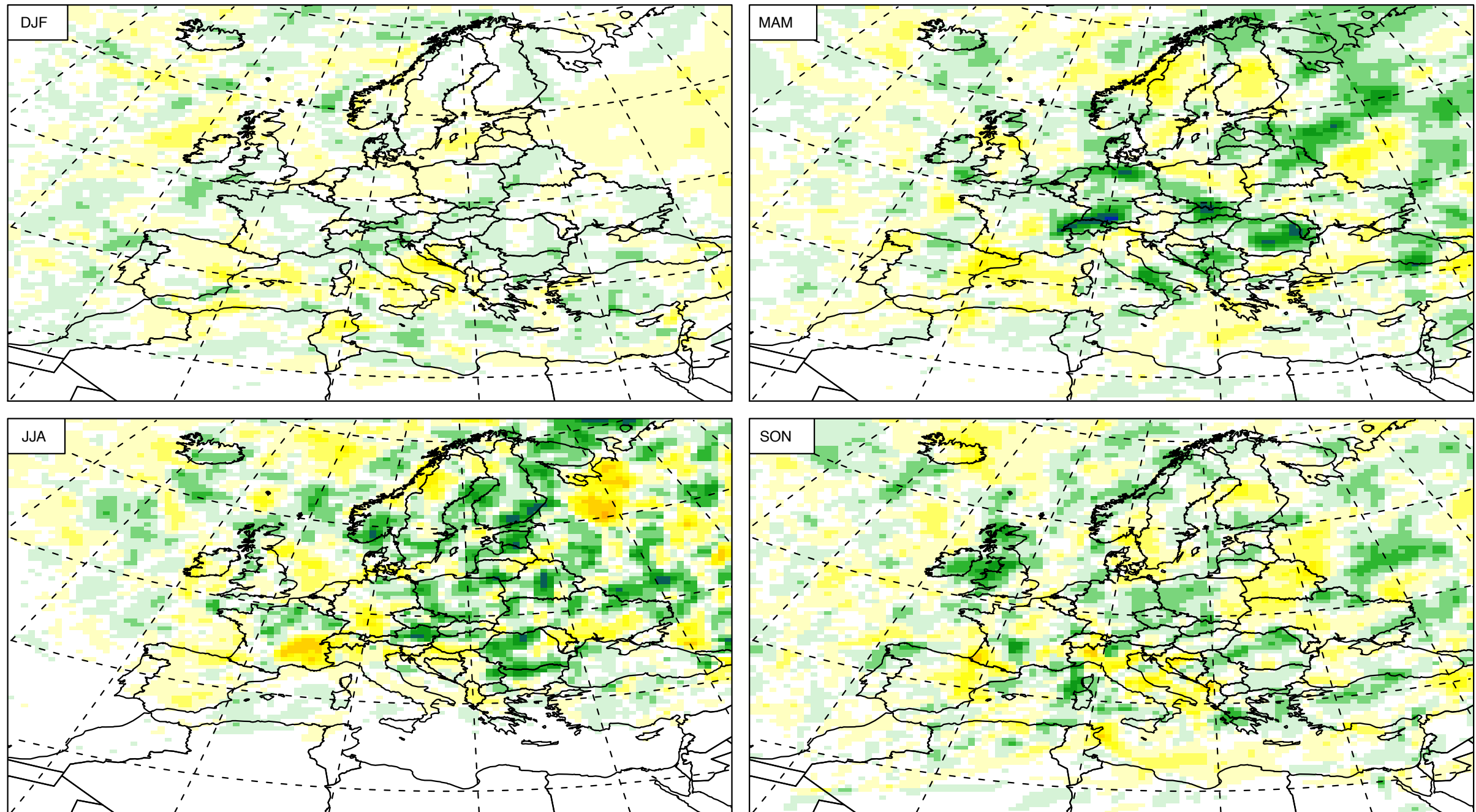
2m temperature difference (no FLake – with FLake) 00625



Precipitation difference (noFL - FL) seasonal means

50 km

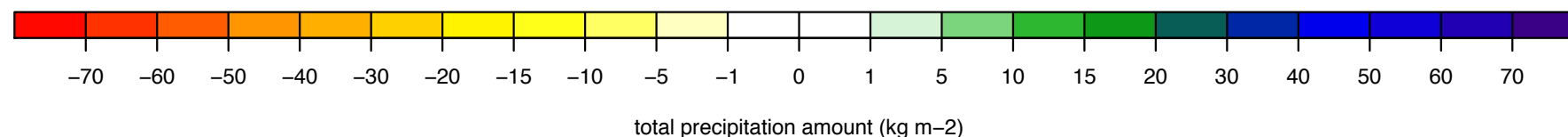
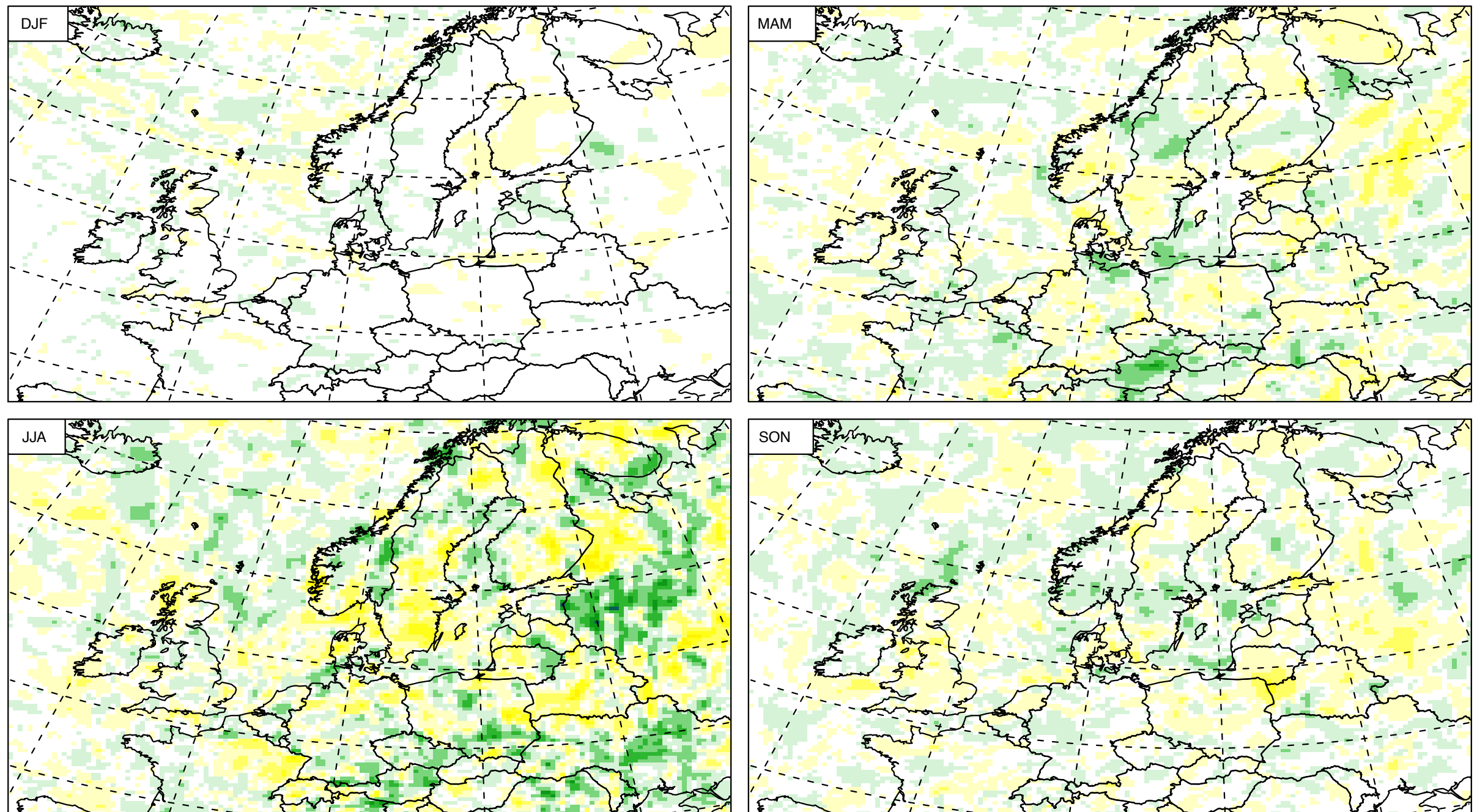
total precipitation difference (no FLake – with FLake) 044



Precipitation difference (noFL - FL) seasonal means

25 km

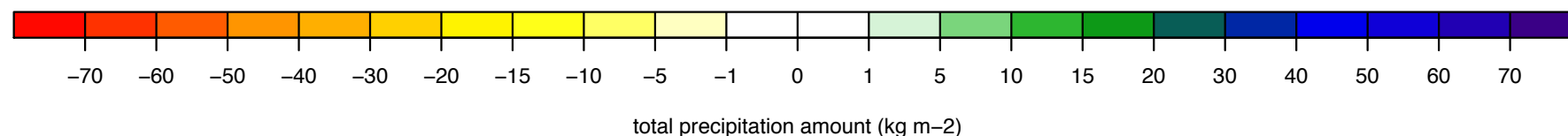
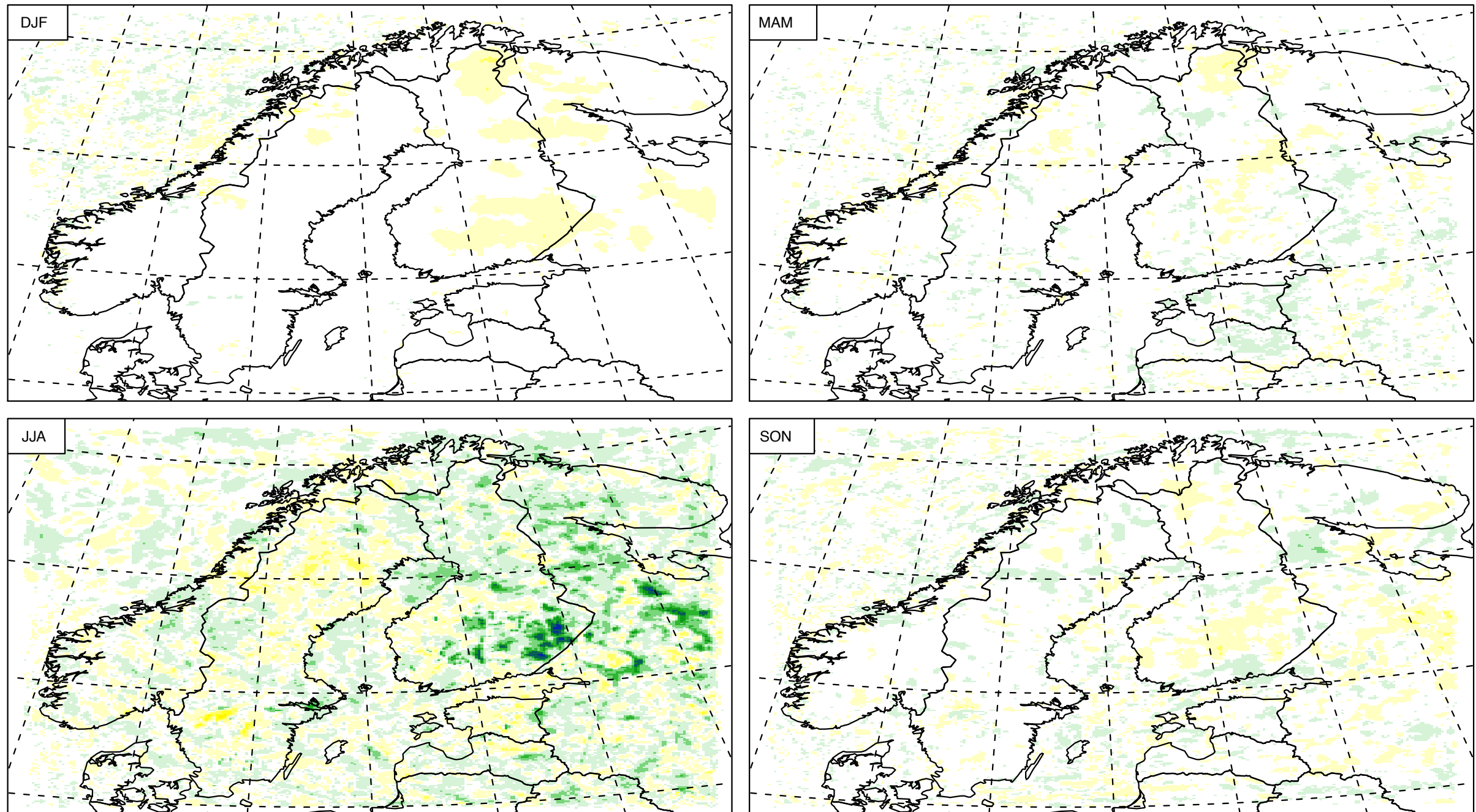
total precipitation difference (no FLake – with FLake) 022



Precipitation difference (noFL - FL) seasonal means

7 km

total precipitation difference (no FLake – with FLake) 00625



➔ Differences (subdomain)

- are largest for the largest grid size
- have opposite annual cycle in T2m for the two largest and two smallest grid sizes
- decrease in precipitation from large to small grid size
- in sea surface temperature are up to 10 degrees

➔ Differences (whole region)

- in T2m are mainly over the lakes and adjacent areas (except for 50 km where differences appear over SE-Europe in Summer)
- in precipitation seem to be largest in summer for the smaller grid sizes and stochastic for all grid sizes.

➔ subgrid lake consideration matters for 50km and 25km, but less for 7km and 2.8km

➔ Tests with tile approach in COSMO-CLM are needed

➔ extended time period; include observations