Angus J. Ferraro

College of Engineering,
Mathematics and Physical Sciences
University of Exeter
North Park Road,
Exeter, EX4 4QF, UK

Email: a.j.ferraro@exeter.ac.uk
Telephone: +44 (0) 1392 725358
Web: **emps.exeter.ac.uk/mathematics/staff/ajf223**
Twitter: **angusferraro**

I am a physical climate scientist with interests in the terrestrial hydrological cycle and atmospheric radiative transfer. I use climate model simulations in conjunction with remote sensing observations to enhance fundamental physical understanding of the climate system. I am also interested in the emerging technology of climate geoengineering and how this interacts with conventional climate policy.

Education

2010-2014 **PhD, Atmosphere, Oceans and Climate**, University of Reading, Reading, UK

Atmospheric responses to geoengineering in the stratosphere

Investigating the impacts of an enhanced stratospheric sulphate layer on stratospheric dynamics and communication of these effects to the troposphere. Supervisors: Dr. Andrew Charlton-Perez and Prof. Eleanor Highwood.

2007-2010 **BSc, Meteorology** (First Class Honours), University of Reading, Reading, UK

Dissertation: Factors influencing the climate sensitivity parameter in a zero-dimensional climate model. Supervisor: Prof. Keith Shine.

Employment

2014 - present **Research Fellow**, University of Exeter, Exeter, UK

Process-Based Emergent Physical and Biogeochemical Feedbacks

Constraints on the lapse rate, water vapour and cloud climate feedbacks. Collaborators: Prof. Mat Collins and Dr. Hugo Lambert.

2009 **Research assistant**, Met Office, Exeter, UK

Impacts of Arctic sea ice retreat on ocean-atmosphere coupling. Supervisor: Dr. Peili Wu.

Competitive Funding

2015 **EPSRC Vacation Bursary** to fund summer student (£2000)

2011 **Travel grant** to attend 2nd Transdisciplinary Summer School on Climate Engineering, Banff (USD 1000)

Awards and Recognition

Awards **Runner-up**, College of Engineering, Mathematics and Physical Sciences Early-Career Researcher poster competition, 2015.

Overall Undergraduate Prize for academic excellence, University of Reading, 2010

Media

Your questions answered: geoengineering (question-and-answer including me, Stephen Salter, Richard Darton and Andrew Charlton-Perez), The Engineer, 2014.

Sulphate geoengineering would harm tropical climate, Environmental Research Web, 2014.

Reflecting the Sun's energy to cool the planet, Walker Institute Research Highlights, 2012.

Aerosol choices matter, *Nature Climate Change*, **2**, 75, 2012, doi:10.1038/nclimate1407.

Teaching Experience

2015

Lecturer at University of Exeter Summer School on Global Climate Change. *Bringing it home - regional climate variability and change.* July 2015

Supervision of summer student. *Direct and indirect drivers of precipitation change in a geoengineered world.* June-July 2015.

2014-2015

Co-supervision of MMath student with Hugo Lambert (University of Exeter) and contributions from Manoj Joshi (University of East Anglia)

Geoengineering and the tropical overturning circulation

2011-2013

Demonstrator/tutor for undergraduates at Department of Meteorology, University of Reading

Introduction to Atmospheric Science

Fluid Dynamics of Atmosphere and Oceans

Invited Presentations

2015

Bringing it home: regional climate change and variability. Lecture at University of Exeter International Summer School on Global Climate Change: Environment, Technology and Society.

2013

Stratospheric dynamics in a geoengineered world. Seminar at Department of Chemistry, University of Cambridge.

Geoengineering aerosols and how they might affect climate and circulation. IOP Environmental Physics Members' Day, London.

2012

Atmospheric responses to geoengineering in the stratosphere. RMetS South-East local centre meeting, Reading.

Selected Presentations

2016

Classification of land-sea shifts in tropical precipitation using temperature and moisture change, (poster), Workshop on Atmospheric Circulation and Regional Climate Change, University of Reading, UK.

2015

Physical mechanisms of tropical climate feedbacks revealed by temperature and moisture trends, **(poster)** AGU Fall Meeting, San Francisco, USA.

Physical mechanisms of tropical climate feedbacks revealed by temperature and moisture trends, **(poster)** CFMIP conference, Asilomar, USA.

Physical mechanisms of tropical climate feedbacks revealed by temperature and moisture trends, **(poster)** EGU General Assembly, Vienna, Austria.

2013

Effects of different geoengineering aerosol choices on stratospheric dynamics, (poster) 3rd NCAS Chemistry-Climate Interaction Meeting, Cambridge, UK.

Impact of aerosol & dimmed-sun geoengineering on stratospheric dynamics, 3rd GeoMIP workshop, Potsdam, Germany.

Atmospheric responses to stratospheric aerosol geoengineering, EGU General Assembly, Vienna, Austria.

2012 *Stratospheric heating by geoengineering aerosols*, 2nd GeoMIP workshop, Exeter, UK.

Professional Activities

- Peer reviewer for *Environmental Research Letters*, *Journal of Geophysical Research* and others. Full review record available via **Publons**.
- Grant application reviewer for US National Science Foundation.

2015-present Member of American Geophysical Union

2013-present Member of European Geoscience Union

2010-present Member of Royal Meteorological Society

Outreach

Personal **blog** summarising recent advances in climate science; contributions to the WCD blog (Department of Meteorology, University of Reading), the GeoBlog (Oxford Geoengineering Programme, University of Oxford) and the GeoLog (European Geosciences Union).

2015 Contributor on geoengineering for Simon Clark's YouTube series, 'Crash Course in Atmospheric Physics'.

'Britain Needs Scientists' schools event, University of Exeter.

2013 Runner-up in **I'm a Scientist, Get Me Out of Here**.

Finalist in University of Reading '3-minute thesis' competition.

2011-2013 Volunteer classroom science assistant at Highdown School, Reading.

Responsibilities

2014-present Convenor of Physical Climate Research Group at Exeter Climate Systems, University of Exeter

2014 Organiser of Exeter Climate Systems collaborative research day.

2011-2013 Convenor of Stratosphere & Climte Research Group and Strathour seminar series at Department of Meteorology, University of Reading

2011 Member of 'Visiting Scientist' committee at Department of Meteorology, University of Reading (visitor: Kevin Trenberth)

Publications

Ferraro, A. J. and H. G. Griffiths, 2016: Quantifying the temperature-independent effect of stratospheric aerosol geoengineering on global-mean precipitation in a multi- model ensemble. *Environmental Research Letters*, **11**, 034012, doi:**10.1088/1748-9326/11/3/034012**.

Ferraro, A. J., F. H. Lambert, M. Collins, and G. Miles, 2015: Physical mechanisms of tropical climate feedbacks revealed by temperature and moisture trends. *Journal of Climate*, **28**, 8968-8987, doi:**10.1175/JCLI-D-15-0253.1**.

Ferraro, A. J., M. Collins, and F. H. Lambert, 2015: A hiatus in the stratosphere?. *Nature Climate Change*, **5**, 497-498, doi:**10.1038/nclimate2624**.

Citations: 1

Ferraro, A. J., A. J. Charlton-Perez, and E. J. Highwood, 2015: Stratospheric dynamics and midlatitude jets under geoengineering with space mirrors and sulfate and titania aerosols. *J. Geophys. Res. Atmos.*, **120**, 414-429, doi:**10.1002/2014jd022734**.

Ferraro, A. J., A. J. Charlton-Perez, and E. J. Highwood, 2014: A Risk-Based Framework for Assessing the Effectiveness of Stratospheric Aerosol Geoengineering. *PLoS ONE*, **9**, e88849, doi:**10.1371/journal.pone.0088849**.

Citations: 3

Part of the PLOS 'Responding to Climate Change' collection

Ferraro, A. J., E. J. Highwood, and A. J. Charlton-Perez, 2014: Weakened tropical circulation and reduced precipitation in response to geoengineering. *Environ. Res. Lett.*, **9**, 014001, doi:**10.1088/1748-9326/9/1/014001**.

Citations: 9

One of 25 highlights of 2014 in *Environmental Research Letters*

Extensive media coverage including BBC, Guardian, The Independent, phys.org, New Zealand Herald, Bangkok Post, Hindustan Times.

Ferraro, A. J., E. J. Highwood, and A. J. Charlton-Perez, 2011: Stratospheric heating by potential geoengineering aerosols. *Geophysical Research Letters*, **38**, doi:**10.1029/2011gl049761**.

Citations: 13

Research Highlight in *Nature Climate Change*