

SPECIAL PROJECT PROGRESS REPORT

Progress Reports should be 2 to 10 pages in length, depending on importance of the project. All the following mandatory information needs to be provided.

Reporting year 2011/2012

Project Title: The global circulation in various coordinate systems

Computer Project Account: SPDLRDE

Principal Investigator(s): (1) K.P. Hoinka
(2) J. Egger

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(1) Universität München, München, Germany

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

Start date of the project: 2011

Expected end date: 2014

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)	500	0	500	0
Data storage capacity	(Gbytes)	10	10	10	10

Summary of project objectives

(10 lines max)

The impact of the choice of the coordinate system on the zonal mean circulation is a fascinating topic which will result in various new insights into the dynamics of the atmosphere when the attempt will be made in this project to cover this field as far as possible.

Summary of problems encountered (if any)

(20 lines max)

Summary of results of the current year

(from July of previous year to June of current year) This section should comprise 1 to 8 pages and can be replaced by a short summary plus an existing scientific report on the project

The publication Egger(2011) can be seen as a final outcome of our work on angular momentum and mountain torques. The earth has to exchange energy with the atmosphere while the standard energy equations deny this possibility. This paradox is now resolved. As stated in the last report, we turn now to the zonal mean circulation, a topic stimulated by our work on angular momentum fluxes in height-coordinates. A paper on potential vorticity coordinates (Egger and Hoinka, 2012) is now accepted and shows as one surprise that the mean circulation in such coordinates contains shallow 'indirect' cells near the surface presumably generated by latent heat release. Two more papers are close to completion, one on the mean circulation in (potential temperature, height coordinates), the other one on (angular momentum, height) coordinates. The circulation in the former case is surprisingly similar to that in standard isentropic coordinates, that in the latter is similar to that in (latitude ,height)-coordinates.

List of publications/reports from the project with complete references

Egger, J., 2011: Mountain forces and the atmospheric Energy budget. J. Atmos. Sci. 68, 2689-2694.

Egger, J. and K.P. Hoinka, 2012: Atmospheric mean circulation in PV coordinates. Mon. Wea. Rev., accepted.

Summary of plans for the continuation of the project

(10 lines max)

Highest priority will be given to completion and synopsis of work on the coordinate issue. A publication is in preparation which will try to discuss and compare all the zonal mean circulations available by now. There are plans to evaluate the Eliassen-Palm fluxes in the new coordinate systems.