Curriculum Vitae for Magnus Lindskog

Date of birth:	1972-05-26
Education:	Doctor of Philosophy in Meteorology (2008)
Employments:	SMHI Research Department (1996-1997) SMHIs Operational Department (1997-1998) SMHIs Research Department (1998-present) Deputy Head of section of SMHI Research department (2004) ECMWF Research Department (3 months during 2007) HIRLAM project leader on data assimilation and use of observations (6 months during 2011) Research leader mesoscale data assimilation for in SMHI numerical weather prediction Research unit (2014-2020) HIRLAM Project Leader for Data Assimilation and Use of Observations (July 2021 and ongoing)
Awards:	The 2008 Quarterly Journal Review Award of the Royal Meteorological Society
Assignments:	WMO point of contact for High-resolution NWP Member of EUMETNET OBServations Science Team (OBS SET) Chair of EUMETNET SRNWP Data Assimilation Expert Team Member of EUMETNET SRNWP Advisory Expert Team

Research highlights

Magnus has for 25 years time worked with various aspects of data assimilation for numerical weather prediction. He significantly contributed to the development of an advanced variational data assimilation system, that is now run operationally at the Swedish Meteorological and Hydrological Institute (SMHI). Magnus has been involved in observation handling, usage and estimation of both observation error statistics and background error statistics, as well as evaluation of extended assimilation experiments. Most of the work has been carried out within the international HIRLAM project that is in close co-operation with the international ALADIN project. In 2007 Magnus worked 3 months at consultant at the research department of the European Centre for Medium-Range Weather Forecasts (ECMWF). The task was to evaluate an improved representation of model errors in data assimilation. In recent years his work covered data assimilation for both the atmosphere and for the surface utilizing the the shared ALADIN-HIRLAM system for km-scale modelling

and data assimilation. Research has focused on short-range forecasting related to moisture, clouds and radiance. During 2014-2020 Magnus worked as a research leader for mesoscale data assimilation in the Numerical Weather Prediction (NWP) research unit at SMHI. Magnus present research tasks include development of 4D-Var for km-scale limited-area NWP, utilization of satellite data and drone measurements.

Project involvement and management

In 2004, Magnus worked as Depute Head for the Section on numerical weather prediction research. This involved economical, administrative and scientific responsibility for the Section, involving roughly 10 researchers. For 25 years Magnus has been working within the international HIRLAM collaboration. He worked as HIRLAM project leader on data assimilation and use of observations for the first half of 2011. Furthermore Magnus has been involved in several national and international projects, funded by the Swedish National Space Board, the Swedish Transport Administration, Swedish Transport Agency, the Swedish Energy Agency and the European Union, respectively. He has also been the Swedish representative in the Management Committee of several European COST projects. At present Magnus acts as SMHI project leader in a national project and task leader in an European Union Copernicus international project. At present Magnus is the HIRLAM Project Leader for Data Assimilation and Use of Observations. It means that he is leading and coordinating the data assimilation work carried out within roughly ten European countries.

Teaching experience and student supervision

Magnus has been giving lectures in numerical weather prediction courses at the department of Meteorology at Stockholm University. He has also been leading hands on computer exercises and acted and acted as supervisor. A master thesis work supervised by Magnus in 2019 was concerned with I*mproving Short-Range Cloud Forecasts in Harmonie-Arome Through Cloud Initialization Using Mesan Cloud Data* (available at http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-380151). In addition Magnus has been involved in the teaching for beginners to data assimilation within the HIRLAM modeling consortium.

Peer-reviewed publications

Belova, E., Kirkwood, S., Voelger, P., Hagelin, S., Lindskog, M., Körnich, H., Chatterje, S., and Satheesan, K., 2021. Validation of wind measurements of two MST radars in northern Sweden and in Antarctica, *Atmos. Meas. Tech.,* https://doi.org/10.5194/amt-2020-405.

Belova, E., Voelger, P., Kirkwood, S., Chatterje, S., and Satheesan, K. Hagelin, S., Lindskog, M., Körnich, H., 2021. Validation of Aeolus winds using ground-based radars in Antarctica and in northern Sweden. *Atm. Measurement Tech.,* https://doi.org/10.5194/amt-2021-54.

Dersch, Jürgen; Schroedter-Homscheidt, Marion; Gairaa, Kacem; Hanrieder, Natalie; Landelius, Tomas; Lindskog, Magnus; Müller, Stefan C.; Ramirez Santigosa, Lourdes; Sirch, Tobias; Wilbert, Stefan, 2019, Impact of DNI nowcasting on annual revenues of CSP plants for a time of delivery based feed in tariff. *Meteorologische Zeitschrift*, **28**, 235-253, http://dx.doi.org/10.1127/metz/2019/0925.

Gustafsson, N., Berre, L., Hörnquist, S., Huang, X.-Y., Lindskog, M., Navascués, B., Mogensen, K. S. and Thorsteinsson, S., 2001: Three-dimensional variational data assimilation for a limited area model. Part I: General formulation and the background error constraint. *Tellus*, **53A**, 425-446.

Gustafsson, N., Huang, X.-Y., Yang, X., Mogensen, K., Lindskog, M., Vignes, O., Wilhelmsson, T. and Thorsteinsson, S., 2012. Four-dimensional variational data assimilation for a limited area model. Tellus A 2012, 64, 14985, DOI: 10.3402/tellusa.v64i0.14985.

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Gregow, E, Lindfors, AV, van der Veen, SH, Schoenach, D, de Haan, S, Lindskog, M. The use of satellite and surface observations for initializing clouds in the HARMONIE NWP model. *Meteorol Appl*. 2020. https://doi.org/10.1002/met.1965.

Järvinen, H., Salonen, K., Lindskog, M., Huuskonen, A., Niemelä, S. and R. Eresmaa, 2009: Doppler radar radial winds in HIRLAM. Part I: observation modelling and validation. Tellus, 61A, 278-287.

Landelius, T., Lindskog, M., Körnich, H., and Andersson, S.: Short-range solar radiation forecasts over Sweden, Adv. Sci. Res., 15, 39-44,, 2018.

Lindskog, M., Gustafsson, N., Navascués, B., Mogensen, K. S., Huang, X.-Y., Yang, X., Andræ, U., Berre, L., Thorsteinsson, S. and Rantakokko, J., 2001. Three-dimensional variational data assimilation for a limited area model. Part II: Observation handling and assimilation experiments. *Tellus*, **53A**, 447-468.

Lindskog, M., Järvinen, H. and Michelson, D. B., 2000. Assimilation of radar radial winds in the HIRLAM 3DVAR. *Phys. Chem. Earth, 25B,* 1243-1249.

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Lindskog, M., Gustafsson N. and Mogensen K.. 2006. Representation of background error standard deviations in a limited area model data assimilation system. *Tellus* 58A, 430-444.

Lindskog, M. Dee, D., Trémolet, Y., Andersson, E. Radnóti, G., and Fisher, M., 2009. Weak-constraint 4D-Var in the stratosphere. *Q. J. R. Meteorol. Soc.*, **135**, 695-706.

Lindskog, M., Ridal M., Thorsteinsson S. and T. Ning., 2017. Data assimilation of GNSS zenith total delays from a Nordic processing centre. *Atmos. Chem. Phys.*, **17**, 13983–13998, https://doi.org/10.5194/acp-17-13983-2017.

Lindskog, M. and Landelius, T., 2019. Short-Range Numerical Weather Prediction of Extreme Precipitation Events Using Enhanced Surface Data Assimilation. *Atmosphere, 10, 587; doi:10.3390/atmos10100587.*

Lindskog, M., A. Dybbroe, R. Randriamampianina. 2021. Use of Microwave Radiances from Metop-C and Feng Yun-3 C/D Satellites for a Northern European Limited-area Data Assimilation System. *Adv. Atmos. Sci.,* *https://doi.org/10.1007/s00376-021-0326-5*.

Lindskog, M., R. Azad, S. de Haan, J. Blomster, M. Ridal, 2023. Impact of Mode-S Enhanced Surveillance Weather Observations on Weather Forecasts over the MetCoOp Northern European model domain. *Journal of Applied Meteorology and Climatology*, vol. 62, no. 8, 985-1003. DOI: https://doi.org/10.1175/JAMC-D-23-0009.1

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A selection of other publications

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Barkmeijer, J., Lindskog, M., Gustafsson, N., Bojarova, J.., Azad, R., Monteiro, I., Escribà, P., Whelan E., Ridal, M. , Sánchez-Arriola, J., Vignes, O., Stappers, R. and Randriamampianina, R.. HARMONIE-AOME 4D-Var. ALADIN-HIRLAM Newsletter No. 16, February 8th, pp 20-34, 2021. Available at: http://www.umr-cnrm.fr/aladin/IMG/pdf/nl16.pdf

Dee, D., Uppala, S., Kobayashi, S., Lindskog, M and A. Simmons. Developments in bias correction for reanalysis. Proceedings of the 3rd WCRP International Conference on Reanalysis, Tokyo, 2008.

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Landelius, T., J. Bojarova, N. Gustafsson and M. Lindskog, 2013: Correction of non-additive errors in variational and ensemble data assimilation using image registration, in Geophysical Research Abstracts Vol. 15, EGU2013-3891, 2013.

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Lindskog, M., Gustafsson, N., Ridal, M. and Dahlgren, P., 2006. Improved structure functions for 3D-VAR. HIRLAM Newsletter, **51**, 18-22. Available from KNMI, DPOSTBOX 201, 3730 AE De Bilt, Netherlands.

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