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	2018
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 2019

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	2625000	0
Data storage capacity	(Gbytes)	4000	0	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)

We have tested the permafrost model GIPL extensively on the DMI's HPC computer (Cray), where the code runs hassle-free. However a difficult financial situation at DMI, which came to a head in spring 2017, has led to less comfortable staffing levels at my institute. We still recovering from these cuts, however coming hiring may allow to revive the project.

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

As part of our intensive testing of the permafrost model, we have performed subsea permafrost simulations with a focus on the Siberian continental shelf. Currently we're analyzing this ensemble of subsea permafrost simulations to understand its future prospects. The publication in progress will address also the results dependence from weakly constrained parameterizations and from various poorly known boundary conditions, such as the layering of the ground properties or salinity profiles with depth.

List of publications/reports from the project with complete references

None

Summary of plans for the continuation of the project

(10 lines max)

The needed boundary conditions to drive our model are now available from the EC-Earth community. Since our staffing level is recovering much slower than we have anticipated, we have to reduce our ambitions for the immediate following period. We will first focus only on the technical part of the work. Hence we would ask only for a fraction of 20% of the originally applied resources.

Reduction of applied resources for 2019

HPCF allocations [SBU] : 525000
Data allocation [GB] : 1800

July 2018