

Projected changes in extreme European rainfall due to North Atlantic storms

Supervisors: Len Shaffrey, Sue Gray

Over the past few years there have been remarkable series of flooding events in the United Kingdom associated with extratropical cyclones (for example the 2005 Carlisle flood, the 2007 summer flood events and the 2009 Cocker mouth flood). These events have incurred large insured losses (2.8 billion in the case of the 2007 summer floods). One of the key questions posed by the insurance and reinsurance industries is whether the occurrence of recent events is evidence of the impact of climate change on extreme precipitation and flooding risk?



Two major questions will be addressed in the project:

1. Are recent flooding events in the United Kingdom unprecedented?

To gain new insight into whether recent flooding events in the UK can be considered atypical, the long-term variability of extreme precipitation associated with extratropical cyclones in a range of observational datasets will be assessed. In particular, the long-term variability of extreme precipitation from the recently available 20th Century reanalysis will be analysed. Metrics of extreme precipitation being developed as proxies for flooding in key UK river catchments by the Storm Risk Mitigation programme will also be investigated.

2. How do climate models project that extreme precipitation and extratropical cyclones will change over North Western Europe and the United Kingdom?

Currently, the worldwide climate modelling community is participating in a huge comparison of climate model projections called CMIP5. The results will be used to inform the next IPCC (International Panel on Climate Change) assessment report on climate change. A new assessment of how intense European extratropical cyclones are projected to change in the CMIP5 climate models is being performed as part of the TEMPEST project (Testing and Evaluating Model Projections of European Storms) led by Dr Shaffrey. In collaboration with TEMPEST, the impact of climate change on extreme precipitation associated with intense extratropical cyclones in North Western Europe and the United Kingdom will be assessed. This project cuts across the boundaries of weather and climate, applying the analysis techniques traditionally used in weather system studies to climate models.

Student profile:

This project would be suitable for students with a degree in mathematics, physics or a closely related physical or environmental science, and who are particularly interested in the economic and societal impacts of weather and climate.

Funding particulars:

The studentship is jointly funded by the University of Reading and Lloyds Banking Group. During the PhD project there will be a range of opportunities to interact with the members of the insurance and reinsurance industry.