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 2012……..……

Project Title: Diabatic effects in mid-latitude weather systems……

Computer Project Account: SPCHBOJO……..……

Principal Investigator(s): Maxi Böttcher and Hanna Joos……..……

Affiliation ETH Zurich……..……

Name of ECMWF scientist(s) collaborating to the project (if applicable) Dr. Richard Forbes……..……

Start date of the project: March 2012……..……

Expected end date: ???……..……

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)	----	----	90000	2742
Data storage capacity	(Gbytes)	----	-----	3500	?

Summary of project objectives

(10 lines max)

Within this special project the importance of different diabatic processes for mid-latitude weather systems is investigated. Simulations with the IFS are performed and the heating rates caused by different microphysical processes are written out as additional fields. We then investigate how important the latent heat release caused by various microphysical processes is for the net latent heating and subsequently for the modification of PV in warm conveyor belts.
Additionally, we planned to investigate the relative importance of the various microphysical processes on the downstream evolution of Rossby waves and surface weather. Therefore, the contribution of different microphysical conversions to the total latent heat release will be modified and the downstream impact will be investigated.

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 project has been started in March 2012. We started with the participation at the "Introduction for new Users/MARS" workshop at ECMWF from 5-9 March 2012. In the following week, we managed to run the IFS and implemented the output of extra fields, namely the heating rates occurring due to the various microphysical conversion processes. In order to modify the initial moisture in the WCB inflow regions a box has been implemented in the IFS where the moisture can be modified in a predefined region and at the desired time steps. It is now tested if this artificial simulation is working. Our project is conducted in close collaboration with Dr. Richard Forbes. We then performed a test simulation for 24 hours for a WCB case in November 23, 2009 in the North Atlantic. As we want to apply a lagrangian perspective, trajectories have to be calculated based on the IFS output. At the moment we therefore evaluate the results from the test simulation and prepare the IFS output for the use with the trajectory tool LAGRANTO. As soon as the technical work is terminated we will start to investigate the microphysical processes occurring in the WCB as well as their influence on the downstream flow evolution.

List of publications/reports from the project with complete references

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Summary of plans for the continuation of the project

(10 lines max)

In a next step, the heating rates occurring due to the various microphysical processes (warm and ice phase) will be investigated in detail. We will do that with a Lagrangian perspective. Thus, the heating rates will be traced along trajectories that represent the considered weather phenomena like e.g. WCBs. It will then be possible to evaluate the contribution of the latent heat release due to different microphysical processes to the total latent heat release and subsequently the PV modification occurring in a WCB or in mid-latidue weather systems. By switching off the contributions of single microphysical processes to the total latent heating it will then be possible to investigate the potential of these processes to modify the PV in the ascending WCB trajectories or mid-latitude weather systems in general. Furthermore it is possible to investigate the potential of each single process to influence the downstream flow evolution.