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. Duscha, 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. Søiland, 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*, 100: 1795–1817

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. *Quaterly 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): ES179–ES182

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.**, V.M. Stepanenko. 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.**, M.Y. Zamyatina, V.M. Stepanenko. 2013. Thermal regime features of Kronotsky lake (in Russian). *Kronotsky State Natural Biosphere Reserve Proceedings*, 3: 29–41

1. **Sergeev, D.E.**, V.M. Stepanenko. 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** | Exoclimes 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

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 • Matlab • NCL
Python libraries: numpy • iris • xarray • pandas • matplotlib • cartopy • pyvista • cython
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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