**Dr. Cathryn Birch**

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I am a tenure-track University Academic Fellow studying monsoons, the water cycle and convection. I specialise in applying high-resolution weather and climate models to better understand key processes in tropical meteorology and to diagnose the source of bias in global atmospheric models. I work partly for the Met Office as a Research Scientist on a number of related projects. I have made extensive use of both models and field campaign data to study atmospheric processes in a number of regions (Africa, India, Maritime Continent, Australia and the Arctic). I have 38 peer-reviewed papers published since 2009 (10 lead-author).

**Career summary**

**Employment**

University Academic Fellow, University of Leeds (July 2015 – present)

Senior Research Scientist, Met Office (June 2013 – June 2015)

Post-doctoral Research Fellow, University of Leeds (June 2010 – June 2013)

Industrial placement, Rolls-Royce Plc (Summer 2004)

**Postgraduate and Undergraduate, University of Leeds**

PhD: ”Surface-atmosphere coupling over the central Arctic Ocean” (Oct 2006 – March 2010)

1st class hons, BSc Environmental Science, (Sept 2002 – June 2006)

**Research strengths**

• Significant experience in combining high-resolution models with observations to understand physical atmospheric processes and diagnose model biases

* Field work experience; I participated in the Arctic Summer Ocean Cloud Study (ASCOS), a multi-disciplinary field campaign to the central Arctic Ocean.

• Experience working with industrial partners: Research projects in collaboration with the UK Mountain Weather Information Service, Met Office, Meteorological Service Singapore, Australian Bureau of Meteorology and several environmental consultancies.

• I have developed a number of significant external and/or multi-disciplinary collaborations, such as with the Met Office, MeteoFrance, Monash University (Australia) and Melbourne University (Australia), resulting in many collaborative papers and research visits/exchanges.

**External funding and awards**

* PI “Seasonal forecasts for crop forecasts in Colombia” (£2.3K).
* Co-I “GENESIS: Triggering of Convection” (£300K).
* Co-I “CSSP China: Convection-permitting simulations of East Asian climate” (£300K).
* Co-I “WCSSP SE Asia: Tropical cyclones predictions in SE Asia” (£300K).
* Co-I “Global Challenges Research Fund: Agriculture and Food-system Resilience: Increasing Capacity and Advising Policy (GCRF-AFRICAP)” (£8million)
* Work package leader “Global Challenges Research Fund: African Science for Weather Information and Forecasting Techniques (GCRF-Africa-SWIFT)” (£8million).
* Funding from the Met Office for 20% of my time to work on IMPALA African climate project
* Co-I “TerraMaris: The Maritime Continent – Driver of the Global Climate System” NERC large grant (£3.7million).
* Lead academic on “Enhanced surface water flood forecasts for Yorkshire” funded through the NERC Yorkshire Integrated Catchment Solutions Programme (iCASP) (£167k)
* Co-I “WCSSP SE Asia: Vertical structures of the Maritime Continent” (£300K).
* Co-I “WCSSP SE Asia: WCSSP SE Asia FORecasting for SouthEast Asia (FORSEA)” (£900k)
* Rupert Ford Award from the Royal Meteorological Society in 2011
* European Meteorology Society Young Scientist Award 2014, which is awarded annually to acknowledge excellence in young scientists.
* Most outstanding presentation by an early career researcher at the 7th International Scientific Conference on the Global Water and Energy Cycle (GEWEX) in The Hague in 2014.
* L F Richardson Prize in 2013, which is awarded annually for a meritorious paper published by an early career scientist in a Royal Meteorological Society journal.
* William Arthur Crabtree Scholarship in 2003, which is awarded annually to the most outstanding student in the Faculty of Environment at the University of Leeds.

**PhD Supervision**

* Lead-supervisor for Hellen Msemo, GCRF-Africa-SWIFT PhD, “Bridging the gap between NWP forecast evaluation and value to usersl”, (Oct 2018 - )
* Co-supervisor for Emmanuel Likoya, GCRF-Africa-SWIFT PhD, “Agricultural water and irrigation modelling for Malawian food production”, (Oct 2018 - )
* Lead-supervisor for Dean Walker, NERC Industrial CASE award with Met Office, “Seasonal forecasts of East African rainfall”, (Oct 2016 - )
* Lead-supervisor for Bethany Woodhams, Met Office CASE PhD, “Severe weather over East Africa”, (Oct 2015 - )

**Leadership roles**

* WCRP GEWEX/CLIVAR Monsoons Panel member
* Centre for Excellence for Modelling the Atmosphere and Climate steering committee member
* Management board member for Leeds EPSRC Centre for Doctoral Training in Fluid Dynamics
* Reviewer for papers in Nature, J. Climate, Atmos. Phys. Chem., Quart. J. Roy. Met. Soc., J. Geophys. Res., Clim. Dyn., Int. J. Climat. and Geophys. Res. Lett..
* I have reviewed grant proposals for the USA and the Netherlands.
* I led the Africa Process Evaluation Group at the Met Office (group of 15-20 Met Office staff and external collaborators) between 2013 and 2015.

**Teaching**

* Fellow of The Higher Education Academy since March 2019
* Environment Faculty PhD/Undergraduate supervisor award in 2019
* Module leader for undergraduate and Masters level computer programming in Python
* Supervision of summer placements and undergraduate and Masters dissertation students
* Fully-qualified Mountain Leader, enabling me to take groups of people (including children) into the upland areas of the UK.

**Publications**

38 peer-reviewed publications since 2009 (10 lead-author). H-index=19.

Selected publications

Woodhams, B. J., **C. E. Birch**, J. H. Marsham, C. L. Bain, T. L. Bain, S. Webster, 2019: The dynamics of severe storms over Lake Victoria in equatorial East AfricaMon. Weat. Rev., submitted.

Walker, D. P., **C. E. Birch**, J. H. Marsham, A. A. Scaife, R. J. Graham, Z. T Segele, 2019: Skill of dynamical and GHACOF consensus seasonal forecasts of East African rainfall, Clim. Dyn., in review..

Woodhams, B., **C. E. Birch**, J. Marsham, C. Bain, 2018: What is the added-value of a convection-permitting model for forecasting extreme rainfall over tropical East Africa? Mon. Weat. Rev., https://journals.ametsoc.org/doi/pdf/10.1175/MWR-D-17-0396.1.

**Birch, C. E.,** and co-authors, 2016: Scale interactions between the MJO and the Maritime Continent in a convection-permitting regional climate model, J. Climate. doi: 10.1175/JCLI-D-15-0557.1.

**Birch, C. E.,** J. H. Marsham, D. J. Parker, C. M. Taylor, 2014: The scale-dependence and structure of convergence fields preceding the initiation of deep convection, Geophys. Res. Lett., doi: 10.1002/2014GL060493.

**Birch, C. E.,** D. J. Parker, J. H. Marsham, D. Copsey, L. Garcia-Carreras, 2014: A seamless assessment of the role of convection in the water cycle of the West African Monsoon, J. Geophys. Res., doi:10.1002/2013JD020887.

Taylor, C. M., **C. E. Birch**, D. J. Parker, N. Dixon, F. Guichard, G. Nikulin, G. M. S. Lister, 2013: Modelling soil moisture - precipitation feedbacks in the Sahel: importance of spatial scale versus convective parameterization, Geophys. Res. Lett., doi:10.1002/2013GL058511.

**Birch, C. E.,** and co-authors, 2013: The impact of soil moisture and atmospheric waves on the development of a mesoscale convective system: A model study of an observed AMMA case, Q. J. R. Meteorol. Soc., 139, 1712-1730, doi:10.1002/qj.2062, (winner of the 2013 L F Richardson Prize of the Royal Meteorological Society).