

Sara Morris

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Qualifications

In my current position as a Research Physical Scientist at the National Oceanic and Atmospheric Administration (NOAA), I have developed a number of specialty areas: 1) Arctic ground heat fluxes – a critical component of the surface energy budget, of which spatial and temporal analysis of the ground heat flux demonstrates the impact of the term on Arctic melt, 2) research in ice mitigation strategies for Arctic instrumentation, specifically broadband radiometers, to investigate the impact of data lost in Polar Regions due to harsh weather conditions. Co-leading the De-Icing Comparison Experiment (D-ICE), my research focuses on improvements to radiation instrumentation capturing measurements in harsh Arctic environments, so that the scientific community can better account for discrepancies in the radiative term of the surface energy budget, 3) Arctic radiation budgets and the collection and processing of climate grade data sets, 4) research into the spatial and annual variability of Arctic black carbon, and 5) spatial and annual variability of ozone depletion events.

I participate in weather and climate research community outreach through my role as facilitator and collaborator of the six science working groups of the International Arctic Systems for Observing the Atmosphere (IASOA) consortium, while facilitating international Arctic working group discussions related to key Arctic climate science questions (<https://www.esrl.noaa.gov/psd/iasoa/science2>). Additionally, as the current US Coordinator for the Multi-disciplinary drifting Observatory for the Study of Arctic Climate (MOSAIC) expedition (<https://www.mosaic-expedition.org/>), I facilitate Arctic climate science by coordinating the development and field deployment of remote flux stations to measure all components of the surface energy budget on the sea-ice. Similarly, as US Coordinator, I facilitate surface energy budget science, data science and logistical efforts while participating as a member of the Central Communications Management Unit (CCMU).

Education

2015-2018	University of Colorado M.A. Physical Geography, Arctic Emphasis	Boulder, CO
2006-2010	University of Colorado B.A.S. Environmental Science, Climate Emphasis Minor in Atmospheric and Oceanic Science	Boulder, CO

Work Experience

- ❖ National Oceanic and Atmospheric Administration (ESRL/PSD/POP)
 - 08 Dec 2019 – present
 - Title: Research Physical Scientist (ZP-1301-3)**
 - Research of the surface energy budget (SEB) on coupled processes in the Arctic
 - Spatial and temporal ground heat flux (GHF) analysis in the Arctic
 - Participation in the study of the closure of the SEB

- Impact of the GHF term on SEB closure and Arctic melt
- Research comparative instrument studies on instrument modifications necessary for Arctic environments
 - Investigation of data lost in polar regions due to frost, rime and snow
 - Impact of ice mitigation methods on measurement uncertainty
- D- ICE Campaign Project Co-Lead: mitigation of icing on radiometer instrumentation
- Research of surface-level ozone and black carbon in the Arctic
 - Tropospheric surface-level ozone climatology of Arctic observations
 - Climatology of black carbon measurements in the Arctic
- US Coordinator for the Multi-disciplinary drifting Observatory for the Study of Arctic Climate (MOSAIC) Expedition
 - Coordination of science and workshops to facilitate interactive discussions among scientists
 - Coordination of logistics, communication and data
 - Participation in the Central Communications Management Unit (CCMU)
 - Develop Atmospheric Surface Flux Stations (ASFS systems)
 - Data management for Atmosphere Team
- International Arctic Systems for Observing the Atmosphere (IASOA) Facilitator, data management lead, website and portal maintenance, Science Working Group team lead
 - Support and assist the scientific community in analyzing both observational and climate model data
- Data Manager of Baseline and Arctic stations of GMD and PSD
- Develop instrument “Datagrams” to track processes by which information moves from sensor to archive
- Provide data management support and infrastructure for complete data flow processes at Baseline and Arctic field sites
- Manage logistical, technical, and research support for field observatories
- Field technician: experience in repairing, troubleshooting, and calibrating instrumentation; establish and organize system network flow of data from remote locations
- Development of a web accessible ftp site and browser for data sets with consistent formats, file structures, data transfer, ingest and tools
- Manage the processing and archiving of data from a wide range of commercial and research grade sensors
- General technical skills for supporting Arctic operations and instruments
- Create and develop ingest, reformatting and diagnostic display software with MATLAB programs for Arctic data sets

- ❖ Cooperative Institute for Research in Environmental Sciences (CIRES) at the National Oceanic and Atmospheric Administration (PSD – Polar Observations & Processes, GMD – Global Radiation Group)
- 29 Feb 2012 – 07 Dec 2019

Title: Arctic & Baseline Data Scientist (Associate Scientist II)

- Research of the surface energy budget (SEB) on coupled processes in the Arctic
 - Spatial and temporal ground heat flux (GHF) analysis in the Arctic
 - Participation in the study of the closure of the SEB
 - Impact of the GHF term on SEB closure and Arctic melt

- Research comparative instrument studies on instrument modifications necessary for Arctic environments
 - Investigation of data lost in polar regions due to frost, rime and snow
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- General technical skills for supporting Arctic operations and instruments
- Create and develop ingest, reformatting and diagnostic display software with MATLAB programs for Arctic data sets

❖ Cooperative Institute for Research in Environmental Sciences (CIRES) at the National Oceanic and Atmospheric Administration

- 01 Dec 2011 – 29 Feb 2012

Title: Professional Research Assistant (Associate Scientist I)

- Data analysis and plotting of Tropospheric ozone results using IDL programs
- Record ozone measurements using Dobson Radar and TEI surface instrumentation
- Process and archive ozone measurement data
- Lab work: maintenance, construction, and upgrading of ozone aircraft, surface, and tower instruments from 2B Technologies and TEI Thermo Scientific Corporation
- Perform calibrations using the TEI Standard Ozone Calibrator for aircraft, surface, and tower ozone instruments

- Maintain and diagnose problems with ozone instruments at designated ozone sites across the world
 - Update and maintain NOAA ftp customer site with ozone data and plots
 - Create Hybrid Single Particle Lagrangian Integrated Trajectory Models (HYSPLIT)
- ❖ Science and Technology Corp. (STC) at the National Oceanic and Atmospheric Administration
- 22 Nov 2010 – 30 Nov 2011
- Title: Ozone Program Research Assistant (Associate Computer Specialist)**
- Data analysis and plotting of Tropospheric ozone results using IDL programs
 - Record ozone measurements using Dobson Radar and TEI surface instrumentation
 - Process and archive ozone measurement data
 - Lab work: maintenance, construction, and upgrading of ozone aircraft, surface, and tower instruments from 2B Technologies and TEI Thermo Scientific Corporation
 - Perform calibrations using the TEI Standard Ozone Calibrator for aircraft, surface, and tower ozone instruments
 - Maintain and diagnose problems with ozone instruments at designated ozone sites across the world
 - Update and maintain NOAA ftp customer site with ozone data and plots
 - Create Hybrid Single Particle Lagrangian Integrated Trajectory Models (HYSPLIT)

Educational and Professional Activities and Outreach

Science Community Activities: US Coordinator of MOSAiC Expedition, International Arctic Science Committee (IASC) Atmosphere Working Group Secretary, Co-Lead of D-ICE field campaign, Facilitator of IASOA Working Groups, PI for surface ozone instrumentation at Tiksi and Eureka Arctic observatories, Invited scientist to Erie Middle School 2016 & 2019, American Geophysical Union Conference 2013 presenter, Software and dataset development for global radiation baseline observatories, BSRN station scientist for NOAA baseline observatories

Professional Memberships: American Meteorological Society, American Geophysical Union

Technical Training: GMD Leadership Training (2019), Campbell Scientific data loggers (2015), Soldering connectors and circuitry, Instrument maintenance: TEI and 2B surface ozonemeters, ATI and Metek sonic anemometers, Eppley and Kipp & Zonen radiometers

Field Experience

- April-September 2019: Development of Atmospheric Surface Flux Stations (ASFS) for deployment during the MOSAiC Expedition in the Arctic; ***study of the closure of the SEB over ice***
- 2017-2018: Co-Lead on the De-Icing Comparison Experiment (D-ICE) examining ice mitigation techniques for solar radiometer instrumentation in the Arctic at the Barrow Observatory in Alaska; ***research of instrument modifications necessary for Arctic environments***
- October 2016: Deployment of surface energy budget flux measurements at the Arctic station of Alert in Nunavut Territory, Canada; ***research the SEB on coupled processes in the Arctic***

- July 2016: Research and technical work on solar radiation instrumentation at the Storm Peak Laboratory in Steamboat Springs, Colorado; **research of ice mitigation methods on broadband radiometers**
- August 2012: Execution and maintenance of surface energy budget flux and ozone measurements at the Arctic station of Tiksi in Siberia, Russia; **research the SEB on coupled processes in the Arctic**

Publications and Presentations

(Presently: S.M. Morris, Formerly: S.M. Crepinsek)

Publications

Cox, C.J., **S.M. Morris**, T. Uttal, C.N. Long, A. McComiskey, 2019: The De-Icing Comparison Experiment – ARM Contribution (DICEXACO) Field Campaign Report, Ed. by Robert Stafford, ARM user facility, DOE/SC-ARM-19-020

Morris, S.M., 2018: Variability of Ground Heat Flux at Tiksi Station *ProQuest Dissertations Publishing*, Master's Degree, University of Colorado at Boulder

Grachev, A., P.O.G. Persson, T. Uttal, E.A. Akish, C.J. Cox, S.M. Morris, C.W. Fairall, R.S. Stone, G. Lesins, A.P. Makshtas, and I.A. Repina, 2017: Seasonal and latitudinal variations of surface fluxes at Arctic terrestrial sites *Climate Dynamics*, 1-26, doi: 10.1007/s00382-017-3983-4, issn: 1432-0894

Cox, C.J., C.N. Long, T. Uttal, S. Starkweather, **S. Crepinsek**, M. Maturilli, A. McComiskey, N.B. Miller, E. Konopleva, V. Kustov, M.D. Shupe, K. Steffen, D. Stanitski, R. Stone, V.P. Walden, 2016: Cloud radiative forcing from pan-Arctic Baseline Surface Radiation Network BSRN stations *J. Clim.*

Eckhardt, S, B Quennehen, DJL Olivie, TK Berntsen, R Cherian, JH Christensen, W Collins, **S Crepinsek**, N Daskalakis, M Flanner, A Herber, C Heyes, O Hodnebrog, L Huang, M Kanakidou, Z Klimont, J Langner, KS Law, MT Lund, R Mahmood, A Massling, S Myriokefalitakis, IE Nielsen, JK Nojgaard, J Quaas, PK Quinn, JC Raut, ST Rumbold, M Schulz, S Sharma, RB Skeie, H Skov, T Uttal, K von Salzen and A Stohl, 2015: Current model capabilities for simulating black carbon and sulfate concentrations in the Arctic atmosphere: a multi-model evaluation using a comprehensive measurement data set *Atmos. Chem. Phys.*, COPERNICUS GESELLSCHAFT MBH, 15(16), 9413-9433, doi: 10.5194/acp-15-9413-2015, issn: 1680-7316, ids: CQ5LT

Evangelidou, N, Y Balkanski, WM Hao, A Petkov, RP Silverstein, R Corley, BL Nordgren, SP Urbanski, S Eckhardt, A Stohl, P Tunved, **S Crepinsek**, A Jefferson, S Sharma, JK Nojgaard and H Skov, 2016: Wildfires in northern Eurasia affect the budget of black carbon in the Arctic - a 12-year retrospective synopsis (2002-2013) *Atmos. Chem. Phys.* , COPERNICUS GESELLSCHAFT MBH, 16(12), 7587-7604, doi: 10.5194/acp-16-7587-2016, issn: 1680-7316, ids: DQ7VZ

Uttal T, Starkweather S., Drummond J.R., Vihma T., Makshtas A.P., Darby L.S., Burkhart J.F., Cox C.J., Schmeisser L.N., Haiden T., Maturilli M., Shupe, M.D. de Boer G., Saha A., Grachev A.A., **Crepinsek S.M.**, Bruhwiler L., Goodison B., McArthur B., Walden V.P., Dlugokencky E.J., Persson P.O.G., Lesins G., Laurila T., Ogren J.A., Stone R., Long C.N., Sharma S., Massling A., Turner D.D., Stanitski D.M., Asmi E., Aurela M., Skov H., Eleftheriadis K., Virkkula A., Platt A., Førlund E.J., Iijima Y., Nielsen I.E., Bergin M.H., Candlish L., Zimov N.S., Zimov S.A., O'Neill N.T., Fogal P.F., Kivi R., Konopleva-Akish E.A., Verlinde J., Kustov V.Y., Vasel B., Ivakhov V.M., Viisanen Y., Intrieri J.M., 2015: International Arctic Systems for

Presentations

Morris, S.M., 2019-6-13: Overview (Observatories and Barrow Datagram). *GMD G-RAD*, Boulder, CO, United States

Morris, S.M., Cox, C.J., Long, C., 2018-5-22: Winter 2017-2018 Results from the De-Icing Comparison Experiment (D-ICE) at NOAA's Barrow Atmospheric Baseline Observatory, Utqiagvik, Alaska. *Global Monitoring Annual Conference*, Boulder, CO, United States

Morris, S.M., 2018-4-4: Variability of Ground Heat Flux at Tiksi Station. *Thesis Defense*, Boulder, CO, United States

Crepinsek, S., Cox, C., Serreze, M., Hall, E., Long, C., 2016-11-30: Arctic Radiometer Modifications. *IASOA*, Boulder, Colorado, USA

Crepinsek, S., 2016-11-30: Arctic Radiometer Modifications. *IASOA*, Boulder, Colorado, United States

Crepinsek, S., McClure, A., 2016-9-31: Ozone Working Group Climatology Publication. *IASOA*, Boulder, Colorado, United States

Crepinsek, S., 2015-11-04: Determining Ground Heat Flux around the Tiksi Station. *IASOA*, Boulder, Colorado, United States

Crepinsek, S., Uttal, T., Sandoval, C., Persson, O.P., Grachev, A.A., 2013-12-12: Comparison of Heat Flux Measurements and Calculations at an Arctic Site. *American Geophysical Union Conference*, San Francisco, California, United States

References

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