

PhD Studentship in Land Surface Hydrology

Project title: Representing uncertainty in land surface hydrology for seasonal forecasting

Department/School: Geography and Environmental Science

Supervisors: Dr Hannah Cloke (University of Reading), Prof Anne Verhoef (University of Reading), Dr Antje Weisheimer (University of Oxford), Prof Florian Pappenberger (European Centre for Medium-range Weather Forecasts, Reading, UK).

Project Overview:

Droughts have severe impacts on societies, economies, agriculture and ecosystems. They are complex events, with impacts dependent on meteorological, hydrological and land surface factors as well as on water demand and management. This PhD is part of a wider research project led by the University of Reading and funded by the Natural Environment Research Council (NERC): **IMPETUS: Improving Predictions of Drought for User Decision-Making**. The IMPETUS project focuses on meteorological and hydrological forecasting linked to innovative methods for forecasting local domestic water demand during drought.

Land surface schemes used in meteorological and climatological models are becoming ever more sophisticated in their representation of fluxes at the surface. Atmospheric forecasts over all space and time scales are influenced by the representation of surface features in these schemes. In particular, the representation of soil moisture is important for representing the climate system in summer seasons and thus essential in the forecasting of droughts. Uncertainty in the atmosphere can be dealt with through the implementation of ensemble forecasts generated with perturbed initial conditions and stochastic physics, however, uncertainty in the parameterisation of soil moisture (and other land surface) equations is not typically represented in these schemes.

This studentship will analyse the effects of soil physics parameter perturbations on forecasted summer surface variables. The analysis will consider predictions fully coupled to the atmospheric model and atmospheric stochastic physics, and will compare the representation of soil physics uncertainty using the land surface schemes of ECMWF and the UK Met Office (HTESSEL and JULES) which are both used in seasonal forecasting. The studentship will consider the hypothesis that improvements in seasonal drought forecasting skill is possible through the implementation of consideration of land surface parameter uncertainty and stochastic land surface parameterisations.

Eligibility:

- Applicants should hold a minimum of a UK Honours Degree at 2:1 level or equivalent in subjects such as Meteorology, Hydrology, Environmental Physics, Physical Geography or Environmental Science.
- Due to restrictions on the funding this studentship is only open to candidates from the UK/EU.

Funding Details:

- Four year award starting October 2014
- Research Council Stipend

How to apply:

To apply for this studentship please submit an application for a **PhD in Environmental Science**. See <http://www.reading.ac.uk/graduateschool/prospectivestudents/gs-how-to-apply.aspx>.

Important note Please quote the reference **GS14-38** in the 'Scholarships applied for' box which appears within the *Funding Section* of your on-line application.

Application Deadline: 15th May 2014.

Further Enquiries: For further details please contact: Dr Hannah Cloke
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Please note that, where a candidate is successful in being awarded funding, this will be confirmed via a formal studentship award letter; this will be provided separately from any Offer of Admission and will be subject to standard checks for eligibility and other criteria.
