

# 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

6. **Sergeev DE**, Renfrew IA, Spengler T, Terpstra, A, and Watanabe S-I. 2019. North Atlantic polar mesoscale cyclones in ERA5 and ERA-Interim reanalyses. *Geophysical Research Letters*, submitted
5. **Sergeev DE**, Renfrew IA, and Spengler T. 2018. Modification of polar low development by orography and sea ice. *Monthly Weather Review*, 146: 3325–3341
4. Shestakova AA, Toropov PA, Stepanenko VM, **Sergeev DE**, and Repina IA. 2018. Observations and modelling of down-slope windstorm in Novorossiysk. *Dynamics of Atmospheres and Oceans*, 83: 83–99
3. **Sergeev DE**, Renfrew IA, Spengler T, and Dorling SR. 2017. Structure of a shear-line polar low. *Quarterly Journal of the Royal Meteorological Society*, 143(702): 12–26
2. Spengler T, Renfrew IA, Terpstra A, Tjernström M, Screen J, Brooks I, Carleton A, Chechin D, Chen L, Doyle J, Esau I, Hezel P, Jung T, Kohyama T, Lüpkes C, McCusker K, Nygård T, **Sergeev DE**, Shupe M, Sodemann H, and Vihma T. 2016. High Latitude Dynamics of Atmosphere-Ice-Ocean Interactions. *Bulletin of American Meteorological Society*, 97(9): ES179–ES182
1. Eliseev AV, **Sergeev DE**. 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 DE**, 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 DE**, Zamyatina MY, Stepanenko VM. 2013. Thermal regime features of Kronotsky lake (in Russian). *Kronotsky State Natural Biosphere Reserve Proceedings*, 3: 29–41
1. **Sergeev DE**, 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

- 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**

## COMPUTER SKILLS

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

**Computer languages:** Python • Fortran

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

**Parallel programming:** 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 **Training 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

- 2015–Present **Contributor to SciSnack blogging platform**
  - Polar Lows: What Fuels Arctic Hurricanes?
  - Disastrous Disaster Movies
  - 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

**Prof Ian Renfrew**  
University of East Anglia  
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**Prof Thomas Spengler**  
University of Bergen  
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