

SPECIAL PROJECT PROGRESS REPORT

All the following mandatory information needs to be provided. The length should *reflect the complexity and duration* of the project.

Reporting year 2021

Project Title: SDAP/NEMO system

Computer Project Account: SPGRVER2

Principal Investigator(s): Vassilios D. Vervatis (1), Pierre De Mey-Frémaux (2)

Affiliation: (1) National Kapodistrian University of Athens (UoA)
(2) Laboratoire d'Etudes en Géophysique et Océanographie Spatiales (LEGOS)

Name of ECMWF scientist(s) collaborating to the project
(if applicable) Sarantis Sofianos (1), Nadia Ayoub (2)

Start date of the project: 01/01/2021

Expected end date: 31/12/2021

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)	-	-	1 MSBU	~1.000 SBU
Data storage capacity	(Gbytes)	-	-	1.000	~10

Summary of project objectives (10 lines max)

The resources requested in this Special Project are used to support the R&D activities of the University of Athens and LEGOS/CNRS, interfacing the SEQUOIA ocean Data Assimilation Platform - SDAP¹ with the ocean model NEMO² (Nucleus for European Modelling of the Ocean) to perform Ensemble data assimilation.

Summary of problems encountered (10 lines max)

We did not encounter any problems.

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

We plan to continue our activities on stochastic modelling, once the data assimilation system under development is ready for the production of ocean model ensembles in double MPI parallelization, including domain decomposition, and ensemble operation. Depending on results, we may ask for a more substantial allowance for production runs in 2022 and perhaps beyond.

List of publications/reports from the project with complete references

n/a.

Summary of results

If submitted **during the first project year**, please summarise the results achieved during the period from the project start to June of the current year. A few paragraphs might be sufficient. If submitted **during the second project year**, this summary should be more detailed and cover the period from the project start. The length, at most 8 pages, should reflect the complexity of the project. Alternatively, it could be replaced by a short summary plus an existing scientific report on the project attached to this document. If submitted **during the third project year**, please summarise the results achieved during the period from July of the previous year to June of the current year. A few paragraphs might be sufficient.

The R&D activities, codenamed here “SPRUCE”, consists in using the SDAP libraries i.e., a modular data assimilation code specialized in ensemble assimilation, including double MPI parallelization of domain decomposition and ensemble operation. We are currently working on a prototype of SPRUCE using a pilot implementation with the Lorentz-63 model. Preliminary results show that the new SDAP/SPRUCE system runs correctly on the Lorentz-63 test case and produces the expected results.

In a second step, once we finalize the Lorentz-63 test runs with the SDAP/SPRUCE system, we will focus on the coupling of the data assimilation platform with the ocean model NEMO. We will use the benchmark GYRE configuration and the double parallelization capabilities of the system, to illustrate a correction and restart strategy in ensemble data assimilation.

Regarding the HPCF resources allocated in the first six months of the project, we have focused on the development of the platform and we have only used a small amount to perform test simulations in the cluster. We anticipate to use all allocated resources for this project in the second half of the year.

¹ <https://sourceforge.net/projects/sequoia-dap/>

² <http://www.nemo-ocean.eu>