

# 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.

<b>Reporting year</b>	2015
<b>Project Title:</b>	Optimization of the OceanVar oceanographic data assimilation system for high-resolution applications
<b>Computer Project Account:</b>	spitstor
<b>Principal Investigator(s):</b>	Andrea Storto
<b>Affiliation:</b>	CMCC, Bologna, Italy
<b>Name of ECMWF scientist(s) collaborating to the project</b> (if applicable)	
<b>Start date of the project:</b>	30.05-2015
<b>Expected end date:</b>	31.12.2017

## **Computer resources allocated/used for the current year and the previous one**

(if applicable)

Please answer for all project resources

August 2015

This template is available at:

<http://www.ecmwf.int/en/computing/access-computing-facilities/forms>

		<b>Previous year</b>		<b>Current year</b>	
		Allocated	Used	Allocated	Used
<b>High Performance Computing Facility</b>	(units)			150000	0
<b>Data storage capacity</b>	(Gbytes)			500	100

## **Summary of project objectives**

(10 lines max)

The project aims at improving the horizontal operator used in OceanVar, the variational data assimilation system developed at CMCC for ocean reanalysis and operational oceanography.

In particular, in OceanVar the horizontal correlations are modelled through a recursive filter, with spatially inhomogeneous correlation length-scales. In the project, we plan to i) replace the use of an artificial extended grid - used at the moment to overcome the problem of defining boundary conditions for the recursive filter - with analytical boundary conditions, and ii) improve the scalability of OceanVar by implementing efficient algorithms for the parallelization of the recursive filter.

## **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

Given the fact that the project started beginning of May 2015, and most of researchers involved in the project did not have any account on the ECMWF supercomputing center, we used this short initial period to start porting the OceanVar code and some test cases on the ECMWF machine.

## **List of publications/reports from the project with complete references**

## **Summary of plans for the continuation of the project**

(10 lines max)

On a uniform grid and with constant length scales, it can be shown that the recursive filter can be slightly modified in order to take into account different boundary conditions, such as periodic conditions for example. This idea can be extended to non-uniform grid (ORCA) and location-dependent length scales, and we are currently working on its implementation in our 3D-VAR system.

The modifications will be implemented and tested shortly on the ECMWF platform.