

## 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** 2010/2011

**Project Title:** The climatology of the global tropopause

**Computer Project Account:** SPDLRDE

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

**Affiliation:** (1) Institut für Physik der Atmosphäre, DLR,  
Oberpfaffenhofen  
(1) Universität München, München, Germany

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

**Start date of the project:** 1996

**Expected end date:** 2011

### 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>	(units)	500	0	500	0
<b>Data storage capacity</b>	(Gbytes)	10	10	10	10

## **Summary of project objectives**

(10 lines max)

At present neither the daily nor time averaged global structures of the tropopause are known with sufficient accuracy. Tropopause data derived from vertical profiles of rawinsondes are usually available above land. However, the density of rawinsonde observations is sparse above large continental regions. Little information of the tropopause exists above the sea. Global available data are necessary, with sufficiently high resolution in the horizontal and the vertical, in order to analyse the local patterns of the tropopause. The data provided by the ERA project form a suitable data base to determine the tropopause surface globally as well as regionally. In particular, the data set allows one to select regions of the globe (e.g. polar, mid-latitude and tropical) where the basic knowledge and understanding of the typical tropopause behaviour above the corresponding regions can be gained.

## **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

Global angular momentum investigations

Main activities in 2010 were related to three publications (Egger and Hoinka 2010, 2011a, 2011b). While the first paper draws attention to the fact that about as much can be learned from inversion of potential temperature as from that of potential vorticity, the second one points out that the standard assumption of white noise in linear models of atmospheric large-scale flow is not supported by the observations. The paper on angular momentum shows that the momentum generated by the positive friction torques in the tropical belt is not exported from the tropics by eddy transports as generally assumed. Instead the transport to the midlatitude sink regions occurs mainly via the Hadley cell and a shallow outflow layer.

Substantial efforts have been devoted to the new project of evaluating the zonal mean circulation in potential vorticity coordinates on the the basis of ERA40 data. Several technical problems had to be overcome but it is just now that a first version of the related paper is completed.

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

Egger, J. and K.P. Hoinka, 2010: Potential temperature inversion: Complementary approaches. *J. Atmos. Sci.*, 67, 4001 -4016.

Egger, J. and K.P. Hoinka, 2011a: Stochastic forcing of potential vorticity: Observations. *Mon. Wea. Rev.*, accepted for publication.

Egger, J. and K.P. Hoinka, 2011b: Global angular momentum fluxes in height coordinates. *Mon. Wea. Rev.*, accepted for publication.

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