REQUEST FOR ADDITIONAL RESOURCES IN THE CURRENT YEAR FOR AN EXISTING SPECIAL PROJECT

MEMBER STATE: Greece, France

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Project title: Stochastic Coastal/Regional Uncertainty Modelling: sensitivity, consistency and potential contribution to CMEMS ensemble data assimilation

Project account: **SPGRVERV**

Additional computer resources requested for	2017
High Performance Computing Facility (units)	5 MSBU
Data storage capacity (total) (Gbytes)	0.5 TB

Continue overleaf

Technical reasons and scientific justifications why additional resources are needed

This is a technical report requesting additional resources for the year 2017, following the progress report of the Special Project SPGRVERV.

The computational resources of this SP are used in a joint CMEMS project named SCRUM (Stochastic Coastal/Regional Uncertainty Modelling) in the framework of Service Evolution (http://www.mercator-ocean.fr/en/portfolio/scrum-2/). The project aims at strengthening CMEMS in the areas of coastal/regional ocean uncertainty modelling, ensemble consistency verification and ensemble data assimilation. The work is based on stochastic modelling of ocean physics and biogeochemistry in the Bay of Biscay, on an identical sub-grid configuration of the IBI-MFC system in its latest operational version.

In the first year of the project we estimated the computational resources on the basis of short test runs, in order to perform ensemble experiments perturbing physics and ecosystem variables. Those tests showed that for our regional configuration we need approximately 500 SBU and 1 GB per member/day. This estimate was proved to be valid for medium range ensembles (few weeks up to a month simulation) of 20 members. However, for seasonal range ensembles of 40 members we underestimated the workload of the I/O tasks. In particular, we underestimated the time needed for XIOS processes to write the netcdf files for all 24 prognostic variables of PISCES. Thus, the walltime was increased from what we had initially calculated by about ~ 20%-25%, i.e. from ~8 hours to ~10 hours per job. Another issue encountered was that, in some cases, the batch job did not exit properly even though the simulation was successful. In those cases, the job was killed by the walltime limit, which in turn, was set approximately 10% more (as a precaution) than the aforementioned walltime, i.e. from 10 hours to 11 hours.

The above mentioned issues and problems had repercussions on the scheduled experiments of the previous year. For instance, in early-2017 we performed experiments which were initially planned for 2016. In order to continue the experiments designed for the joint CMEMS project, we are requesting additional resources for this year. So far, we continue our experiments without being able to solve the problem of the batch job not finishing properly. In order to debug this issue, we are currently working together with ECMWF administrators to find the cause of it (most likely related to XIOS and netcdf libraries, as well as memory issues).

In summary, we still need to perform a seasonal range ensemble of 7 months and 40 members. In the above paragraphs we argue that we need to increase the walltime by about 30% in order to tackle some of the issues encountered the previous year. An estimate of the computational resources for this year is as follows:

*500 SBU/member/day * 1.3 factor increasing walltime * 40 members * 210 days ~ 5.5 MSBU*

Up to now, we have used ~85% of the resources allocated for 2017 (as of 20170619), i.e. 3.4 MSBU out of 4 MSBU. We estimate that *5.5 – (4 – 3.4) = 4.9 ~ 5 MSBU* in addition, would be sufficient to complete this study. There is not a significant request for storage, since these model outputs had been already taken under account in previous reports. We will only ask of 0.5 TB as a precaution to store some of the ensemble restarts.