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

MEMBER STATE: CROATIA

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Project title: The Adriatic decadal and inter-annual oscillations: modelling component

Project account: **SPCRDENA**

Additional computer resources requested for	**2020**
High Performance Computing Facility (units)	10,000,000
Data storage capacity (total) (Gbytes)	/

Continue overleaf

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

Technical reasons and scientific justifications why additional resources are needed

The physical explanation of the thermohaline oscillations of the Adriatic-Ionian System (BIOS) is still under debate as they are thought to be generated by either pressure and wind-driven patterns or dense water formation travelling from the Northern Adriatic. The aim of the ADIOS project (currently funded till next year) is to numerically investigate and quantify the processes driving the inter-annual to decadal thermohaline variations in the Adriatic-Ionian basin with the high resolution AdriSC atmosphere-ocean model (Denamiel et al., 2019). This model consists in two nested atmospheric grids of 15-km and 3-km and two nested ocean grids of 3-km and 1-km.

Within the third year of the special project (spcrdena), the AdriSC model finished to run for the historical period 1987-2017 and started to run – via a surrogate climate change method (Schär et al., 1996), for the 2070-2100 period (RCP 8.5 scenario) on the ECMWF supercomputing facilities. Due to the high resolution of the grids, the optimal configuration of the AdriSC model was found to produce a month of model results per day. Each 30-year long simulation thus require a full year elapse time to be produced. In addition, the total amount of SBUs needed to continuously run the model during one year is: 230CPUs*365days*86400s*P ~ **33,000,000 SBUs**.

Only **13,000,000 SBUs** were asked per year in the special project, while the remaining of SBUs was planned to be partially used from the ECMWF national quota, in collaboration with the Croatian Meteorological and Hydrological Service (DHMZ) which is the national hub for ECMWF. Therefore, it implies that the special project only covers about 5 months of simulation per year (= per 30-year long simulation). Unexpectedly and sadly, the Croatian capital of Zagreb was hit by two major earthquakes in early April 2020, damaging strongly the DHMZ building in which operational HPC facilities are stored and used for numerical weather prediction and operational meteorological services of the Republic of Croatia. To cope with the problem, DHMZ moved the execution of operational forecast models to the ECMWF HPC, leaving no space for access of our project to the ECMWF national quota.

High resolution climate modelling at the coastal scale is currently under development (for example within the MEDCORDEX initiative) and is not state of the art, the project is thus facing some understandable technical challenges including, principally, the stretch in numerical resources needed to run such a model. In order to carry on with the RCP 8.5 scenario, similarly to last year, we would like to know if additional credits are available and if possible, we would like to request additional resources for about 4 more months: 230CPUs*120days*86400s*P ~ **10,000,000 SBUs**.

Denamiel, C., Šepić, J. Ivanković, D., Vilibić, I., 2019. The Adriatic Sea and Coast modelling suite: Evaluation of the meteotsunami forecast component. Ocean Modelling, 135, 71-93. doi:10.1016/j.ocemod.2019.02.003

Schär, C., Frei, C., Lüthi, D., Davies, Huw C. (1996). Surrogate climate-change scenarios for regional climate models. Geophysical Research Letters, 23 (6). https://doi.org/10.1029/96GL00265