

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

MEMBER STATE: SWEDEN

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Project title: Regional European re-analysis with HARMONIE for UERRA (RERA)

Project account: **SPSERERA**

Additional computer resources requested for	2016
High Performance Computing Facility (units)	10,000,000
Data storage capacity (total) (Gbytes)	88,000

Continue overleaf

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

Technical reasons and scientific justifications why additional resources are needed

For the FP7-project UERRA (Uncertainties in Ensembles of Regional Re-Analyses) we aim to produce a European regional reanalysis at horizontal resolution of 12 km for the period 1961 to present-day. Over a shorter time span of 5 years, a multi-physics mini-ensemble is run with different physical parameterisations. The total costs for this data set are estimated to 173 Million SBUs and 1200 terabyte of disk space. However, only 350 terabyte of selected output will be archived in MARS as a contribution to the Copernicus Climate Services. The remaining 850 terabyte are model level and surface model output which might be important, if one wants to downscale the regional reanalysis set further, such as in the Copernicus proof-of-concept project UrbanSiS for urban-scale climate indicators.

Currently, we are producing the regional reanalysis. However, the production is now condensed to the last two years of the project, leading to an increased requirement of computational and archiving resources.

Technical reasons for additional resources

During the first year of the special project SPSENERA the HARMONIE system was not implemented on the new CRAY-computer at ECMWF. After the implementation, the setup required optimization for the production runs. Therefore, only 3 Million SBUs of 30 Million SBUs were used in the first year and production of UERRA was delayed.

In order to archive the HARMONIE data in MARS, all required parameters have to be defined in GRIB2, agreed upon by the consortium and accepted by ECMWF. This process is delayed leading to a large amount of data stored on ECFS. The requested additional amount was chosen such that the special project reaches the maximum allowed disk space for current special projects.

Scientific reasons for additional resources

After the production of 13 years reanalysis data, an error was discovered. The error concerned the gradient calculation of the so-called Jk-term and resulted in an erroneous calculation of the cost-function gradient leading to sub-optimal analysis. The Jk-term adds the background error of the host model into the cost function of the regional analysis. The impact of the error could be seen especially in observation-sparse regions. The bug was identified in the end of 2015 and fixed in January 2016. Since the error affected the core of the reanalysis product, we decided to rerun the already produced years of the reanalysis.

With the applied 10 million SBUs we would be able to rerun the years 2006 to 2010 with the ALADIN-model. This shorter period is needed for the development of the 2D-analysis system MESCOAN with HARMONIE input by Météo-France. The applied disk storage of 88 Terabyte will allow us to store all data, i.e. both atmospheric and surface model data, from these 5 years in order to ensure the availability during the development of MESCOAN.