

# 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:** Evaluation, Tuning and Optimisation of Surface Physics Parametrizations in HARMONIE-AROME for NWP forecasting for Ireland

**Computer Project Account:** spieglee

**Principal Investigator(s):** Emily Gleeson

**Affiliation:** Met Eireann

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

**Start date of the project:** 01/01/2019

**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	
<b>High Performance Computing Facility</b>	3M (2019)	3M (2019)	3M (2020)	3M (2020)	
<b>Data storage capacity</b>	10TB	(have not stored data in ECFS under this account)			

10/06/20

This template is available at:

<http://www.ecmwf.int/en/computing/access-computing-facilities/forms>

**Summary of project objectives** (10 lines max)

The focus of this project is primarily on testing surface related physics modules in the model in order to improve weather forecasts for Ireland but also to feed all improvements back into the shared ALADIN-HIRLAM system for the benefit of all collaborating members. This work has currently not been carried out for any HARMONIE domain and it crucial in order to make the best use of the system and to continue to improve the skill of the forecasts. Testing the sensitivity of the surface physics will also feed into the mesoscale ensemble systems of the members.

**Summary of problems encountered** (10 lines max)

No technical issues encountered. Issues are only of a scientific nature as discussed elsewhere in the report.

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

I used this year's allocation to run a suite of surface physics related tests using HARMONIE-AROME. Most of these tests related to surface winds. Next year's allocation will be used for further testing a surface physics in Cycle 43 of HARMONIE-AROME. By then we will hopefully be running this cycle operationally but there will always be more fine tuning to be done regarding surface issues.

**List of publications/reports from the project with complete references**

No journal publications on this project so far this year.

**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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The SBUs for this project have all been used for testing cycle 43 of HARMONIE-AROME. While much of the experiments have been surface physics related, it is unrealistic to decouple surface from upper-air physics, so inevitably many upper-air physics experiments also needed to be carried out.

Topics tested included the following: shortwave radiation experiments, use of near real-time CAMS aerosols, adjustments in longwave radiation and cloud condensation nuclei to improve fog forecasts and a large suite of surface drag related experiments as the new physiography database, ECOCLIMAP-SG, results in much lower drag over Ireland and hence large positive wind biases. Experiments using a new soil database, SOILGRIDS, were also run and compared to results from experiments using SOILGRIDS blended with a local dataset by Teagasc.

Several reports and presentations, which provide a lot of information and examples, can be found on [https://drive.google.com/drive/folders/1wpfit36j8VAZM\\_KOkApkRSFf3Jflxn-C?usp=sharing](https://drive.google.com/drive/folders/1wpfit36j8VAZM_KOkApkRSFf3Jflxn-C?usp=sharing)