

## Joseph A. Sedlar

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### CONTACT INFORMATION

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### PROFESSIONAL APPOINTMENTS

**Cooperative Institute for Research in Environmental Sciences**, Department of Atmospheric and Oceanic Sciences, University of Colorado Boulder, Boulder, CO, USA: Visiting research scientist, *2017-present*

**Stockholm University**, Department of Meteorology (MISU), Stockholm, Sweden: Research scientist, *2017-present, remotely located in Boulder, CO*

**Swedish Meteorological and Hydrological Institute**, Atmospheric Remote Sensing Division, Norrköping, Sweden: Research scientist, *2010-present; currently on leave of absence*

**Stockholm University**, Department of Meteorology (MISU), Stockholm, Sweden: Post-doctoral research associate, *2013-2016*

**Stockholm University**, Department of Meteorology (MISU), Stockholm, Sweden: Ph.D. candidate, *2006-2010*

**Meridian Environmental Technology, Inc.**, Grand Forks, ND, USA: Operational weather forecaster, *2004-2005*

### EDUCATION

**Stockholm University**, Stockholm, Sweden

Ph.D. in Atmospheric Science and Oceanography, *January 2011*

- Dissertation Title: "Arctic Clouds: Interactions with Radiation and Thermodynamic Structure"

M.Sc. (Magisterexam) in Meteorology, *June 2006*

**University of Wisconsin-Milwaukee**, Milwaukee, WI USA

B.Sc., Atmospheric Science, *May 2004*

- Minor in Mathematics
- Graduated with honors

### RESEARCH INTERESTS

Arctic clouds: macro- and microphysical, radiative, thermodynamic and dynamical processes and characteristics; surface energy budget and boundary-layer structure and dynamics; remote sensing of clouds and thermodynamics; Arctic climate; global cloud and radiation characteristics through a synergy of in-situ and satellite-based observational platforms; simulating cloud properties with varying model complexities; processing and analysis of earth observation - big data records.

### TEACHING EXPERIENCE

Theoretical exercise and laboratory instructor for the following courses at Stockholm University, *2006-2009*

- Dynamic Meteorology I, II
- Climatology

- Atmospheric and Oceanic Boundary Layers
- Atmospheric Chemistry

SUPERVISION	<p>Supervisor for the following Ph.D. candidates at the Department of Meteorology, Stockholm University</p> <p>Georgia Sotiropoulou, <i>2012-2016</i></p> <ul style="list-style-type: none"> <li>• Thesis title: "Arctic mixed-phase clouds and their interactions with the ice/ocean surface and boundary layer"</li> <li>• Role: Co-supervisor</li> </ul> <p>Eva Nygren, <i>2013-present</i></p> <ul style="list-style-type: none"> <li>• Thesis title: "Clouds and climate: exploiting GCMs and observations to understand the role of thermodynamic and dynamic forcing on sub-tropical stratocumulus-to-cumulus transition"</li> <li>• Role: Co-supervisor</li> </ul>
FIELD WORK EXPERIENCE	<p>Arctic Ocean 2016 - North Pole transect <i>2016</i></p> <p>Arctic Clouds during Summer Experiment (ACSE) - Arctic Ocean transect, <i>2014</i></p> <p>Surface-layer turbulence mast measurement course project - Stockholm University, <i>2008, 2009</i></p> <p>Arctic Summer Cloud Ocean Study (ASCOS) - central Arctic Ocean, <i>2008</i></p> <p>Balloon validation of remotely sensed aerosol properties - Chilbolton Observatory, England, <i>2008</i></p>
HONORS AND AWARDS	<p>Outstanding Young Scientist Award for the Division on Atmospheric Sciences, European Geosciences Union, <i>2016</i></p> <p>L&amp;E Kinanders donation stipend, <i>2009</i></p> <p>SUCLIM Climate Research School travel stipend, <i>2009</i></p> <p>President, Atmospheric Science Club, University of Wisconsin-Milwaukee <i>2003-2004</i></p> <p>Bill Carlsen Scholarship, University of Wisconsin-Milwaukee, <i>2003</i></p> <p>Honors list, University of Wisconsin-Milwaukee, <i>2002, 2004</i></p>
SPECIAL SKILLS	<p>Knowledgeable in Linux, Mac OS X and PC computing. Proficient in MATLAB and Python. Working knowledge of Fortran and shell scripting. Introductory knowledge of IDL, C, and cdo. Introductory knowledge using GIT version control software. Knowledge on handling large data sets of various data formats (netCDF, HDF, grib). Statistical data analytics. Spoken languages: English (native), Swedish</p>
OTHER	<p>Peer reviewer for <i>Geophys. Res. Lett.</i>; <i>J. Geophys. Res.</i>; <i>Clim. Dyn.</i>; <i>J. Clim.</i>; <i>Remote Sensing Letters</i>; <i>Tellus</i>; <i>Atmos. Chem. Phys.</i>; <i>Atmos. Res.</i></p> <p>Parental leave of absences:</p> <ul style="list-style-type: none"> <li>• October 2011 - February 2012 (full time, not working)</li> <li>• February 2012 - August 2012 (half time, working 50%)</li> <li>• June 2014 - October 2014 (full time, not working)</li> <li>• October 2014 - January 2015 (half time, working 50%)</li> </ul>
INVITED PRESENTATIONS	<p>Bolin Days 2016 Workshop, Stockholm University, Stockholm Sweden - November 2016</p> <p>Title: <i>Clouds, warm air and a climate cooling signal over the summer Arctic?</i></p>

Leipzig Meteorological Colloquium, TROPOS, Leipzig, Germany - December 2016

Title: *Developing process-level understanding of Arctic mixed-phase clouds through observations*

NCAR - Mesoscale and Microscale Meteorology Laboratory, Boulder, CO, USA - April 2017

Title: *Bridging observations across scales to understand the summer Arctic cloud-covered lower troposphere*

## PUBLICATIONS

### Under review or in preparation

**Sedlar, J.**, Spring Arctic Atmospheric Preconditioning: Do Not Rule Out Shortwave Radiation Just Yet, *J. Climate*, *under review*.

Naaka, T., T. Nygård, T. Vihma, **J. Sedlar** and R. Graversen, Atmospheric moisture transport between mid-latitudes and the Arctic: Regional, seasonal and vertical distributions, *in prep*.

Tjernström, M. et al. (including **J. Sedlar**), Arctic summer air-mass transformation, surface inversions and the surface energy budget, *in prep*.

### 2017

Brooks, I. M., M. Tjernström, P. O. G. Persson, M. D. Shupe, R. A. Atkinson, G. Canut, C. E. Birch, T. Mauritsen, **J. Sedlar** and B. J. Brooks, 2017: The turbulent structure of the Arctic summer boundary layer during ASCOS, *J. Geophys. Res. Atmos.*, 122, doi: <https://doi.org/10.1002/2017JD027234>.

Igel, A. L., A. M. L. Ekman, C. Leck, M. Tjernström, J. Savre and **J. Sedlar**, 2017: The Free Troposphere as a Potential Source of Arctic Boundary Layer Aerosol Particles, *Geophys. Res. Lett.*, 44, 7053-7060, doi:10.1002/2017GL073808.

Loewe, K., A. M. L. Ekman, M. Paukert, **J. Sedlar**, M. Tjernström and C. Hoose, 2017: Modelling micro- and macrophysical contributors to the dissipation of an Arctic mixed-phase cloud during the Arctic Summer Cloud Ocean Study (ASCOS), *Atmos. Chem. Phys.*, 17, 6693-6704, doi:10.5194/acp-17-6693-2017.

Karlsson, K.-G., K. Anttila, J. Trentmann, M. Stengel, J. F. Meirink, A. Devasthale, T. Hanschmann, S. Kothe, E. Jääskeläinen, **J. Sedlar**, N. Benas, G.-J. van Zadelhoff, C. Schlundt, D. Stein, S. Finkensieper, N. Håkansson and R. Hollmann, 2017: CLARA-A2: the second edition of the CM SAF cloud and radiation data record from 34 years of global AVHRR data, *Atmos. Chem. Phys.*, 17, 5809-5828, doi:10.5194/acp-17-5809-2017.

**Sedlar, J.** and M. Tjernström, 2017: Clouds, warm air and a climate cooling signal over the summer Arctic, *Geophys. Res. Lett.*, 44, 1095-1103, doi:10.1002/2016GL071959.

### 2016

Sotiropoulou, G., M. Tjernström, **J. Sedlar**, P. Achtert, B. J. Brooks, I. M. Brooks, P. O. G. Persson, J. Prytherch, D. J. Salisbury, M. D. Shupe, P. E. Johnston and D. Wolfe, 2016: Atmospheric Conditions during the Arctic Clouds in Summer Experiment (ACSE): Contrasting Open Water and Sea Ice Surfaces during Melt and Freeze-Up Seasons, *J. Clim.*, 29, 8721-8744, doi:10.1175/JCLI-D-16-0211.1.

Devasthale, A., **J. Sedlar**, B. H. Kahn, M. Tjernström, E. J. Fetzer, B. Tian, J. Teixeira and T. S.

Pagano, 2016: A decade of spaceborne observations of the Arctic atmosphere. Novel insights from NASA's AIRS instrument, *Bull. Amer. Meteorol. Soc.*, 97, 2163-2176, doi:10.1175/BAMS-D-14-00202.1.

Leung, W.-Y. H., J. Savre, F. A.-M. Bender, M. Komppula, H. Portin, S. Romakkaniemi, **J. Sedlar**, K. Noone, and A. M. L. Ekman, 2016: Sensitivity of a continental night-time stratocumulus-topped boundary layer to varying environmental conditions, *Quart. J. Roy. Meteorol. Soc.*, doi:10.1002/qj.2877.

Sotiropoulou, G., **J. Sedlar**, R. Forbes and M. Tjernström, 2016: Summer Arctic clouds in the ECMWF forecast model: an evaluation of cloud parameterization schemes, *Q. J. R. Meteorol. Soc.*, 142, 387-400, doi:10.1002/qj.2658.

## **2015**

Tjernström, M., M. D. Shupe, I. M. Brooks, P. O. G. Persson, J. Prytherch, D. J. Salisbury, **J. Sedlar**, P. Achtert, B. J. Brooks, P. E. Johnston, G. Sotiropoulou and D. Wolfe, 2015: Warm-air advection, air mass transformation and fog causes rapid ice melt, *Geophys. Res. Lett.*, 42, 5594-5602, doi: 10.1002/2015GL064373.

## **2014**

**Sedlar, J.**, 2014: Implications of Limited Liquid Water Path on Static Mixing within Arctic Low-Level Clouds, *J. Appl. Meteorol. Climatol.*, 53, 2775-2789, doi:10.1175/JAMC-D-14-0065.1.

Vihma, T., R. Pirazzini, I. Fer, I. A. Renfrew, **J. Sedlar**, M. Tjernström, C. Lüpkes, T. Nygård, D. Notz, J. Weiss, D. Marsan, B. Cheng, G. Birnbaum, S. Gerland, D. Chechin, and J. C. Gascard, 2014: Advances in understanding and parameterization of small-scale physical processes in the marine Arctic climate system: a review, *Atmos. Chem. Phys.*, 14, 9403-9450, doi:10.5194/acp-14-9403-2014.

Tjernström, M. and coauthors (including **J. Sedlar**), 2014: The Arctic Summer Cloud-Ocean Study (ASCOS): Overview and experimental design, *Atmos. Chem. Phys.*, 14, 2823-2869, doi:10.5194/acp-14-2823-2014.

**Sedlar, J.** and M. D. Shupe, 2014: Characteristic nature of vertical motions observed in Arctic mixed-phase stratocumulus, *Atmos. Chem. Phys.*, 14, 3461-3478, doi:10.5194/acp-14-3461-2014.

Sotiropoulou, G., **J. Sedlar**, M. Tjernström, M.D. Shupe, I.M. Brooks and P.O.G. Persson, 2014: The thermodynamic structure of summer Arctic stratocumulus and the dynamic coupling to the surface, *Atmos. Chem. Phys.*, 14, 12573-12592, doi:10.5194/acp-14-12573-2014.

## **2013**

Kupiszewski, P., C. Leck, M. Tjernström, S. Sjogren, **J. Sedlar**, M. Graus, M. Müller, B. Brooks, E. Swietlicki, S. Norris and A. Hansel, 2013: Vertical profiling of aerosol particles and trace gases over the central Arctic Ocean during summer, *Atmos. Chem. Phys.*, 13, 12405-12431, doi:10.5194/acp-13-12405-2013.

Shupe, M. D., P. O. G. Persson, I. M. Brooks, M. Tjernström, **J. Sedlar**, T. Mauritsen, S. Sjogren and C. Leck, 2013: Cloud and boundary layer interactions over the Arctic sea ice in late summer,

*Atmos. Chem. Phys.*, 13, 9379-9400, doi:10.5194/acp-13-9379-2013.

Devasthale, A., **J. Sedlar**, T. Koenigk, and E. J. Fetzer, 2013: The thermodynamic state of the Arctic atmosphere observed by AIRS: Comparisons during the record minimum sea ice extents of 2007 and 2012, *Atmos. Chem. Phys.*, 13, 7441-7450, doi:10.5194/acp-13-7441-2013.

Karlsson, K.-G., A. Riihelä, R. Müller, J.F. Meirink, **J. Sedlar**, M. Stengel, M. Lockhoff, J. Trentmann, F. Kaspar, R. Hollmann and E. Wolters, 2013: CLARA-A1 - a cloud, albedo, and radiation dataset from 28 yr of global AVHRR data, *Atmos. Chem. Phys.*, 13, 5351-5367, doi:10.5194/acp-13-5351-2013.

## **2012**

**Sedlar, J.** and A. Devasthale, 2012: Clear-sky thermodynamic and radiative anomalies over a sea ice sensitive region of the Arctic, *J. Geophys. Res.*, 117, D19111, 11 pp., doi:10.1029/2012JD017754.

Tjernström, M., C.E. Birch, I.M. Brooks, M.D. Shupe, P.O.G. Persson, **J. Sedlar**, T. Mauritsen, C. Leck, J. Paatero, M. Szczodrak and C.R. Wheeler, 2012: Meteorological conditions in the central Arctic summer during the Arctic Summer Cloud Ocean Study (ASCOS), *Atmos. Chem. Phys.*, 12, 6863-6889, doi:10.5194/acp-12-6863-2012.

Birch, C.E., I.M. Brooks, M. Tjernström, M.D. Shupe, T. Mauritsen, **J. Sedlar**, A.P. Lock, S.F., P. Earnshaw, P.O.G. Persson, S.F. Milton and C. Leck, 2012: Modelling atmospheric structure, cloud and their response to CCN in the central Arctic: ASCOS case studies, *Atmos. Chem. Phys.*, 12, 3419-3435, doi:10.5194/acp-12-3419-2012.

**Sedlar, J.**, M.D. Shupe and M. Tjernström, 2012: On the Relationship between Thermodynamic Structure and Cloud Top, and its Climate Significance in the Arctic, *J. Clim.*, 25, 2374-2393, doi:10.1175/JCLI-D-11-00186.1.

## **2011**

**Sedlar, J.**, M. Tjernström, T. Mauritsen, M.D. Shupe, I.M. Brooks, P.O.G. Persson, C.E. Birch, C. Leck, A. Sirevaag and M. Nicolaus, 2011: A transitioning Arctic surface energy budget: the impacts of solar zenith angle, surface albedo and cloud radiative forcing, *Clim. Dyn.*, 37, 7-8, 1643-1660, doi:10.1007/s00382-010-0937-5.

Devasthale, A., **J. Sedlar** and M. Tjernström, 2011: Characteristics of water-vapour inversions observed over the Arctic by Atmospheric Infrared Sounder (AIRS) and radiosondes, *Atmos. Chem. Phys.*, 11, 9813-9823, doi:10.5194/acp-11-9813-2011.

Mauritsen, T., **J. Sedlar**, M. Tjernström, C. Leck, M. Martin, M. Shupe, S. Sjogren, B. Sierau, P.O.G. Persson, I.M. Brooks and E. Swietlicki, 2011: An Arctic CCN-limited cloud-aerosol regime, *Atmos. Chem. Phys.*, 11, 165-173, doi:10.5194/acp-11-165-2011.

Devasthale, A., M. Tjernström, K.-G. Karlsson, M.A. Thomas, C. Jones, **J. Sedlar** and A.H. Omar, 2011: The vertical distribution of thin features over the Arctic analyzed from CALIPSO observations, *Tellus B*, 63: 77-85, doi:10.1111/j.1600-0889.2010.00516.x.

## **2008 - 2010**

**Sedlar, J.** and M. Tjernström, 2009: Stratiform Cloud-Inversion Characterization During the Arctic Melt Season, *Boundary-Layer Meteorol.*, 132, 455-474, doi:10.1007/s10546-009-9407-1.

**Sedlar, J.** and R. Hock, 2009: Testing longwave radiation parameterizations under clear and overcast skies at Storglaciären, Sweden, *The Cryosphere*, 3, 75-84, doi:10.5194/tc-3-75-2009.

Tjernström, M., **J. Sedlar** and M.D. Shupe, 2008: How Well Do Regional Climate Models Reproduce Radiation and Clouds in the Arctic? An Evaluation of ARCMIP Simulations, *J. Appl. Meteorol. Climatol.*, 47, 2405-2422, doi:10.1175/2008JAMC1845.1.