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

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MEMBER STATE: ……Italy……………...…

Principal Investigator[1]: ……Chunxue Yang………

Affiliation: Institute of Marine Sciences, National Research Council of Italy

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Address: …Via del Fosso del Cavaliere, 100, Rome, 00133, Italy

Project title: … The impact of Stochastic physics in North Atlantic Climate

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Project account: **SP_ _ spityang_ _ _ _**

Additional computing resources requested for year		2025
High Performance Computing Facility	[SBU]	8M
Total DHS Data storage capacity	[GB]	1000
EWC resources		
Number of vCPUs	[#]	
Total memory	[GB]	
Storage	[GB]	
Number of vGPUs[3]	[#]	

Continue overleaf

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[1] The Principal Investigator is the contact person for this Special Project

Technical reasons and scientific justifications why additional resources are needed

To ensure the successful continuation and completion of our project, we respectfully request additional computing and storage resources. This request is driven by the following technical and operational needs:

1. **High-Resolution NEMO CREG12 Simulations**
   We are currently running high-resolution NEMO CREG12 simulations, which are computationally intensive. Thus far, simulations have been completed up to the year 2009, with the goal of extending them to at least 2020, and ideally to 2023. To minimize computational overhead, we have opted to run the model without the XIOS I/O server. While this reduces runtime costs, it also increases the burden of post-processing, particularly as we are outputting data at daily frequency, which are needed for accurate mesoscale eddy detection. The process of rebuilding output files and transferring large datasets to local systems and the ECMWF ECFS archive is both time-consuming and resource-intensive. Therefore, additional compute hours are crucial to continue these simulations efficiently, complete the time series, and carry out comparative validation with the lower-resolution CREG025 experiment.

2. **Validation of CREG025 Experiment**
   The CREG025 control simulation is now complete and ready for evaluation. We require additional computational resources to perform validation analyses, which include comprehensive comparisons with satellite and in-situ observations, as well as with the CREG12 simulation results.

3. **Testing of Stochastic Physics Implementation**
   We are also conducting tests with stochastic physics schemes implemented in the model. Current results have shown instability, including simulation blow-ups, necessitating tuning, multiple reruns and parameter adjustments. Additional resources are essential to complete this testing phase and ensure model robustness under stochastic configurations.

4. **Critical Storage Constraints**
   We are currently facing severe limitations in storage capacity. Given the large volume of output data, immediate transfer of results is not always feasible and can significantly delay our workflow. We therefore request additional storage resources to buffer intermediate data and reduce the operational pressure of real-time data transfers. This will allow us to better manage large-scale simulations and maintain data integrity.