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	2017
Project Title:	Permafrost in the global climate system: EC-Earth and GIPL
Computer Project Account:	spdkrode
Principal Investigator(s):	Christian Rodehacke (nhc)
Affiliation:	Danish Meteorological Institute (DMI), DK
Name of ECMWF scientist(s) collaborating to the project (if applicable)	Peter L Langen (nhy) Shuting Yang (miy) Tido Semmler (de1t)
Start date of the project:	2 January 2017
Expected end date:	31 December 2017

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)			2500000	0
Data storage capacity	(Gbytes)			4000	0

Summary of project objectives
(10 lines max)

Permafrost in the global climate system

As part of our commitment to the EC-Earth community, we aim to perform simulations between the two-way coupled global climate model EC-Earth and the dedicated permafrost model GIPL.

Permafrost is commonly considered as passive parts of the global climate system due to their long memory of past climate conditions. However they may be subject to sporadic changes and/or trigger changes in the remaining climate system. Permafrost as a large cryonic body, with a vertical extent up to more than 100 meter, requires a substantial amount of energy to change its state from frozen to thaw. Could this mitigate the "Polar Amplification" over centuries? Since permafrost holds vast quantities of various potent greenhouse gases, their release could potentially amplify warming trends. The amplified release of methane may already occur from subsea permafrost located on the continental shelf of Siberia.

Summary of problems encountered (if any)
(20 lines max)

Two kind of problems have caused the reported low use of the granted computer resources.

1. All simulations shall be done with the same version of the EC-Earth climate used for the next CMIP6. Since EC-Earth model has not been released in its final version the for our project required background climate, which should be the control climate of the EC-Earth pre-industrial climate simulations, is still not available. These delays has keep us back from performing the wanted long simulations.
2. We have tested the permafrost model GIPL extensively on the DMI's HPC computer (Cray XC-5), where the code runs hassle-free. However a difficult financial situation at DMI, which came to a head in spring, has lead to less comfortable staffing levels at my institute. Consequently the progress of projects has been delayed.

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

We have tested the permafrost model GIPL extensively in the OpenMP mode. Currently we prepare to run GIPL as standalone model with the MPI parallelization in a extensive test.

List of publications/reports from the project with complete references

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

Since we want to couple the permafrost model with the EC-Earth model, we need to drive our permafrost model with climate boundary conditions consistent with the coming version of the CMIP6 EC-Earth model to avoid spurious run-away effects after coupling. Since the EC-Earth community makes good progress, we hope to have the needed boundary conditions available soon, so that we can start our simulations at the ECMWF.

June 2017