

SPECIAL PROJECT FINAL REPORT

All the following mandatory information needs to be provided.

Project Title:	Constraining stochastic parametrisation schemes through coarse graining
Computer Project Account:	spgbtpcs
Start Year - End Year :	2015 - 2017
Principal Investigator(s)	Hannah Christensen Tim Palmer
Affiliation/Address:	University of Oxford
Other Researchers (Name/Affiliation):	Andrew Dawson (ECMWF)

The following should cover the entire project duration.

Summary of project objectives

(10 lines max)

Stochastically Perturbed Parametrisation Tendencies (SPPT) is an attractive stochastic parametrisation scheme due to its ease of use and beneficial impact on ensemble forecast reliability. However, despite its popularity, the SPPT scheme remains ad hoc in its assumptions. For example, the imposed spatial and temporal correlations have not been derived from theory or observation and have simply been tuned to give the best results. SPPT also does not distinguish between different parametrisation schemes and assumes the errors from each scheme are perfectly correlated. This project seeks to address these shortcomings using coarse graining experiments: a high-resolution data set will be coarse grained to the resolution of a NWP model, and the characteristics of the ‘error’ between high resolution data set and NWP tendencies will be calculated

Summary of problems encountered

Initially we had some technical problems with the openIFS SCM, which we chose to use as our forecast model, though these were addressed during the first year of the project.

Experience with the Special Project framework

We have always had a very good experience with the Special Project framework, and particularly with support provided by ECMWF through general user support (contact: Paul Dando) and the openIFS user support (Filip Vaña and Glenn Carver).

Summary of results

Please see attached report.

List of publications/reports from the project with complete references

Christensen, H. M., Dawson, A., and Holloway, C. Forcing the IFS Single Column Model using high-resolution model simulations. Accepted in JAMES

Christensen, H. M. and co-authors, Constraining stochastic parametrisation schemes using high-resolution simulations. In preparation (see attached)

Future plans

Analysis of the results produced during this special project is ongoing and will likely continue for two to three more months. The results from this special project are currently being written up for submission to a peer-reviewed journal. The attached report is an early draft of this manuscript. The coarse-graining framework developed as part of this project will continue to be used through the NERC funded project ‘Reliable climate projections: the final frontier for stochastic parametrisation’ (PI: HM Christensen).