

PROJECT PROPOSAL FORM

PROJECT TITLE *Variability in UK precipitation: from hours to decades*

SUPERVISOR(S) *Dr. Tim Osborn (main supervisor)*
 Prof. Phil Jones (co-supervisor)

PROJECT DESCRIPTION (maximum 300 words)

The data set of precipitation measurements made at an hourly timescale is now becoming large enough (in terms of spatial coverage of the UK and in terms of records extending over a number of decades) to support a range of climatic analyses that have not previously been possible. The proposed project would enhance our understanding of precipitation processes in the real world and in computer-based climate models, and make progress towards the detection of changes in rainfall intensity over recent decades.

There is a broad range of questions that could be addressed, allowing the PhD student some flexibility to focus on those that best fit their knowledge and interests, including:

- (1) What is the climatology of hourly precipitation across the UK – e.g. how does the diurnal cycle change with season and with location?*
- (2) To what degree do high rainfall rates cluster at certain times of the day, particularly if associated with summer convective activity?*
- (3) How are the diurnal characteristics related to atmospheric circulation or other characteristics of the atmosphere?*
- (4) How well can a regional climate model simulate the observed diurnal cycles of precipitation occurrence over the UK?*
- (5) Does a regional climate model simulate, as part of the greenhouse-gas-induced climate change, stronger trends in precipitation at sub-daily time scales than at daily time scales, or are they broadly comparable?*
- (6) Have there been any trends in the intensity of precipitation events during recent decades, when intensity is measured at hourly, 3-hourly, 6-hourly, or 12-hourly time scales, and how do these results compare with already published analyses of daily rainfall accumulations.*

The student will be based in the world-renowned Climatic Research Unit, will receive formal training in research skills, transferable skills and IT, and will develop expertise in meteorology, statistical data analysis and climatic interpretation.

REFERENCES (up to 5)

Osborn TJ and Hulme M (2002) Evidence for trends in heavy rainfall events over the United Kingdom. Philosophical Transactions of the Royal Society London series A 360, 1313-1325 (doi:10.1098/rsta.2002.1002).

Svensson C and Jakob D (2002) Diurnal and seasonal characteristics of precipitation at an upland site in Scotland. International Journal of Climatology 22, 587-598.

Information about BENCH FEES (even a rough estimate is helpful for applicant queries) <i>Standard bench fees for the School of Environmental Sciences (currently £1000 per year)</i>
Do you have specific FUNDING for this project? <i>No</i>
SOURCE of FUNDING <i>N/A</i>
CONDITIONS of FUNDING (e.g. Home/EU) <i>N/A</i>
AMOUNT of FUNDING for the student (fees, stipend, bench fees etc) <i>N/A</i>
OTHER FUNDING INFORMATION (e.g. CASE partner details) <i>It may be possible to develop this into a CASE studentship with an appropriate non-academic partner.</i>
DEADLINE associated with FUNDING <i>N/A</i>

RESEARCH AREA/THEME (please mark all that apply across SCI – double click on relevant boxes and mark checked) <u>ENV</u> ☐ Atmospheric Sciences ☐ Ecology ☐ Environmental Earth Sciences ☐ Environmental Social Sciences ☐ Marine Sciences <u>BIO</u> ☐ Cells and Tissues ☐ Molecules and Pathways ☐ Organisms and the Environment <u>CMP</u> ☐ Computational Biology ☐ Imaging, Graphics and Vision ☐ Mathematical Modelling and Algorithms (KDD, Optimisation, TLM) ☐ Speech, Language and Virtual Humans

CHE

- ☐ Synthetic Chemistry
- ☐ Physical and Analytical Chemistry
- ☐ Biological Chemistry

PHA

- ☐ Drug Delivery and Materials Characterisation
- ☐ Cell Biology
- ☐ Medicinal Chemistry
- ☐ Pharmacy Practice

MTH

- ☐ Pure
- ☐ Applied

ACCEPTABLE FIRST DEGREE (please indicate acceptable first degree subject areas – list all that apply):

Environmental Sciences, Geophysical Sciences, Physics, Mathematics, Geography, Meteorology