

SPECIAL PROJECT PROGRESS REPORT

All the following mandatory information needs to be provided. The length should *reflect the complexity and duration* of the project.

Reporting year 01/2020-06/2020

Project Title: Simulations of extreme precipitation over Denmark and its dependence on resolution

Computer Project Account: spdkchri

Principal Investigator(s): Ole Bøssing Christensen (obc@dmi.dk ECMWF: nho).

Affiliation: Danish Meteorological Institute

Name of ECMWF scientist(s) collaborating to the project (if applicable) N/A

Start date of the project: 1/1/2020

Expected end date: 31/12/2021

Computer resources allocated/used for the current year and the previous one (if applicable)

Please answer for all project resources

		Previous year		Current year	
		Allocated	Used	Allocated	Used
High Performance Computing Facility	(units)			9000000	0
Data storage capacity	(Gbytes)			7500	0

Summary of project objectives (10 lines max)

Testing the capability of sub-kilometre simulations with the HARMONIE-Climate (HCLIM) model, based on the HARMONIE NWP model with AROME physics, to reproduce the spatio-temporal statistics of extreme convective precipitation through analysis of several variables. Comparisons will be performed against gridded observational data and model simulations with varying resolutions (sub-kilometre, 3 km, and 12 km). Due to the computational cost of the very-high resolution experiments, we may focus on the representation of specific events or individual seasons and years. We plan to assess the added value of the sub-kilometre-scale simulations and quantify the actual spatial extent of extreme events and how this depends on model resolution, e.g., using spatial correlation.

Summary of problems encountered (10 lines max)

The calculations have not started yet, but we are quite confident that we will be able to reach our targets in due time. It was never the plan to start immediately in January 2020; on top of that, Emma Thomassen, the PhD-student who will perform the bulk of the simulations, has been on a planned external stay at the UKMO and has therefore not been focussing on the HCLIM simulations. Finally, the COVID19 situation has also caused further delays.

After the summer break 2020 we are ready to start these calculations and do plan to use the resources allocated in time.

Summary of plans for the continuation of the project (10 lines max)

With the current allocation of resources it will be possible during the current project year to perform climate simulations covering Denmark and a part of the surrounding sea in an extremely high resolution of 750m grid distance for a total duration of around one full year, which will be allocated to two summer seasons (May-October) due to the aim to investigate the simulation of heavy convective (summer) weather systems. We will be using ERA5 boundaries and will choose years, which have experienced more heavy rains over Denmark than the average. Candidate years are 2006 and 2007.

List of publications/reports from the project with complete references

None yet.

Summary of results

As the project in reality has not started yet, there is nothing to report for the time being.