

# CURRICULUM VITAE

Leopold Haimberger, 16. Oktober 2016

## Personal data

- Born in 25 January 1969 in Amstetten, Austria, Austrian citizenship,
- Married since 26 August 1995 with Romana Burger,
- Four children (Klara, \*1996; Sophia, \*1999; Friedrich, \*2000; Valerie, \*2002)

## Academic education

- October 1987 - August 1992: Study of meteorology at the University of Vienna (UoV). Diploma thesis: *A diagnostic model for the determination of sub-gridscale vertical energy fluxes*
- March 1993 - October 1995: Doctoral study at the UoV. Dissertation: *The role of convective enthalpy fluxes in Lorenz's energy cycle*, under guidance of Prof. Dr. M. Hantel
- 17 April 2007: Habilitation (Venia Docendi) in Meteorology at UoV. Title of thesis: *Towards temporally homogeneous evaluations of the observed global atmospheric circulation*

## Professional positions

- March 1991 - December 1993; May 1995 - May 1997: Research assistant at University of Vienna (UoV), funded by the Austrian Fonds zur Förderung der wissenschaftlichen Forschung (FWF)
- 1994; June 1997 - 2003; 2005-Oct 2007: University assistant at the Institute for Meteorology and Geophysics, UoV.
- 2004: Consultant at the European Centre for Medium-Range Weather Forecasts, U.K., funded by an EU 6th framework programme Marie Curie Intra-European Fellowship
- October 2007 - : Associate professor at the Institute for Meteorology and Geophysics, UoV.
- February 2008: Member of editorial board of *Meteorologische Zeitschrift*

## Research Projects

- Marie Curie Fellowship at ECMWF for the year 2004, funded by the EU 6th framework programme, managed by ECMWF.
- P.I. of project P18120-N10 "Homogenization of the global radiosonde temperature dataset", funded by the Austrian Fonds zur Förderung der wissenschaftlichen Forschung (FWF), 06/2005-06/2009, 140k€.
- Project partner in COST initiative ES0601 ("HOME"), which was devoted to intercomparison of homogenization methods 2007-2010.
- 2009-2012 P.I. of project P21772-N22 "Global in situ upper air data for climate change research", funded by FWF, 07/2009-09/2012, 280k€.
- 2011-2017 Project partner in EU 7th framework projects "ERA-CLIM", "ERA-CLIM2" devoted to collecting and improving input data as well as to develop algorithms for an extended European reanalysis project, 380k€ and 300k€, respectively.

- 2013-2016 P.I. of project P25260-N29 "Homogeneous observations, state and flux quantities of the past 75 years", funded by FWF, 160k€
- 2016-2018 P.I. of project P28818-N29 "Variability and Change of Arctic Energy and Freshwater Budgets", funded by FWF, 210k€

## **Professional research background**

### **Atmospheric budgets:**

- Diagnosing sub-gridscale convective transports from gridscale analyses (Hantel et al. 1993; Haimberger et al. 1995; Haimberger 1995; Hantel and Haimberger 1998; Haimberger et al. 2001) in cooperation with the European Centre for Medium-Range Weather Forecasts (ECMWF).
- Evaluation of Lorenz's energy cycle with special emphasis on the sub-gridscale components of this energy cycle, funded by the European Community. (Hantel and Haimberger, 2000; Haimberger and Hantel, 2000). Author of chapter "The atmospheric general circulation" (Haimberger, 2005) in Volume V/6 of the handbook series "Landolt Börnstein" edited by Springer. Coauthor of book "Grundkurs Klima" (Hantel and Haimberger, 2016), an undergraduate introduction into quantitative budget methods for climate research.
- Assessing the variability of the global mean energy and moisture budgets. This was long uncharted territory since no suitable observation or analyses data were available. With the advent of improved reanalyses that are temporally homogeneous enough, this approach has become feasible. Haimberger (2006), Chiodo and Haimberger (2010), Mayer and Haimberger (2012), Mayer et al. (2013)
- Coupled budget analysis of atmosphere and ocean. With new atmospheric and oceanic reanalyses together with independent observations it has been possible to trace energy flow between ocean basins and into the arctic Mayer et al. (2014), Mayer et al. (2016a,b)

### **Upper air data homogenization:**

- Bias correction of radiosonde time series since about 2003, within a one-year Marie-Curie Fellowship MEIF-CT-2003-503976 at ECMWF awarded by the EC for the year 2004. and within FWF and EC projects until present. The radiosonde bias adjustments are used in most major reanalyses projects worldwide, e.g. ERA-Interim, MERRA, JRA-55. Results are described in Haimberger (2007), Haimberger et al. (2008), Santer et al. (2008), Gruber and Haimberger, (2008), Haimberger et al. (2012), Ramella-Pralungo et al. (2014a,b), Haimberger and Ramella-Pralungo (2015), Milan and Haimberger (2015)

### **Climate Change**

- Contributing author in WG1 chapter 3 (Observations) in IPCC 5th assessment report (2013)
- Coordinating Lead (Co)Author in Chapter 1 of Austrian Assessment Report (2014)
- Regular contributions to Bulletin of the American Meteorological Society "State of the Climate" supplement.

### **Presentations**

There were about 10 international invited presentations in the past 10 years, together with typically 3–5 conference and workshop presentations each year.

## Refereed publications 2007-

- Haimberger, L., 2007: Homogenization of radiosonde temperature time series using innovation statistics. *J. Climate* **20**, 1377-1403
- Haimberger, L., C. Tavalato and S. Sperka, 2008: Towards elimination of the warm bias in historic radiosonde temperature records - some new results from a comprehensive intercomparison of upper air data, *J. Climate* **21**, 4587-4606
- Gruber, C. and L. Haimberger, 2008: On the homogeneity of radiosonde wind time series. *Meteorol. Z.*, doi:10.1127/0941-2948/2008/0298.
- Grant, A. N. and Brönnimann, S. and Haimberger, L., 2008: Recent Arctic warming strongest near ground, *Nature*, **455**, E2-E3. doi:10.1038/nature07257
- Santer, B., P. Thorne, L. Haimberger, K. Taylor, T. Wigley, J. Lanzante, S. Solomon, M. Free, P. Gleckler, P. Jones, T. Karl, S. Klein, C. Mears, D. Nychka, G. Schmidt, S. Sherwood, and F. Wentz, 2008: Consistency of modelled and observed temperature trends in the tropical troposphere. *Int. J. Climatol.*, **28**. DOI: 10.1002/joc.1756.
- Chiodo, G. and L. Haimberger, 2010: Interannual changes in mass consistent energy budgets from ERA-Interim and satellite data. *J. Geophys. Res.* **115**, D02112.
- Dee, D.P., E. Kallen, A.J. Simmons, and L. Haimberger, 2010: Comments on "reanalyses suitable for characterizing long-term trends". *Bull. Amer. Meteorol. Soc.*, **90**, 65–70. DOI: 10.1175/2010BAMS3070.1.
- Dai, A., J. Wang, P.W. Thorne, D.E. Parker, L. Haimberger, and X.L. Wang, 2011: A new approach to homogenize daily radiosonde humidity data. *J. Climate*, **24**, 965–991.
- Dee, D.P., S.M. Uppala, A.J. Simmons, P. Berrisford, P. Poli, S. Kobayashi, U. Andrae, M.A. Balmaseda, G. Balsamo, P. Bauer, P. Bechtold, A.C.M. Beljaars, L. van de Berg, J. Bidlot, N. Bormann, C. Delsol, R. Dragani, M. Fuentes, A.J. Geer, L. Haimberger, S.B. Healy, H. Hersbach, E.V. Hólm, L. Isaksen, P. Kallberg, M. Köhler, M. Matricardi, A.P. McNally, B.M. Monge-Sanz, J.J. Morcrette, B.K. Park, C. Peubey, P. de Rosnay, C. Tavalato, J.N. Thépaut, and F. Vitart, 2011: The ERA-Interim reanalysis: configuration and performance of the data assimilation system. *Quart. J. Roy. Meteor. Soc.*, **137**, 553–597. doi: 10.1002/qj.828.
- Ladstätter, F., A.K. Steiner, U. Foelsche, L. Haimberger, C. Tavalato, and G. Kirchengast, 2011: An assessment of differences in lower stratospheric temperature records from (A)MSU, radiosondes and GPS radio occultation. *Atm. Meas. Tech.*, **4**, 1965–1977.
- Mayer, M., and L. Haimberger, 2012: Poleward atmospheric energy transports and their variability as evaluated from ecmwf reanalysis data. *J. Climate*, **25**, 734–752.
- Haimberger, L., C. Tavalato, and S. Sperka, 2012: Homogenization of the global radiosonde temperature dataset through combined comparison with reanalysis background series and neighboring stations. *J. Climate*, **25**, 8108–8131.
- Young, P.J., N. Calvo, D.R. Marsh, W.J. Randel, K.R. Rosenlof, A. Butler, L. Haimberger, and P.J. Kushner, 2012: Late twentieth century Southern Hemisphere stratospheric temperature trends in observations and CCMVal-2, CMIP3 and CMIP5 models. *J. Geophys. Res.*, **118**, 605–613.
- Mayer, M., Trenberth, K. E., Haimberger, L., Fasullo, J. T., 2013: The Response of Tropical Atmospheric Energy Budgets to ENSO. *Journal of Climate*, **26**, 4710-4724.
- Mayer, M., Haimberger, L., and Balmaseda, M. A., 2014: On the energy exchange between tropical ocean basins related to ENSO. *J. Climate*, **27**, 6393–6403.
- Ramella-Pralungo, L., and L. Haimberger (2014), A global radiosonde and tracked balloon archive on 16 pressure levels (grasp) back to 1905: part I: Homogeneity adjustments for pilot and radiosonde wind data, *ESSD*, **6**, 297–316, doi:10.5194/essd-6-297-2014.
- Ramella-Pralungo, L., L. Haimberger, A. Stickler, and S. Brönnimann (2014), A global radiosonde and tracked balloon archive on 16 pressure levels (grasp) back to 1905: part II: Merging and interpolation to 00 and 12gmt, *ESSD*, **6**, 185–200, doi:10.5194/essd-6-185-2014.

- Haimberger, L., P. Seibert, P. Weihs, and A. Steiner, 2014: *Das globale Klimasystem und Ursachen des Klimawandels*, Chapter 1, pp. 137–171. Austrian Panel on Climate Change 2014: Österreichischer Sachstandsbericht Klimawandel. Wien, Österreich: Verlag der ÖAW. ISBN 978-3-7001-7699-2.
- Ramella-Pralungo, L., and L. Haimberger (2015), New estimates of tropical mean temperature trend profiles from zonal mean historical radiosonde and pilot balloon wind shear observations. *JGR*, **120**, 3700-3713.
- Teubner, I., L. Haimberger and M. Hantel (2015), Estimating snow cover duration from ground temperature *JAMC*, **54**, 959–965, doi:10.1175/JAMC-D-15-0006.1.
- Milan, M., and L. Haimberger, 2015: Predictors and grouping for bias correction of radiosondes. *J. Geophys. Res.*, **120**, 10736–10766. doi:10.1002/2015JD023635.
- Landgraf, M., C. Matulla, and L. Haimberger, 2015: Statistically downscaled projections of local scale temperature in the topographically complex terrain of Austria up to the end of the 21st century. *Meteorol. Z.*, **24**, 425–440.
- Mayer, M., J.T. Fasullo, K.E. Trenberth, and L. Haimberger, 2016: ENSO-Driven Energy Budget Perturbations in Observations and CMIP Models. *Climate Dynamics*. in press.
- Mayer, M., L. Haimberger, and A. Pietschnig, M. Storto, 2016: Facets of arctic energy accumulation based on observations and reanalyses 2000–2015. *Geophys. Res. Lett.*, **43**. doi:10.1002/2016GL070557.
- Nabavi, S.O., L. Haimberger, and C. Samimi, 2016: Climatology of dust distribution over West Asia from homogenized remote sensing data. *Aeolian Research*, **21**, 93–107.
- Hantel, M., and L. Haimberger, 2016: *Grundkurs Klima*. Springer, 418 pp.