

Dr Claire Ryder

Associate Professor

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Expertise

Dr Ryder's expertise lies in microphysical and optical properties of mineral dust. She has exploited airborne measurements to demonstrate the evidence and impact of coarse dust particles on climate, and has also worked with international teams to extrapolate links with weather and climate models as well as satellite retrievals.

Publications Summary

Dr Ryder has published 45 peer-reviewed articles with an H-index of 19. She has over 1,500 citations averaging 33 citations/paper, with publications cited in the IPCC 2007, 2013 and 2021 policy documents and 8 highly cited papers with >50 citations. Selected publications are listed on page 3.

Research Funding

Dr Ryder has been PI and Co-I on a variety of externally funded projects since 2012 totalling >£1,000k

- **DAZSAL:** Diurnal vAriation of the vertically resolved siZe distribution in the Saharan Air Layer, EU ATMO-ACCESS TNA in collaboration with ASKOS 2022
- **MAPP:** Metrology for Aerosol Optical Properties (EU H2020), Reading PI, £90k
- **DAHLIA:** Dust-AtmosphHere-Land Interactions in East Asia (Newton Fund), PI, £283k
- **Independent Research Fellowship,** 'The Role of Coarse Mineral Dust in the Climate System,' (NERC), PI, £468k, 2015-2022
- **SAVEX, SAVEX-D, Fennec 2012:** Additional flying hours/EUFAR Transnational Access for aircraft fieldwork

Conference Presentations:

- **Recent Invitations:** National Observatory Athens (2023); NASA Lidar Working Group (2023); Finnish Meteorological Institute seminar (2021); InDust COST Action webinar (2021); American Meteorological Society (2021); Royal Meteorological Society (2020); American Geophysical Union Fall Meeting (2019); Staubtag 'dust day' (Nov 2018); UK Met Office (2018)
- **Oral Contributions:** Dr Ryder has given >15 contributed oral presentations over the last 15 years at venues including EGU, AGU, AMS, AeroCom, DUST conferences, Dust Workshops and International Aerosol and Radiation Conferences

Supervision

Dr Ryder supervises Natalie Ratcliffe (fully funded 2nd year PhD student: Using Aircraft Observations and Modelling to Improve Understanding of Mineral Dust Transport and Deposition Processes with UK Met Office CASE support). She has supervised 16 BSc, MSc and summer student research projects. She has acted as external PhD examiner at the University of Leeds (2018). Dr Ryder has recently supervised 2 PDRAs Dr Alcide Zhao and Dr Dharendra Kumar, both working on the DAHLIA project (Dust in East Asia), and Dr Jon Elsey (MAPP project, radiative effect of aerosols).

Employment

2021-present	Associate Professor in the Meteorology Department, University of Reading, UK
2016	Maternity Leave
2015 – 2022	NERC Independent Research Fellowship The Role of Coarse Mineral Dust Particle in the Climate System Department of Meteorology, University of Reading, UK
2014-2015	Senior PDRA, Department of Meteorology, University of Reading, UK Semi-direct effect of Amazonian Biomass Burning, SAMBBA (South American Biomass Burning Analysis) Project
2013	Maternity Leave
2013	Merit-based promotion to Grade 7 Senior PDRA
2010-2013	PDRA, Department of Meteorology, University of Reading, UK Aircraft Measurements of Saharan Dust, Fennec Project
2009-2010	PDRA, Imperial College London, UK Atmospheric aerosols and their radiative effect in London
2003	UK Met Office Summer Scholarship Placement, Hadley Centre Carbon Cycle representation in climate modelling

Education and Qualifications

2005-2009	PhD: Optical, microphysical and radiative properties of Saharan dust using aircraft measurements Department of Meteorology, University of Reading, UK CN Davies Award for PhD from UK Aerosol Society
2001-2005	BSc Meteorology with a year in Oklahoma, 1st class honours University of Reading, UK (with a year at the University of Oklahoma, USA) BSc Undergraduate Prize for undergraduate research project

Research Leadership

- Invited member of the Scientific Advisory Group for the FAAM UK Research aircraft Mid-life Upgrade
- Co-chair of InDust (EU COST Action Network) Observations Working Group, 2019-2021
- Member of NERC Facility for Airborne Atmospheric Measurements (FAAM) research aircraft aerosol and radiation instrument working groups (2010-present)
- Co-convenor of EGU dust sessions in 2023, 2020, 2019, 2013; AGU dust session 2020, DUST2021 session; Royal Meteorological Society Conference 2021 committee and lead for 'Adaption and Mitigation' day.
- Guest editor for Special Issue with ACP/AMT for SALTRACE (Saharan Aerosol Long-range Transport Aerosol-Cloud Interaction Experiment) (2015-present) and InDUST Special Issue (2020-2022)
- Peer reviewer for Nature, JGR, ACP, AMT, Atmos. Env., ASL, Sci. Advances, Env. Res Lett.
- Mission Scientist role during 5 FAAM airborne research field campaigns (2008-2015, Europe, Africa, Canaries, Cape Verde): designing and implementing flight missions; daily forecast briefings; project management to achieve science aims; in-flight rapid decision making; management of staff time and instrument usage
- Community contributions: EGU student poster judge (2014, 2017, 2019, 2023); AGU student poster judge (2019, 2020), AGU/EGU Mentor 2019/2023

Selected Publications

Published under the name of McConnell up to 2009

Full up-to-date publications available at www.researcherid.com/rid/K-5969-2014, including name changes

- Adebijiyi, A., Kok, J., Murray, B., **Ryder, C.L.**, Stuut, J-B.W., Kahn, R., Knippertz, P., Formenti, P., Mahowald, N.M., Garcia-Pando, C.P. Klose, M., Ansmann, A., Samset, B.H., Ito, A., Balkanski, Y., Di Biagio, C., et al., A review of coarse mineral dust in the Earth system, *Aeolian Research*, doi:10.1016/j.aeolia.2022.100849, 2023
- Drakaki, E., Amiridis, V., Gkikas, A., Proestakis, E., Mallios, S., Solomos, S., Spyrou, S., Marinou, E., **Ryder, C.L.**, et al. Modelling coarse and giant desert dust particles, *ACP*, doi:10.5194/acp-22-12727-2022, 2022.
- Meng, J., Huang, Y., Leung, D., Li, L., Adebijiyi, A., **Ryder, C.L.**, Mahowald, N., Kok, J., Improved Parameterization for the Size Distribution of Emitted Dust Aerosols Reduces Model Underestimation of Super Coarse Dust, *GRL*, doi:10.1029/2021GL097287, 2022.
- Zhao, A., **Ryder, C.L.**, Wilcox, L., How well do the CMIP6 models simulate dust aerosols?, *Atmos. Chem. Phys.*, <https://doi.org/10.5194/acp-22-2095-2022>, 2022
- Ryder, C.L.**, Radiative Effects of Increased Water Vapour Associated with Enhanced Dustiness in the Saharan Air Layer, *J. Geophys. Res.*, 126, 21, <https://doi.org/10.1029/2021JD034696>, 2021.
- Marsham, J.H. and **Ryder, C.L.**, *Weather Insight: Dust Storms and Haboobs*, Weather, 2021
- Yu, H., Tan, Q., Zhou, L., Zhou, Y., Bian, H., Chin, M., **Ryder, C.L.**, et al., Observation and modeling of the historic “Godzilla” African dust intrusion into the Caribbean Basin and the southern US in June 2020, *ACP*, <https://doi.org/10.5194/acp-21-12359-2021>, 2021.
- O'Sullivan, D., F. Marengo, **Ryder, C.L.**, Pradhan, Y., Kipling, Z., Johnson, B., Benedetti, A., et al., Models transport Saharan dust too low in the atmosphere: a comparison of the MetUM and CAMS forecasts with observations, *Atmos. Chem. Phys.*, <https://doi.org/10.5194/acp-20-12955-2020>, 2020.
- Ryder, C.L.**, Highwood, E.J., Walser, A., Seibert P., Philipp, A., Weinzierl, B., Coarse and giant particles are ubiquitous in Saharan dust export regions and are radiatively significant over the Sahara, *Atmos. Chem. Phys.*, 19, 15353–15376, <https://doi.org/10.5194/acp-19-15353-2019>, 2019
- Ryder, C.L.**, Marengo, F., Brooke, J., Estelles, V., Cotton, R., Formenti, P., McQuaid, J., Price, H., et al., Coarse mode mineral dust size distributions, composition and optical properties from AER-D aircraft measurements over the Tropical Eastern Atlantic, *Atmos. Chem. Phys.*, <https://doi.org/10.5194/acp-18-17225-2018>, 2018.
- Song, Q., Zhang, Z., Yu, H., Kato, S., Yang, P., Colarco, P., Remer, L.A., **Ryder, C.L.**, Toward an Observation-Based Estimate of Dust Net Radiative Effects in Tropical North Atlantic Through Integrating Satellite Observations and In Situ Measurements of Dust Properties, *Atmos. Chem. Phys.*, 2018.
- Harrison, R.G., Nicoll, K.A., Marlton, G.J., **Ryder, C.L.**, Bennett, A.J., Saharan dust plume charging observed over the UK, *Environmental Research Letters*, <https://doi.org/10.1088/1748-9326/aabcd9>, 2018.
- Ryder, C.L.**, McQuaid, J., Flamant, C., Rosenberg, R., Washington, R., Brindley, H., et. Al., Advances in understanding mineral dust and boundary layer processes over the Sahara from Fennec aircraft observations, 15, 8479-8520, doi:10.5194/acp-15-8479-2015, *Atmos. Chem. Phys.*, 2015.
- Rosenberg, P., Parker, D., **Ryder, C.L.**, Marsham, J.H., Garcia-Carreras, L., Dorsey, J.R., et al., Quantifying particle size and turbulent scale dependence of dust uplift in the Sahara using Aircraft Measurements, 2014, 119, 12, doi:10.1002/2013JD021255, *Atmos. Chem. Phys.*
- Ryder, C.L.**, Highwood, E.J., Lai, T.M., Sodemann, H. and Marsham, J.H., Impact of Atmospheric Transport on the Evolution of Microphysical and Optical Properties of Saharan Dust, 2013, doi:10.1002/grl.50482, *GRL*.
- Ryder, C.L.**, Highwood, E., Rosenberg, P., Trembath, J., Brooke, J., Bart, M., Dean, A., et al., Optical properties of Saharan dust aerosol and contribution from the coarse mode as measured during the Fennec 2011 aircraft campaign, 2013, doi:10.5194/acp-13-2347-2013, *Atmos. Chem. Phys.*.
- McConnell, C.**, et al., Seasonal variations of the physical and optical characteristics of Saharan dust: results from the Dust Outflow and Deposition to the Ocean (DODO) Experiment, 2008, *J. Geophys. Res.*