

Denis Sergeev

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College of Engineering, Mathematics and Physical Sciences | University of Exeter | Exeter | United Kingdom

My interests include exoplanet atmospheric dynamics, general circulation of the atmosphere, polar meteorology. Most of my current research focuses on the atmospheric modelling of terrestrial planets. I hope to contribute to our understanding of the climate regimes on different planets and their potential for habitability.

PROFESSIONAL EXPERIENCE

2018–2021 **Postdoctoral Research Fellow** | Climate modelling of terrestrial exoplanets | *University of Exeter*
Exeter, United Kingdom

EDUCATION

2014–2018 **PhD in Meteorology** | *University of East Anglia* | Norwich, United Kingdom
Supervisors: Prof. Ian A. Renfrew • Prof. Thomas Spengler • Prof. Stephen Dorling
Thesis title: **Characteristics of polar lows in the Nordic Seas and the impact of orography and sea ice on their development**

- Analysis of high-resolution model simulations
- Model skill verification against aircraft and satellite observations
- Sensitivity to orography and sea ice distribution
- Statistical analysis of cyclone climatology

2009–2014 **Specialist Diploma in Meteorology** | With Honours | *Lomonosov Moscow State University* | Moscow, Russia
Supervisor: Dr. Victor Stepanenko
Thesis title: **Idealised numerical modelling of polar mesocyclone dynamics**

- Idealised baroclinic channel simulations
- Testing different parameterizations and experiment set-ups
- Energy and vorticity budgets

INTERNSHIPS

Oct 2013 **Visiting student** | Geophysical Institute | *University of Bergen* | Bergen, Norway
Supervisor: Prof. Thomas Spengler

Jul 2012 **Intern** | Laboratory of Climate Theory | *A.M. Obukhov Institute of Atmospheric Physics* | Moscow, Russia
Supervisor: Dr. Alexey Eliseev

PUBLICATIONS

Peer-reviewed

7. **Sergeev, D.E.**, I.A. Renfrew, T. Spengler, A. Terpstra, and S.-I. Watanabe. 2019. North Atlantic polar mesoscale cyclones in ERA5 and ERA-Interim reanalyses. *Geophysical Research Letters*, under review
6. Renfrew, I.A., R.S. Pickart, K. Våge, G.W. Moore, T.J. Bracegirdle, A.D. Elvidge, E. Jeansson, T. Lachlan-Cope, L. McRaven, L. Papritz, J. Reuder, H. Sodemann, A. Terpstra, S. Waterman, H. Valdimarsson, A. Weiss, M. Almansi, F. Bahr, A. Brakstad, C. Barrell, J.K. Brooke, B. Brooks, I.M. Brooks, M.E. Brooks, E.M. Bruvik, C. Duschka, I. Fer, H.M. Golid, M. Hallerstig, I. Hessevik, J. Huang, L. Houghton, S. Jónsson, M. Jonassen, K. Jackson, K. Kvalsund, E.W. Kolstad, K. Konstali, J. Kristiansen, R. Ladkin, P. Lin, A. Macrander, A. Mitchell, H. Olafsson, A. Pacini, C. Payne, B. Palmason, M.D. Pérez-Hernández, A.K. Peterson, G.N. Petersen, M.N. Pisareva, J.O. Pope, A. Seidl, S. Semper, **D.E. Sergeev**, S. Skjelsvik, H. Sjøland, D. Smith, M.A. Spall, T. Spengler, A. Touzeau, G. Tupper, Y. Weng, K.D. Williams, X. Yang, and S. Zhou. 2019. The Iceland Greenland Seas Project. *Bulletin of American Meteorological Society*, accepted
5. **Sergeev, D.E.**, I.A. Renfrew, and T. Spengler. 2018. Modification of polar low development by orography and sea ice. *Monthly Weather Review*, 146: 3325–3341
4. Shestakova, A.A., P.A. Toropov, V.M. Stepanenko, **D.E. Sergeev**, and I.A. Repina. 2018. Observations and modelling of downslope windstorm in Novorossiysk. *Dynamics of Atmospheres and Oceans*, 83: 83–99
3. **Sergeev, D.E.**, I.A. Renfrew, T. Spengler, and S.R. Dorling. 2017. Structure of a shear-line polar low. *Quarterly Journal of the Royal Meteorological Society*, 143(702): 12–26

2. Spengler, T., I.A. Renfrew, A. Terpstra, M. Tjernström, J. Screen, I.M. Brooks, A. Carleton, D. Chechin, L. Chen, J. Doyle, I. Esau, P.J. Hezel, T. Jung, T. Kohyama, C. Lüpkes, K.E. McCusker, T. Nygård, **D.E. Sergeev**, M.D. Shupe, H. Sodemann, and T. Vihma. 2016. High Latitude Dynamics of Atmosphere-Ice-Ocean Interactions. *Bulletin of American Meteorological Society*, 97(9): E5179–E5182
1. Eliseev, A.V., **D.E. Sergeev**. 2014. Impact of Subgrid Scale Vegetation Heterogeneity on the Simulation of Carbon Cycle Characteristics. *Izvestiya, Atmospheric and Oceanic Physics*, 50(3): 259–270

Proceedings

3. **Sergeev, D.E.**, Stepanenko VM. 2013. Numerical modelling of polar mesocyclones generation mechanisms. *International Conference "Turbulence, atmosphere and climate dynamics" dedicated to A.M. Obukhov*, Selected papers: 168–170
2. **Sergeev, D.E.**, Zamyatina MY, Stepanenko VM. 2013. Thermal regime features of Kronotsky lake (in Russian). *Kronotsky State Natural Biosphere Reserve Proceedings*, 3: 29–41
1. **Sergeev, D.E.**, Stepanenko VM. 2012. Parameterization of mesoscale sensible heat and methane fluxes in the region of Western Siberia. *International Conference and Early Career Scientists School on Environmental Observations, modelling and Information Systems (ENVIROMIS-2012)*, Selected papers: 67–69

CONFERENCES

Oral presentations

- Aug 2019 Simulations of moist convection on tidally-locked rocky exoplanets | Exoclimates V | Oxford, UK
- Jun 2019 North Atlantic polar mesoscale cyclones in ERA5 and ERA-Interim reanalyses | IGP workshop | Norwich, UK
- Apr 2019 Atmospheric convection on tidally-locked Earth-like exoplanets | UK Exoplanet Community Meeting | London, UK
- Jun 2018 Modification of Polar Low Development by Sea Ice and Svalbard Orography | POLAR2018 | Davos, Switzerland
- Oct 2017 The influence of Svalbard orography and sea ice on polar low development | 18th Cyclone Workshop | Sainte-Adèle, Canada
- Apr 2017 Polar lows and how background environment can influence their development | Cambridge Earth Systems Science EnvEast Doctoral Alliance Symposium | Cambridge, UK
- May 2016 Structure of the shear-line polar low south of Svalbard | NORPAN kick-off meeting | Tokyo, Japan
- Apr 2016 Structure of the shear-line polar low south of Svalbard | 13th European Polar Lows Working Group (EPLWG) Workshop | Paris, France

Poster presentations

- Jul 2015 Structure and dynamics of a shear-line polar low during a cold-air outbreak over the Norwegian Sea | Royal Meteorological Society Student Conference | Birmingham, UK
- Mar 2015 Structure and dynamics of a shear-line polar low during a cold-air outbreak over the Norwegian Sea | Dynamics of Atmosphere-Ice-Ocean Interactions in the High Latitudes workshop | Rosendal, Norway
- May 2014 Numerical modelling of polar mesocyclones dynamics diagnosed by the energy budget | European Geosciences Union (EGU) General Assembly | Vienna, Austria
- Apr 2013 Impact of subgrid-scale vegetation heterogeneity on results of climate model simulation of carbon cycle | European Geosciences Union (EGU) General Assembly | Vienna, Austria
- Apr 2013 Numerical modelling of polar mesocyclones generation mechanisms | European Geosciences Union (EGU) General Assembly | Vienna, Austria

AWARDS AND SCHOLARSHIPS

- 2017 Best Presentation Award | Cambridge Earth Systems Science EnvEast Doctoral Alliance (CEEDA) Symposium
- 2016 Travel Bursary | WWRP/WCRP/Bolin Center Polar Prediction School
- 2015 Travel Award | Dynamics of Atmosphere-Ice-Ocean Interactions in the High Latitudes workshop
- 2014–2018 Lord Zuckerman scholarship | School of Environmental Sciences, University of East Anglia
- 2014 Young Scientist's Travel Award (YSTA) | European Geosciences Union (EGU) General Assembly
- 2014 Russian Academy of Sciences Young Scientist Medal

SUPERVISION OF STUDENTS

2019 **Isobel Parry** | Summer student | *University of Exeter* | Water cycle on Proxima Centauri b

2018–2019 **Jake Eager** | MSc | *University of Exeter* | Implications of Stellar Type on the Habitability of Tidally Locked Terrestrial Exoplanets

COMPUTER SKILLS

Operating systems: *Linux* • *Unix* • *Windows*

Computer languages: *Python* • *Fortran*

Data visualisation: *Python* • *Matlab* • *NCL* • *Paraview*

Parallel programming: *Dask* • *MPI* • *OpenMP*

Version control systems: *Git* • *Subversion*

Document preparation: *LaTeX* • *Markdown*

LANGUAGES

Russian: Native speaker

English: Fluent

French: Basic

VOCATIONAL TRAINING

Jul 2019 **2nd ICTP Summer School on Theory, Mechanisms and Hierarchical Modelling of Climate Dynamics: Convective Organization and Climate Sensitivity**

Apr 2018 **Fortran Modernisation Workshop**

Apr 2016 **WWRP/WCRP/Bolin Center Polar Prediction School**

Dec 2014 **UK Met Office Unified Model Training**

Sep–Dec 2011 **Global Climate Change course**

EnvEast Doctoral Training Partnership (DTP)

Jun 2017 **Weather presenting course**

Jan 2017 **Raspberry Pi course**

Safety training

Feb 2017 **Level 1 First Aid for Field Work course**

Dec 2017 **Sea Survival course**

Jan 2018 **Helicopter Underwater Escape Training Course (CA-EBS)**

FIELDWORK EXPERIENCE

Feb–Mar 2018 **The Iceland–Greenland Seas Project (IGP) field campaign** | Characterising the atmospheric forcing and the ocean response of coupled atmosphere–ocean processes; in particular cold-air outbreaks in the vicinity of the marginal ice zone and their triggering of oceanic heat loss and the generation of dense water masses | Akureyri, Iceland

Aug 2012 **Field practice in meteorology** | Study of prevailing mesoscale processes via wind characteristic measurements and lake hydrothermodynamical modelling | Kronotsky National Reservation, Kamchatka pen., Russia

Jan–Feb 2012 **Field practice in meteorology** | Measurements of the convective boundary layer over the polynya | White Sea Biological Station, Karel Republic, Russia

TEACHING EXPERIENCE

Jan 2018 **ECR course “Introduction to Python in Environmental Sciences”** | Course leader | University of East Anglia | Norwich, UK

2015–2017 **Teaching assistance** | Modelling Environmental Processes, Meteorology, Numerical Skills for Scientists | University of East Anglia | Norwich, UK

Apr 2017 **Field course teaching assistance** | University of East Anglia | Slapton, UK

Nov 2016 **Python training course** | Course leader | University of East Anglia | Norwich, UK

EDITORIAL SERVICE

Acted as
reviewer for Quarterly Journal of the Royal Meteorological Society (x3)

OUTREACH

2019 School outreach programme "Exoplanet Explorers"

- Visit to Pool Academy

2014–2015 Contributor to SciSnack blogging platform

- Disastrous Disaster Movies
- Polar Lows: What Fuels Arctic Hurricanes?
- Worldwide Weird Weather Words

VOCATIONAL EXPERIENCE

Apr–Jun 2018 **Data technician** | Processing of meteorological data collected in the IGP field campaign | University of East Anglia

2015–Present **Python group leader** | Founder and leader of the Python programming language users group | University of East Anglia

Mar 2015 **Rapporteur** | Dynamics of Atmosphere-Ice-Ocean Interactions in the High-Latitudes workshop | Rosendal, Norway

Aug–Sep 2013 **Weather Forecaster** | Forecast and Briefing Service | Main Aviation Meteorological Centre, Vnukovo Airport

REFERENCES

Dr F Hugo Lambert

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Prof Ian Renfrew

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Prof Thomas Spengler

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