Climate Feedbacks through reactive greenhouse gases

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In this project you will determine how reactive greenhouse gases such as methane and ozone are affected by climate change, and so in turn affect the climate. For instance climate change could result in large natural emissions of gases from wildfires, vegetation or lightning that react to increase ozone and methane. These greenhouse gases could warm the climate still further in a feedback loop. These chemical feedbacks act with the physical climate feedbacks to amplify or dampen human-induced climate change. Understanding how these feedbacks affect future climate is at the cutting edge of climate research as the large climate models are only just starting to include these effects.

How does climate affect the composition of the atmosphere, and how does atmospheric composition affect climate? In this project you will use a development version of the UK's state of the art Earth System model (UKESM1.1) which has the most comprehensive detail of chemistry, biogeochemical and climate processes of any climate model in the world. You will be setting up and running this Earth system model, visualizing its output and comparing its results with a range of satellite (MOPITT, IASI, and TROPOMI) observations of relevant atmospheric gases.



Training opportunities:
In Reading you will be part of the Atmospheric Composition, Radiation, and Climate research group in the Department of Meteorology, learning from a broad range of researchers whose work focuses on the interactions between chemistry and climate and is based on both climate modelling and Earth observations. You will spend at least 3 months at the Met Office in Exeter within the Earth System and Mitigation Science team, relating your work to wider climate science and understanding how this science is used by the UK Government. The collaboration with the Leverhulme Centre for Wildfires, Environment and Society will introduce you to scientists and students from a wide range of disciplines.
Training courses will be provided on running climate models on large supercomputers.
This is a new and rapidly increasing area of climate science and will involve you collaborating with international scientists in the field.

Student profile:
This project would be suitable for students with a degree in physics, mathematics or a closely related environmental or physical science. It would suit a student with an interest in environmental issues such as air pollution and climate change. Experience of computing and some prior knowledge of programming in python or similar would be desirable, but is not essential as training will be provided.

Funding particulars:
This is a CASE studentship in association with the Met Office.

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