

REQUEST FOR A SPECIAL PROJECT 2018–2020

MEMBER STATE: ...AUSTRIA.....

Principal Investigator¹: ...Leopold Haimberger.....

Affiliation: ...University of Vienna.....

Address: Althanstrasse 14, 1090 Wien, Austria

E-mail: Leopold.haimberger@univie.ac.at

Other researchers: Michael Mayer, Michael Blaschek, Omid Nabavi, Johannes Mayer

Project Title: Coupled energy and freshwater budgets from and early upper air data enhancements for reanalysis

If this is a continuation of an existing project, please state the computer project account assigned previously.	SP ATLH00	
Starting year: <small>(Each project will have a well defined duration, up to a maximum of 3 years, agreed at the beginning of the project.)</small>	2018	
Would you accept support for 1 year only, if necessary?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>

Computer resources required for 2018-2020: <small>(The maximum project duration is 3 years, therefore a continuation project cannot request resources for 2021.)</small>	2018	2019	2020
High Performance Computing Facility (units)	10000	10000	10000
Data storage capacity (total archive volume) (gigabytes)	2000	2000	2000

An electronic copy of this form **must be sent** via e-mail to: *special_projects@ecmwf.int*

Electronic copy of the form sent on (please specify date):
30 June 2017

Continue overleaf

¹ The Principal Investigator will act as contact person for this Special Project and, in particular, will be asked to register the project, provide an annual progress report of the project's activities, etc.

Principal Investigator: Dr. Leopold Haimberger

Project Title: Homogeneous upper air data and coupled energy budgets

Extended abstract

The special project is intended to support the collaboration of the applicants working group with ECMWF on arctic and ENSO related energy and freshwater exchanges as well as on upper air data for the Copernicus Climate Change Service.

There is an ongoing Austrian Research Funds (FWF) project on quantification of oceanic and atmospheric energy and freshwater exchange from in situ measurements as well as reanalysis. This work is performed in collaboration with Dr. Michael Mayer, who is currently at ECMWF, and Dr. Magdalena Balmaseda. The project will help identifying systematic errors in the representation of these fluxes in ocean reanalyses (Pietschnig et al. 2017). To accomplish this in the atmosphere the diagnostic evaluation procedure has recently been substantially improved (Mayer et al. 2017). Further improvement seems feasible with most recent reanalyses if the budget evaluation procedure adopts the octagonal grid representation currently used in ERA5 as well as in the operational IFS system. In particular we hope to reduce noise near complex topography. For this purpose a few experimental test runs with the IFS model will be needed. Also access to the MARS system and recent IFS documentation is essential.

The second research focus deals with preparing optimal bias-corrections for upper air data back to the early 20th century. These are needed for assimilation activities within the Copernicus Climate Change Service. Only part of these early data have been ingested in an experimental assimilation run (Hersbach et al. 2017) and further quality control and bias adjustments for temperature, humidity and wind are needed. We also hope to contribute to making the global upper air network data publicly available through the ECMWF public data hub, similar to what has been achieved for the ICOADS and ISPD data sets (Hersbach et al. 2015). Availability of sub-daily upper air station data through this powerful interface will likely foster more research in the quality of early upper air data and early 20th century climate.

The computer resources needed for this special project are moderate, however the efficient and convenient access to data and documentation as it is available with an ECMWF user account is of great importance for the success of these efforts.

References:

Hersbach, H., P. Poli and D. Dee, 2015: The observation feedback archive for the ICOADS and ISPD data sets. ERA report series 18, 29pp.

Hersbach, H., S. Brönnimann, L. Haimberger, M. Mayer, L. Villiger, J. Comeaux, A. Simmons, D. Dee, S. Jourdain, C. Peubey, P. Poli, N. Rayner, A. Sterin, A. Stickler, M. A. Valente, S. Worley, 2017: The potential value of early (1939-1967) upper-air data in atmospheric climate reanalysis. Quart. J. Roy. Meteorol. Soc., in press.

Malardel, S., N. Wedi, W. Deconinck, M. Diamantakis, Ch. Kühnlein, G. Mozdzyński, M. Hamrud, P. Smolarkiewicz, 2016: A new grid for the IFS. ECMWF Newsletter No. 146 – Winter 2015/16, pp. 23-28

Mayer, M., L. Haimberger, J. M. Edwards, P. Hyder, 2017: Towards consistent diagnostics of the coupled atmosphere and ocean energy budgets. Submitted to J. Climate.

Pietschnig, M., M. Mayer, T. Tsubouchi, A. Storto, L. Haimberger, 2017: Comparing reanalysis-based volume and temperature transports through Arctic Gateways with mooring-derived estimates. J. Geophys. Res. Oceans, under review.