EMI R&D 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 2026

Project Title: EURO-CORDEX2 simulations with Harmonie-Climate downscaling the IPSL GCM

Computer Project Account: spdkchri……

Principal Investigator(s): Ole B. Christensen, special consultant, PhD

Affiliation: Danish Meteorological Insitute

Name of ECMWF scientist(s) collaborating to the project (if applicable) ……

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Start date of the project: 1/1/2024……

Expected end date: 31/12/2026……

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)	27 000 000	26 139 443	10 000 000	0
Data storage capacity	(Gbytes)	80 TB	86 TB	80 TB	86 TB

Summary of project objectives (10 lines max)

Enabling a contribution from the DMI to EURO-CORDEX6, the newest generation of downscaling simulations over Europe, this time based on CMIP6 global climate models following the most recent set of greenhouse gas emission scenarios.The DMI is part of the consortium centred around HARMONIE-CLIMATE, a climate version of the operational weather forecast model HARMONIE. The DMI would contribute a downscaling simulation driven by the IPSL-CM6A-LR global simulation, one of ten CMIP6 simulations selected by the EURO-CORDEX community, which aimed for a GCM simulation selection balanced in signal.

Summary of problems encountered (10 lines max)

Our estimates of required resources and computing speed for the project were not good. As a result we had serious overspending of SBUs during the first two years, 2024-2025. On the other hand, we completed the planned simulations during that period and have therefore not been spending any additional computing units this year.

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

The simulations, which were kindly funded in this project, have completed. We will therefore not spend the SBU resources for this year, unless we run into necessary reruns as we investigate the data.

In the final report, the results from the simulations will be presented, and they will be put into context wrt. the entire EURO-CORDEX-CMIP7 international initiative.

List of publications/reports from the project with complete references

No results have been published yet, due to some consortium-level unfortunate software delays, which are out of our hands.

Summary of results

If submitted **during the first project year**, please summarise the results achieved during the period from the project start to June of the current year. A few paragraphs might be sufficient. If submitted **during the second project year**, this summary should be more detailed and cover the period from the project start. The length, at most 8 pages, should reflect the complexity of the project. Alternatively, it could be replaced by a short summary plus an existing scientific report on the project attached to this document. If submitted **during the third project year**, please summarise the results achieved during the period from July of the previous year to June of the current year. A few paragraphs might be sufficient.

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As we have no new results for the last year, I will refer to the 2025 progress report for more detailed information.

In summary, climatological biases exist when comparing our ERA5-driven European simulation to the observational gridded E-OBS dataset. Temperatures are generally somewhat too low in this simulation, particularly in winter with a Scandinavian negative bias of 2 degrees. In other seasons, the biases are smaller. Precipitation is quite realistic, though generally positive. In summer in Southern Europe, where precipitation is very low, we have around twice the observed values; this is not considered a major cause for concern, as the amounts are still very small compared to other seasons.

For climate change, we have simulated two scenarios, ssp126 and ssp370. Generally, the spatial patterns of climate change for the two scenarios are the same, with the expected difference in amplitude. The most striking difference between results from this simulation and CMIP in general is the rather low amplitude of the summer heating/drying signal in Southern Europe. Precipitation is reduced by only around 25%, and the corresponding excess heating is quite moderate, resulting in a spatial maximum of summer warming in eastern Ukraine and southern Russia. This feature should be analysed in comparison to other simulations, and the driving GCM results should also be further studied wrt. summer heating/drying in this area.