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	2020
Project Title:	Near-term Climate Prediction at High Resolution
Computer Project Account:	spesiccf
Principal Investigator(s):	Louis-Philippe Caron
Affiliation:	Barcelona Supercomputing Center
Name of ECMWF scientist(s) collaborating to the project (if applicable)	N/A
Start date of the project:	January 2020
Expected end date:	December 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)	N/A	N/A	66M	4.3M
Data storage capacity	(Gbytes)	N/A	N/A	60k	52k

Summary of project objectives (10 lines max)

The main objective of the first set of experiments (year 1) is to better understand the climate impacts of the observed AMV in order to estimate their predictability. This will be done by performing idealized experiments with EC-Earth3 CGCM in which the North Atlantic SST will be restored towards the observed AMV anomalies. We will particularly focus on the AMV impacts on the occurrence of weather extremes such as Tropical Cyclones, heat waves, and heavy precipitation events. In the second part (year 2), we will explore the impact of increasing horizontal resolution on the oceanic and atmospheric domains on seasonal prediction skill of EC-Earth3 through retrospective seasonal predictions of seven months initialized twice every year for the period 1980-2018. Specific emphasis will be made on improvements in simulating Arctic climate variability, and how it affects simulated climate over land areas including Europe, and climate extremes.

Summary of problems encountered (10 lines max)

The covid-19 has had a strong negative impact on this project. Spain has been hit particularly hard and strong measures were put in place to deal with the situation. This has created delays in many projects, this one included. However, we are finally managing to catch up with the accumulated delays. Most of the computing hours used were used in the last month or so. We should be ready to proceed with the experiments during the summer.

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

We are finishing to test the workflow on CCA and in parallel (on our local machine), we are finishing the tuning of the high-resolution version on the model, an effort that has been ongoing for many months now and much slower than anticipated. Once both of these activities are completed, we will proceed with the first set of experiments. Given the highly parallelized nature of these experiments, we expect to use all the remaining computing hours within a month or so of launching them. Plans for year 2 remain unchanged at the moment.

List of publications/reports from the project with complete references

None so far. (project started in January 2020)

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.

As mentioned above, we have suffered significant delays due to the covid-19 situation, which had a cascading effect and created delays in many projects, including this one. As a result, we have used only around 6% of the hours allocated. Most of the hours used to test the workflow and the model. In parallel, we are tuning the latest version of EC-Earth on our local machine, as we found that the high-resolution version had an unrealistically cold climate over the North Atlantic sector, which we expect would strongly degrade the skill of the forecasts. This tuning effort has been ongoing since late summer 2019 and is relatively time consuming due to the lower SYPD of the high resolution

compared to the low-resolution. We expect to be able to proceed with our first set of experiments on CCA over the summer of 2020.