

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 2016/17

Project Title: Ocean-Atmosphere Chemistry Climate Model Simulations for new WMO-SPARC-Chemistry Climate Model Initiative (CCMI)

Computer Project Account: SPDEWMO3

Principal Investigator(s): Prof. Dr. Ulrike Langematz

Affiliation: Institut für Meteorologie, Freie Universität Berlin

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

Start date of the project: 2016

Expected end date: 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)	6.500.000	2.300.307	6.500.000	0
Data storage capacity	(Gbytes)	12.000	?	?	0

Summary of project objectives

Within the project a 140-year transient simulation with the Atmosphere-Ocean-Chemistry-Climate Model (AOCCM) ECHAM/MESSy/MPIOM (EMAC-O) using the RCP8.5 greenhouse gas scenario according to the CCMi specifications was planned as a contribution to the German research programme “Mittelfristige Klimaprognosen” (MiKlip) and the approved project “ROMIC-SOLIC - Quantification of Uncertainties of Solar Induced Climate Variability”. The main focus within these projects lies on the assessment of the importance of stratospheric solar forcing, decadal stratospheric internal variability and the role of atmosphere-ocean interactions in view of the development of a mid-term, i.e. decadal, climate prediction model. Furthermore, the simulation was expected to provide important input to the upcoming WMO Scientific Assessment of Ozone Depletion 2018.

Summary of problems encountered (if any)

The planned model simulation could not be carried out as the responsible scientist, Dr. Janna Abalichin, after having finished her PhD in August 2016, left my group to accept a new position.

Summary of results of the current year (from July of previous year to June of current year)

As the planned model simulation could not be carried out, no new results were obtained between July 2016 and June 2017.

List of publications/reports from the project with complete references

The following new publications/ theses have used data from EMAC and EMAC-O simulations carried out in this project in previous years:

Hegedüs, Adrienn, Auswirkungen eines zukünftigen Grand Solar Minimum auf die Klimaentwicklung und Klimavariabilität der Südhemisphäre, Master thesis, Eötvös Loránd University Budapest and Freie Universität Berlin, 2017.

Hellmer, H.H., Rhein, M., Heinemann, G., Abalichin, J. Langematz, U., et al., Meteorology and oceanography of the Atlantic sector of the Southern Ocean—a review of German achievements from the last decade, *Ocean Dynamics*, 66: 1379. <https://doi.org/10.1007/s10236-016-0988-1>, 2016.

Spiegl, Tobias, Die Auswirkungen eines potentiellen Grand Solar Minimum auf das Klimasystem vor dem Hintergrund des anthropogenen Klimawandels, PhD thesis, Freie Universität Berlin, 2017.

Spiegl, Tobias, and Langematz, Ulrike, Quantifying the Regional Effects of a potential 21st century Grand Solar Minimum on aggregate climate change using Euclidean Distances, to be submitted to *J. Climate*, 2017.

Summary of plans for the continuation of the project

There are no plans for a continuation of the project.