

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

MEMBER STATE: Germany

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Project title: Global Atmospheric Chemistry Modelling

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Project account: SPDEACM

Additional computer resources requested for	Current Year
High Performance Computing Facility (units)	165.000
Data storage capacity (total) (Gbytes)	10.000

Continue overleaf

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

Technical reasons and scientific justifications why additional resources are needed

The following justifications refer to the SPDEACM interim report 2011/2012.

Investigation of the CO underestimation problem with the MACCity emission inventory required more MOZART offline simulations for the year 2008 to be run in 2012 than originally thought of. In total seven such simulations with refined scaling of CO emissions have been simulated in 2012, each of them needing 45.000 BU (resolution T63L60). Another three runs are mapped for the coming months. These simulations are requisite for a scientific paper which is planned for publication later this year (Stein et al. 2012, on the wintertime low bias of Northern Hemisphere carbon monoxide in global model studies, in preparation for ACP). On a longer perspective, the model runs have the potential to help reducing the significantly low bias in current CO emission datasets.

Another comprehensive MOZART simulation has been run in 2012 comprising the years 2003-2010. This simulation was not foreseen in the original work plan, since it came out of discussions in the MACC team following the results from the MACC reanalysis, which was finished by end of 2011. The simulation needs 30.000 BU per simulated year (T63L690). The simulation can only be continued for the years 2011 (and 2012) if additional computer time on c1a will be granted. This simulation will serve the MACC-II project partners for the evaluation of their stratospheric products (DLR) and the NO₂ satellite retrievals (U Bremen). The simulation uses ERA INTERIM meteorology as an alternative driver compared to the MACC reanalysis, which will be important to evaluate stratospheric processes in MACC. Tropospheric NO₂ columns retrieved from satellite data are an important tool to investigate natural and anthropogenic emissions of nitrogen oxides (NO_x = NO + NO₂). One necessary prerequisite is the separation between those parts of the NO₂ changes which are linked to meteorology and those which are the result of NO_x emission changes. This separation can be best performed with the help of a CTM run covering the full length of the SCIAMACHY time series (2003 - 2011) and using fixed NO_x emissions. While many different model runs exist for various time periods, and also the MACC run covering the full time series, all of these simulations use time dependent NO_x emissions which make them useless for this specific application. Having a consistent full model run from 2003 - 2011 with constant NO_x emissions is therefore of high importance for correct interpretation of the SCIAMACHY data records. In addition it is currently discussed, if this simulation can also serve as a sensitivity simulation for the investigation of the inter-annual variability of methane (collaboration with JRC ISPRA). In comparison to the MACC reanalysis and control simulations it may be possible to separate the influences of emission trends and meteorology with the help of this MOZART simulation. This would also require a run for as many years as possible.

Estimated resources

All together we estimate the required additional sources for the additional MOZART simulations necessary in the MACC-II project in the year 2012 as follows:

4.5 years MOZART sensitivity runs in standard resolution T63L60	135000 BU
1 year MOZART simulation (2003-2011) continuation for 2011 (T63L60)	30000 BU

Total: 165000 BU and ca. 10000 GB new data storage on ecfs