CARLY REDDINGTON CURRICULUM VITAE

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Current Research Feb 2013 to May 2016

Two distinct research projects that require the management and prioritisation of multiple commitments.

1) Investigating the properties and impacts of tropical biomass burning aerosol
Quantifying the impacts of biomass burning (BB) aerosol on air quality and climate requires detailed understanding of the physical, chemical and optical properties of the aerosol. My research involves using a global aerosol microphysics model and a variety of observations to identify where significant model-observation differences exist and to improve representation of BB aerosol properties. Furthermore, I use these tools to examine the contribution of BB to air quality degradation and impacts on human health.

2) Constraining uncertainty in global aerosol models
My research also involves understanding and reducing the uncertainty in global models of cloud-active aerosols to improve estimates of the effect of aerosol on climate. I have synthesised a vast array of diverse aerosol measurements from aircraft, ground stations and ships, which will be used in combination with statistical methods to evaluate a global aerosol model and constrain the model uncertainties.

Research Experience

Feb. 2013 - May 2016 **Postdoctoral Research Fellow**
University of Leeds, UK
Projects: the South American Biomass Burning Analysis (SAMBBA) Project and the Global Synthesis Science Project (GASSP).

Main duties for SAMBBA: Modelling aerosol processes in the troposphere using the Global Model of Aerosol Processes (GLOMAP), evaluating the model against aerosol observations, improving the model representation of BB aerosol, quantifying impacts of BB aerosol on air quality and climate, visualising data and writing publications.

Main duties for GASSP: Creating and managing a database of global atmospheric aerosol (microphysical) measurements, obtaining aerosol observational data, developing scripts to convert data into standardised formats, advising on model parameter perturbations, analysing (UKCA and GLOMAP) model output, visualising data and writing publications.

May 2012 - Jan. 2013 **Research Support Scientist**
University of Leeds, UK

Job responsibilities: Contributing to an international assessment of aerosol microphysics models (AeroCom), analysis of a perturbed physics ensemble for the NERC AEROS project, modelling and analysis of air quality-climate interactions for the PEGASOS project and providing technical support to the aerosol research group.

Main duties: Submitting and analysing global aerosol model simulations, producing model intercomparisons, developing analysis software, visualising results, providing modelling support, coordinating technical meetings and co-writing publications.

Qualifications

2008 - 2012 **PhD** in Atmospheric Science
University of Leeds, UK
Thesis title: "Primary versus secondary contributions to particle number concentrations in the European boundary layer". Supervised by Prof K. Carslaw and funded by The European Integrated project on Aerosol Cloud Climate and Air Quality Interactions (EUCAARI).

2003 - 2007 **Master of Physics (Hons) Physics with Astrophysics (2:1)**
University of Leeds, UK

2005 - 2006 Study abroad year at Pennsylvania State University, USA.

1996 - 2003 **A Levels Chemistry, Physics & Maths (AAB)**; AS Level Drama (A); 10 GCSEs (A*-C).
Fortismere School and Sixth Form, London, UK

Publications

PhD completed September 2012; 23 peer-reviewed publications to date.

***h*-index: 11 on Scopus; 9 on Web of Science; 12 on Google Scholar.**
Researcher ID: I-3390-2015; https://scholar.google.co.uk/citations?user=9xrwQpcAAAAJ&hl=en

Peer-reviewed publications

24. **Reddington, C.L.**, Spracklen, D.V., Artaxo, P., Ridley, D.A., Rizzo, L.V., and Arana, A.: Analysis of particulate emissions from tropical biomass burning using a global aerosol model and long-term surface observations, Atmos. Chem. Phys., 16, 11083-11106, doi:10.5194/acp-16-11083-2016, 2016. [**1 citation on Scorpus; Altmetrics: 18**]

23. O'Sullivan, M., Rap, A., **Reddington, C.L.**, Spracklen, D.V., Gloor, E. and Buermann, W.: Small global effect on terrestrial net primary production due to increased fossil fuel aerosol emissions from East Asia since the turn of the century, Geophys. Res. Lett., 43, 8060–8067, doi:10.1002/2016GL068965, 2016.

22. Baranizadeh, E., Murphy, B.N., Julin, J., Falahat, S., **Reddington, C.L.**, Arola, A., Mikkonen, S., Fountoukis, C., et al.: Implementation of state-of-the-art ternary new particle formation scheme to the regional chemical transport model PMCAMx-UF in Europe, Geosci. Model Dev., 9, 2741-2754, doi:10.5194/gmd-9-2741-2016, 2016.

21. Kapadia, Z.Z., Spracklen, D.V., Arnold, S.R., Borman, D.J., Mann, G.W., Pringle, K.J., Monks, S.A., **Reddington, C.L.**, et al.: Impacts of aviation fuel sulfur content on climate and human health, Atmos. Chem. Phys., 16, 10521-10541, doi:10.5194/acp-16-10521-2016, 2016.

20. Turnock, S.T., Butt, E.W., Richardson, T.B., Mann, G.W., **Reddington, C.L.**, Forster, P.M., Haywood J, Crippa, M., et al.: Environ. Res. Lett., 11(2), 024010, 2016. [2 citations on Scopus]

19. Lee, L.A., **Reddington, C.L.**, and Carslaw, K.S.: On the relationship between aerosol model uncertainty and radiative forcing uncertainty, Proc. Natl. Acad. Sci. U.S.A., 113(21), 5820-5827, 2016. [1 citation on Scopus]

18. Butt, E.W., Rap, A., Spracklen, D.V., Schmidt, A., Scott, C.E., Pringle, K., **Reddington, C.L.**, Richards, N., et al.: Short-term impacts of residential solid fuel combustion on atmospheric aerosol, human health and climate, Atmos. Chem. Phys., 16, 873-905, doi:10.5194/acp-16-873-2016, 2016. [4 citations on Scopus]

17. **Reddington, C.L.**, Butt, E., Ridley, D., Artaxo, P., Coe, H., Morgan, W., and Spracklen, D.V.: Air quality and human health improvements from reductions in deforestation-related fire in Brazil, Nature Geoscience 8, 768-771, 2015. [**7 citations on Scopus; Altmetrics: 154**]

16. Rap, A., Spracklen, D.V., Mercado, L., **Reddington, C.L.**, Haywood, J.M., Ellis, R.J., Phillips, O.L., Artaxo, P., et al.: Fires increase Amazon forest productivity through increases in diffuse radiation, Geophys. Res. Lett., 42, doi: 10.1002/2015GL063719, 2015. [12 citations on Scopus]

15. Regayre, L.A., Pringle, K.J., Lee, L.A., Booth, B.B.B., Rap, A., Browse, J., Mann, G.W., Woodhouse, M.T., **Reddington, C.L.**, and Carslaw, K.S.: The climatic importance of uncertainties in regional aerosol-cloud radiative forcings over recent decades, J. Climate, e-View doi: http://dx.doi.org/10.1175/JCLI-D-15-0127.1, 2015.

14. Hamilton, D.S., Lee, L.A., Pringle, K J., **Reddington, C.L.**, Spracklen, D.V., and Carslaw, K.S.: Occurrence of pristine aerosol environments on a polluted planet, Proc. Natl. Acad. Sci. U.S.A., 111(52):18466-18471, 2014. [6 citations on Scopus]

13. Regayre, L.A., Pringle, K.J., Booth, B.B.B., Lee, L.A., Mann, G.W., Browse, J., Woodhouse, M.T., Rap, A., **Reddington, C.L.**, and Carslaw, K.S.: Uncertainty in the magnitude of aerosol-cloud radiative forcing over recent decades, Geophys. Res. Lett., 41, 9040-9049, doi:10.1002/2014GL062029, 2014. [11 citations on Scopus]

12. **Reddington C.L.**, Yoshioka, M., Balasubramanian, R., Ridley, D., Toh, Y.Y., Arnold, S.R., Spracklen, D.V.: Contribution of vegetation and peat fires to particulate air pollution in Southeast Asia, Environ. Res. Lett., 9, 094006, doi:10.1088/1748-9326/9/9/094006, 2014. [**15 citations on Scopus; Altmetrics: 22**]

11. Mann, G.W., Carslaw, K.S., **Reddington, C.L.**, Pringle, K.J., Schulz, M., Asmi, A., Spracklen, D.V., Ridley, D.A., et al.: Intercomparison and evaluation of global aerosol microphysical properties among AeroCom models of a range of complexity, Atmos. Chem. Phys., 14, 4679-4713, doi:10.5194/acp-14-4679-2014, 2014. [30 citations on Scopus]

10. Carslaw, K.S., Lee, L.A., **Reddington, C.L.**, Pringle, K.J., Rap, A., Forster, P.M., Mann, G.W., Spracklen, D.V., et al.: Large contribution of natural aerosols to uncertainty in indirect forcing, Nature, 503, pp.67-71, 2013. [134 citations on Scopus]

9. Carslaw, K.S., Lee, L.A., **Reddington, C.L.**, Mann, G.W., and Pringle, K.J.: The magnitude and sources of uncertainty in global aerosol, Faraday Discuss., doi:10.1039/C3FD00043E, 165, 495-512, 2013. [8 citations on Scopus]

8. Lee, L.A., Pringle, K.J., **Reddington, C.L.**, Mann, G.W., Stier, P., Spracklen, D.V., Pierce, J.R., and Carslaw, K.S.: The magnitude and causes of uncertainty in global model simulations of cloud condensation nuclei, Atmos. Chem. Phys.,13, 8879-8914, doi:10.5194/acp-13-8879-2013, 2013. [62 citations on Scopus]

7. **Reddington, C.L.**, McMeeking, G., Mann, G.W., Coe, H., Frontoso, M.G., Liu, D., Flynn, M., Spracklen, D.V., and Carslaw, K.S.: The mass and number size distributions of black carbon aerosol over Europe, Atmos. Chem. Phys., 13, 4917-4939, doi:10.5194/acp-13-4917-2013, 2013. [**21 citations on Scopus**]

6. Laakso, L., Merikanto, J., Vakkari., V., Laakso, H., Kulmala, M., Molefe, M., Kgabi, N., Mabaso, D., Carslaw, K.S., Spracklen, D.V., Lee, L.A., **Reddington, C.L.**, et al.: Boundary layer nucleation as a source of new CCN in savannah environment, Atmos. Chem. Phys., 13, 1957-1972, doi: 10.5194/acp-13-1957-2013, 2013. [15 citations on Scopus]

5. Dunne, E.M., Lee, L.A., **Reddington, C.L.**, and Carslaw, K.S.: No statistically significant effect of a short-term decrease in the nucleation rate on atmospheric aerosols, Atmos. Chem. Phys., 12, 11573-11587, doi:10.5194/acp-12-11573-2012, 2012. [10 citations on Scopus]

4. Mann, G.W., Carslaw, K.S., Ridley, D.A., Spracklen, D.V., Pringle, K.J., Merikanto, J., Korhonen, H., Schwarz, J.P., et al. (**including Reddington, C.L.**): Intercomparison of modal and sectional aerosol microphysics representations within the same 3-D global chemical transport model, Atmos. Chem. Phys., 12, 4449-4476, doi:10.5194/acp-12-4449-2012, 2012. [37 citations on Scopus]

3. Kulmala, M., Asmi, A., Lappalainen, H.K., Baltensperger, U., Brenguier, J.-L., Facchini, M.C., Hansson, H.-C., Hov, Ø., et al. (**including Reddington, C.L.**): General overview: European Integrated project on Aerosol Cloud Climate and Air Quality interactions (EUCAARI) – integrating aerosol research from nano to global scales, Atmos. Chem. Phys., 11, 13061-13143, doi:10.5194/acp-11-13061-2011, 2011. [122 citations on Scopus]

2. **Reddington, C.L.**, Carslaw, K.S., Spracklen, D.V., Frontoso, M.G., Collins, L., Merikanto, J., Minikin, A., Hamburger, T., Coe, H., et al.: Primary versus secondary contributions to particle number concentrations in the European boundary layer, Atmos. Chem. Phys., 11, 12007-12036, doi:10.5194/acp-11-12007-2011, 2011. [**50 citations on Scopus**]

1. Spracklen, D.V., Carslaw, K.S., Merikanto, J., Mann, G.W., **Reddington, C.L.**, Pickering, S., Ogren, J.A., Andrews, E., et al.: Explaining global surface aerosol number concentrations in terms of primary emissions and particle formation, Atmos. Chem. Phys., 10, 4775-4793, doi:10.5194/acp-10-4775-2010, 2010. [97 citations on Scopus]

Publications in preparation/under review

Reddington, C.L., Carslaw, K.S., Stier, P., Schutgens, N., Coe, H., Liu, D., Allan, J., Browse, J. et al.: The Global Aerosol Synthesis and Science Project (GASSP): Measurements and modelling to reduce uncertainty. (In review).

Reddington, C.L., Spracklen, D.V., Darbyshire, E., Morgan, W.T., Coe, H., Artaxo, P., Brito, J., Rizzo, L., and Ridley, D.: Biomass burning aerosol over the Amazon: integrated analysis of aircraft, surface and satellite observations and a global aerosol model. (In preparation).

Other publications

Spracklen D.V., Reddington C.L., Gaveau D.L.A.: Industrial concessions, fires and air pollution in Equatorial Asia, Environ. Res. Lett., 10, 091001, 2015. Perspective Article.

Awards & Grants

Dec. 2015 Royal Society of Chemistry Travel Grant (£800).
Funding to attend the AGU Fall Meeting in San Francisco, USA.

Jun. 2015 Climate and Geohazard Services (CGS) University of Leeds funding (~£350).
Funding for a 2-day visit to the Met Office to work with scientists in the Atmospheric Dispersion and Air Quality group.

Dec. 2014 UK-Southeast Asia Knowledge Partnership Collaboration Development Award (£2000).
Funding from the British Council Singapore for UK-based researchers to visit Southeast Asia to explore and define areas for future research collaborations.

Mar. 2014 Royal Society of Chemistry Travel Grant (£800).
Funding to attend the iLEAPS Science Conference in Nanjing, China.

Feb. 2012 Letter of commendation for excellent paper submissions which deserve special mention.
Awarded by the University of Leeds School of Earth and Environment for the publication Reddington et al. (2011).

Selected Conference Presentations

Dec 2015 American Geophysical Union Fall Meeting, San Francisco, USA
Reddington, C.L., Butt, E., Ridley, D., Artaxo, P., Coe, H., et al.: Air quality and human health improvements from reduced deforestation in Brazil. (**Oral presentation**).

Aug 2015 International Workshop on Air Quality in Asia, Bogor, Indonesia
Reddington, C.L., Butt, E. and Spracklen, D.V.: Impact of vegetation and peat fires on air quality and human health in Southeast Asia. (**Invited oral presentation**).

May 2015 Institute of Physics Environmental Physics Day, University of Reading, UK
Reddington, C.L., Rap, A., Spracklen, D.V., Mercado, L., Haywood, J., et al.: Modelling biomass burning aerosol and its impacts on radiation and the biosphere. (**Invited oral presentation**).

Dec. 2014 American Geophysical Union Fall Meeting, San Francisco, USA

Reddington, C.L., Spracklen, D.V., Artaxo, P., Rizzo, L.V., Arana, A., et al.: Evaluation of tropical biomass burning emissions using a global aerosol model: implications for climate and air quality. (**Invited oral presentation**).

Reddington, C.L., Lee, L., Carslaw, K.S., Pringle, K., Browse, J., et al.: Using a comprehensive synthesis of aerosol observations and statistical modelling to constrain model uncertainty. (**Oral presentation**).

May 2014 4th iLEAPS Science Conference, Nanjing, China

Reddington, C.L., Spracklen, D.V., Artaxo, P., Ridley, D., Rap., A., et al.: Evaluation of tropical biomass burning emissions using a global aerosol model. (**Poster presentation**).

Dec. 2013 American Geophysical Union Fall Meeting, San Francisco, USA

Reddington, C.L., Spracklen, D.V., Artaxo, P., Rizzo, L.V., Arana, A., et al.: Tropical biomass burning is a larger than expected source of black carbon aerosol. (**Oral presentation**).

Reddington, C.L., Spracklen, D.V., Yoshioka, M., Arnold, S.R., and Balasubramanian, R.: Contribution of forest fires to concentrations of particulate matter in Singapore. (**Poster presentation**).

Sep. 2011 European Aerosol Conference, Manchester, UK

Reddington, C.L., Carslaw, K.S., Spracklen, D.V., Frontoso, M.G., Collins, L., et al.: Primary versus secondary contributions to particle number concentrations in the European boundary layer. (**Oral presentation**).

Reddington, C.L., Carslaw, K.S., McMeeking, G., Coe, H., Liu, D., et al.: Model evaluation of the physical properties of black carbon in the boundary layer over Europe during the EUCAARI Intensive Observation Period. (**Poster presentation**).

Mar. 2011 Final EUSAAR Meeting, Grenoble, France

Reddington, C.L. and Carslaw, K.S.: Utilisation of EUSAAR data in the EUCAARI project. (**Oral presentation**).

Sep. 2010 International Aerosol Conference, Helsinki, Finland

Reddington, C.L., Frontoso, M.G., Carslaw, K.S., Spracklen, D.V., Minikin, A., et al.: Global model simulations of particle concentrations over Europe during the EUCAARI Intensive Observation Period. (**Oral presentation**).

Teaching & Supervision

2012 - 2015 **Co-supervision** of one Master of Research project, two undergraduate final year dissertations and one undergraduate summer project. Main duties: i) teaching Linux/Unix commands and IDL programming language; ii) providing guidance on how to analyse and visualise results; iii) demonstrating how to run the global aerosol model and analyse the model output; and iv) providing guidance on research direction.

2012 – 2013 **Technical support role** for the aerosol modelling research group. Main duties: support for the global aerosol model and guidance on data analysis and visualisation with IDL.

2009–2011 **Demonstrator** for undergraduate module "Physics for Environmental Science", for which I delivered weekly tutorials for up to 20 students to support lectures. Main duties: i) teaching problem solving techniques, ii) aiding students with numerical problems; and iii) explaining core physics concepts.

Seminar & Meeting Organisation

Mar. 2016 **Part of the scientific organising committee for the annual NCAS Composition-Climate Interaction Meeting**. My role in the organising committee involved: i) deciding on the key

themes for the meeting; ii) selecting abstracts for oral or poster presentations; iii) putting together a schedule of presentations; and iv) sending out notification and reminder emails.

2014 - 2015 **Organiser of weekly informal meetings for the aerosol modelling research group** to discuss our research ideas, recent interesting papers and technical problems.

2013 - 2015 **Sole coordinator of the Institute for Climate and Atmospheric Science (ICAS) Internal Seminar Series** (weekly seminars; Jan.-Jun., Sep.-Dec.). These seminars are an important way for researchers to share their work, receive feedback and discuss ideas, encouraging cross-departmental collaboration. For each seminar I organised three speakers to present, a session chair, advertisement of the presentations and room bookings.

2012 - 2013 **Organiser of monthly technical meetings for the aerosol modelling research group.** I ensured that a collaborative and conducive learning environment was in place for each meeting by: agreeing a focussed agenda, chairing the meeting to drive discussion and involve all attendees, and documenting the output of the meeting to capture the key points and actions which I shared in a Wiki format.

Technical Skills

Aerosol modelling skills

Extensive experience of the following:

- Running a complex global aerosol microphysics model on multiple supercomputing platforms.
- Modifying subroutines in the model code (FORTRAN) and altering the set-up of the model.
- Handling and analysing large model and observational datasets in a range of file formats.

General computing skills

High proficiency using the following:

- Unix/Linux and Windows operating systems.
- IDL programming language.
- Latex document preparation system.
- Microsoft Office applications.

Good experience of the following:

- Statistical analysis using R.
- Altering model code written in FORTRAN.
- Writing scripts using Perl or Bash programming/command languages.

Additional Skills

- **Excellent communication skills** developed through demonstrating, research and technical support work, oral conference presentations, and scientific discussions with colleagues and collaborators.
- **Excellent organisational skills** demonstrated by coordination of seminars and technical meetings and ability to balance two distinct research projects with minimal need for guidance.
- **Strong technical writing skills** demonstrated by number and standard of publications.

Journal reviews

I have reviewed papers in the following scientific journals: Atmospheric Chemistry and Physics, Environment Research Letters, Journal of Geophysical Research – Atmospheres, Atmospheric Environment, Geoscientific Model Development, and Atmosphere.