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	2019
Project Title:	Assessing the impact of stochastic physics (SPPT) on sub-decadal time-scales
Computer Project Account:	SPGBDJB
Principal Investigator(s):	Daniel J Befort, Antje Weisheimer
Affiliation:	University of Oxford
Name of ECMWF scientist(s) collaborating to the project (if applicable)	Antje Weisheimer, Tim Stockdale, Stephanie Johnson, Magdalena Balmaseda
Start date of the project:	January 2019
Expected end date:	December 2019

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	5 000 000	0
Data storage capacity	(Gbytes)	N/A	N/A	6 000	0

Summary of project objectives (10 lines max)

The aim of this project is to assess the impact of stochastic physics (SPPT) on multi-year time-scales (up to three winters ahead). Experiments with and w/o SPPT with a forecast length of 28 months initialized in November from 1981 to 2010 are planned to be conducted using the coupled long-range system.

Summary of problems encountered (10 lines max)

N/A

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

After implementing the ability to restart IFS from a previous run (see Summary of results below) a set of simulations to analyse the impact of SPPT on multi-year time-scales will be carried out.
Two hindcast experiments using IFS CY46R1 in a resolution of TCo199 will be conducted; one experiment will be run without SPPT, whereas the second experiment will include SPPT. The setup of both hindcast sets is identical; hindcast years: 1981 until 2010 initialized in November, ensemble size: 10-members and, forecast length: 28 months. Thus, this setup allows to link scientific knowledge about stochastic parametrizations on (sub-) seasonal time-scales with those for long climate time-scales. Overall, this study will inform the scientific community about the influence of model uncertainty representations on sub-decadal time-scales and will potentially motivate the discussion about the inclusion of such stochastic schemes in current decadal prediction systems. It is planned to use all granted resources (5 million SBU/ 6TB disk space).

List of publications/reports from the project with complete references

N/A

Summary of results

The initial objective of this project is to assess the impact of SPPT on multi-year time-scales, which is thought to inform e.g. the decadal community about potential benefits. Initially simulations are planned to cover 28 months (three winters ahead when initialised in November), however, depending on results it might be scientifically relevant to analyse SPPT impacts also on longer time-scales. Until now it hasn't been possible to extend the forecasts length of a previous IFS simulation. In collaboration with scientists at ECMWF, the PI of this project has worked to implement that ability into IFS CY46R1. This work has been finished now and these changes will be eventually merged using the current operational CY46R1 version, which will be further used to carry out the proposed simulations.