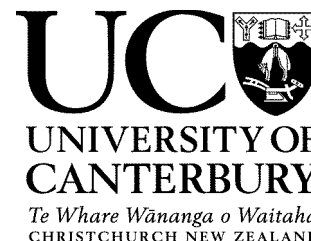


College of Science

Department of Physics & Astronomy
Tel: +64 3 364 2987 ext 7544, Fax: + 64 3 364 2469
Email: steve.george@canterbury.ac.nz



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REANZ, PO Box 3325, Wellington 6140, New Zealand

Dear Julie

RE: Trip report for application entitled Chemistry-Climate Modelling (SOCOL)

The following details the highlights of my recent trip to the UK (18th June – 6th July). The institutions I visited are as follows:

- Meteorological Department, University of Reading, Reading
- British Atmospheric Data Centre (BADC), Rutherford Appleton Laboratory, Didcot
- Meteorological Office, Exeter
- CCMVal 2007 Workshop, University of Leeds, Leeds
- British Antarctic Survey, Cambridge

The main purpose of my trip was to attend the Chemistry-Climate Modelling Validation Activity (CCMVal) workshop (26th-29th June). CCMVal was established by the SPARC (Stratospheric Processes And their Role in Climate) project, with a goal to an improved understanding of Chemistry-Climate Models (CCMs) and their underlying GCMs (General Circulation Models) through process-oriented evaluation. SPARC itself is a core project of the World Climate Research Programme.

The UC Atmospheric Physics Group employs a CCM variant known as Socol. The model simulations are computational demanding and have been run on the UC supercomputer (indeed, Socol has been an exemplar project on said system). The CCMVal workshop was an opportunity to both present our current results and model developments, and to interact face-to-face with co-researchers (who are mostly northern hemisphere based). Specifically, I presented details of a new dynamical parameterisation scheme that has been (locally) incorporated into Socol. The scheme has been shown to correct one of the major deficiencies in the original CCM: a major mode of atmospheric variability known as the Quasi-Biennial Oscillation (QBO) was missing. The lack of a QBO has major ramifications if one wishes to correctly simulate to complex chemistry relating to ozone hole recovery (a major subject for CCMVal). Thus, there was significant interest (from the Socol user community) in incorporating our new code into the main model code base.

During the workshop I was a member of a Breakout Group addressing 'Diagnostic Tools, Data Archiving and Data Formats'. The CCMVal programme will produce large volumes of data, which will need to be easily accessed and manipulated by third-party users. I pressed for CF standard netCDF output from all groups, and suggested the data should be available via the NERC DataGrid. The latter had been the subject of my visit to BADC the previous week. The NERC DataGrid provides a transparent portal to potentially thousands of datasets (stored locally or remotely), and using a strict UML/XML interface allows real language (rather than pseudo-code) data discovery searches. Standard APIs also allow for the relatively simple development of graphical front-end analysis environments (even if the underlying, original data are in disparate formats).

In a local context, the NERC DataGrid portal, combined with the bandwidth capabilities of KAREN, would allow us to make our CCM data (approximately 1Terrabyte at present, but growing steadily) easily accessible to third-party users. On a more ambitious front, a NZ implementation of the DataGrid portal could be established (NERC would provide the software for free). In the atmospheric sciences, as in most sciences, there are huge quantities of offline data, recorded in esoteric formats, which fail to achieve their usage potential. A local DataGrid/storage-facility could help to make available such NZ data (which potentially cost large sums of money to initially collect).

A potential third-party user of our model data is the British Antarctic Survey. I visited them in Cambridge and gave a presentation detailing what we are presently doing, and where we are planning to head in the future. We derived an initial plan to compare the gravity-wave momentum deposition derived from their operational MF radar, with that occurring in the SOCOL CCM. Another area of possible joint work involved the model simulation of high-atmosphere charged particle deposition (space weather influence on the climate). We already have several collaborative links, and updates were made regarding these areas.

The visit to the Metoffice was to enable a face-to-face meeting with people I have been collaborating with whilst developing the new dynamical scheme for SOCOL. The new parameterisation still needs refining/tuning, and the meeting provided useful feedback in this regard. I also met with the group responsible for orographic gravity waves parameterisation (Metoffice Unified Model), and precipitated some future collaboration regarding improving said scheme (we have proposed an observational study to produce an improved climatology of gravity-waves over the Antarctic, and the results could lead to direct improvements in gravity wave parameterisations).

The visit to Reading helped to reinforce ongoing collaborations, and finalised the details of a scientific paper (which has now been submitted to Climate Dynamics).

Yours sincerely

Dr Steve George
Departmental Research Fellow