UNIVERSITY OF LEEDS

CANDIDATE BRIEF

Research Fellow in Climate Modelling, School of Earth and Environment



Salary: Grade 7 (£34,304 – £40,927 p.a.)

Reference: ENVEE1500

Fixed-term until 31 January 2024 – due to external funding

We will consider job share / flexible working arrangements

Research Fellow in Climate Modelling
School of Earth and Environment, Faculty of Environment

Would you like to help to address one of the biggest uncertainties in climate projections, do you have an established background in clouds and aerosol research and do you want to further your career in a one of the world's leading atmospheric science institutes?

You will become a key team member of the "Resolving climate sensitivity associated with shallow mixed phase cloud in the oceanic mid- to high-latitudes (M-Phase)" project. Shallow mixed phase clouds are a critical, but poorly understood part of the climate system. M-Phase aims to address this deficit through a combination of lab, field and modelling work. It is a major £3 Million project funded by NERC with multiple partners including the University of Manchester and the UK Met Office. M-Phase is part of the broader NERC 'Uncertainty in Climate Sensitivity due to Clouds programme'.

The overarching objective of M-Phase is to reduce the uncertainty in how mixed-phase clouds will respond to changes in climate, and thereby reduce uncertainty in climate sensitivity. We will do this by improving our understanding of the physical processes that determine the properties of mixed-phase clouds and their response to climate drivers (sea-surface temperatures and aerosols).

You will build on a previous work where we demonstrated that shallow clouds are extremely sensitive to INP concentrations (Vergara-Temprado et al., 2018), with high INP leading to low amounts of supercooled water and lower albedo. In a warmer future world, these clouds will contain less ice and will therefore be more reflective, which represents a strong negative climate feedback (Storelvmo et al. 2015). It has been shown that improving the representation of ice in clouds increases the equilibrium climate sensitivity (the amount the planet will warm with a doubling of CO_2) by 2 K (Tan et al., 2016). Hence, the present day INP concentration directly impacts the extent to which our planet will warm and the work you will do within M-Phase will therefore be critically important.

You will explore these mixed-phase systems with the most realistic weather forecast tools currently available using spatial resolutions of <1km and domains ~3000km, allowing cloud-scale dynamics, cloud production and cloud dissipation to be accurately



modelled. The high resolution model will use the CASIM (Cloud AeroSol Interacting Microphysics) scheme that predicts both mass and number concentration for hydrometeor species which allows for two-way interaction with aerosols to activate liquid droplets and ice crystals and reintroduce the aerosols back into the environment on evaporation. The high resolution model (with identical underlying atmospheric physics to the lower resolution model climate model) will be initialised using meteorological and dynamical observations and will therefore replicate the weather conditions. We will compare the high-resolution models against the more heavily parameterised climate models to understand and improve how mixed-phase clouds are simulated.

What does the role entail?

As a Research Fellow, your main duties will include:

- Developing expertise in the use and development of the Unified Model UKCA-CASIM aerosol-cloud modelling suite;
- Accurately simulating and validating, against observations, aerosol-cloud interactions in large domains (~1000km);
- Understanding the dominant physics acting in different cloud-aerosol regimes using realistic case studies and idealised frameworks;
- Working as part of the interdisciplinary M-Phase project team and partners, effectively collaborating with the field and laboratory scientists as well as the modellers;
- Collaborating with aerosol-cloud groups at the Met Office, and University of Manchester;
- Generating and pursuing independent and original research ideas in the appropriate subject area;
- Developing research objectives and proposals and contributing to setting the direction of the research project and team including preparing proposals for funding in collaboration with colleagues;
- Evaluating methods and techniques used and results obtained by other researchers and to relate such evaluations appropriately to your own work;
- Preparing papers for publication in leading international journals;
- Present the results of this work at project workshops and international conferences;
- Working both independently and also as part of a larger team of researchers, engaging in knowledge-transfer activities where appropriate and feasible;





- Maintaining your own continuing professional development and acting as a mentor to less experienced colleagues as appropriate;
- Contributing to the training of both undergraduate and postgraduate students, including assisting with the supervision of projects in areas relevant to the project.
- Contribute to the wider research programmes of the cloud and atmospheric dynamics research groups at Leeds;
- Maintaining your own continuing professional development and acting as a mentor to less experienced colleagues as appropriate;
- Contributing to the training of both undergraduate and postgraduate students, including assisting with the supervision of projects in areas relevant to the project.

These duties provide a framework for the role and should not be regarded as a definitive list. Other reasonable duties may be required consistent with the grade of the post.

What will you bring to the role?

As a Research Fellow you will have:

- A PhD or near completion (i.e. the initial thesis needs to have been handed in no later than 2 months following the application deadline) in a quantitative physical science, such as Atmospheric Science, Physics, Applied Mathematics or Meteorology;
- A strong background in atmospheric science, in particular aerosol-cloud interactions;
- Proven experience in numerical programming, handling of large datasets and data visualisation;
- Working knowledge of FORTRAN, UNIX and Python;
- Ability to work successfully as part of a team and also be strongly self-motivated to carry out research;
- Demonstrable experience with running and analysing weather and/or climate models;
- Good time management and planning skills, with the ability to meet tight deadlines, manage competing demands and work effectively under pressure without close support;



- A proven track record of peer-reviewed publications in high impact factor journals;
- Excellent written and verbal communication skills including presentation skills;
- A strong commitment to your own continuous professional development.

You may also have:

- A track record of modelling aerosol-cloud interactions;
- A knowledge of cold-air outbreaks and the associated low-level mixed-phase clouds;
- Experience of pursuing external funding to support research.

How to apply

You can apply for this role online; more guidance can be found on our How to Apply information page. Applications should be submitted by **23.59** (UK time) on the advertised closing date.

Please note: If you are not a British or Irish citizen, from 1 January 2021 you will require permission to work in the UK. This will normally be in the form of a visa but, if you are an EEA/Swiss citizen and resident in the UK before 31 December 2020, this may be your passport or status under the EU Settlement Scheme.

Contact information

To explore the post further or for any queries you may have, please contact:

Paul Field, Professor of Climate Science
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Additional information

There may be an opportunity to extend this contracted position until 30 September 2024, subject to an approval for an extension to M-Phase, which is pending.

You will be supported by Centre for Environmental Modelling And Computation (CEMAC).

Find out more about the Faculty of Environment.

Find out more about the School of Earth and Environment.

Find out more about our Research and associated facilities.

Find out more about Equality and Inclusion in the faculty.

A diverse workforce

As an international research-intensive university, we welcome students and staff from all walks of life and from across the world. We foster an inclusive environment where all can flourish and prosper, and we are proud of our strong commitment to student education. Within the Faculty of Environment we are dedicated to diversifying our community and we welcome the unique contributions that individuals can bring, and particularly encourage applications from, but not limited to Black, Asian and ethnically diverse people; people who identify as LGBT+; and people with disabilities. Candidates will always be selected based on merit and ability.

The Faculty of Environment has received a prestigious Athena SWAN silver award from Advance HE, the national body that promotes equality in the higher education sector. This award represents the combined efforts of all schools in the Faculty and shows the positive actions we have taken to ensure that our policies, processes and ethos all promote an equal and inclusive environment for work and study.

Working at Leeds

Find out more about the benefits of working at the University and what it is like to live and work in the Leeds area on our Working at Leeds information page.

Candidates with disabilities



Information for candidates with disabilities, impairments or health conditions, including requesting alternative formats, can be found on our Accessibility information page or by getting in touch with us at disclosure@leeds.ac.uk.





Criminal record information

Rehabilitation of Offenders Act 1974
A criminal record check is not required for this position. However, all applicants will be required to declare if they have any ‘unspent’ criminal offences, including those pending.

Any offer of appointment will be in accordance with our Criminal Records policy. You can find out more about required checks and declarations in our Criminal Records information page.



