Improving statistical models for flood risk assessment

Ross Towe¹ ² Rob Lamb¹ Ye Liu¹ Alexandra Scott¹ Jonathan Tawn² Chris Sherlock²

¹JBA Consulting; ²Lancaster University.

Motivation for the KTP
- Floods impact on both individuals and communities, and have social, economic, and environmental consequences
- The 2013/2014 UK winter floods are an example of the impact of flooding.

Who are JBA Consulting?
- JBA Consulting is a specialist flood risk and environmental engineering consultancy
- 17 offices across the UK and Ireland and employ over 300 people
- JBA Consulting is a part of JBA Group Ltd
- JBA Risk Management sell flood risk maps and analytics to the insurance, reinsurance and allied industries
- The KTP will benefit both JBA Consulting and Risk Management

Why should we model flood risk?
- Floods are likely to occur simultaneously at a number of locations
- Accounting for this dependence between locations allows us to manage and mitigate flood risk

Why Lancaster University?
- Builds on strong existing research links between the two organisations
- Previous work between JBA and Lancaster has provided the first tool to assess spatial risk of flooding in multiple rivers
- JBA and Lancaster have also optimised the height of all coastal flood protection schemes in the UK
- These 900 schemes influenced a total spend of £0.9 Billion

Steps we have taken
- Conducted a review of the previous methods used to model flood risk
- Assessed the quality of the available rainfall and river flow data
- Conducted an exploratory analysis on rainfall and river flow data in the North West
- Developed a more computationally and statistically efficient method to handle missing values

Comparison of the existing and new methods
- Consider river flow measurements at three sites
- Interested in the dependence between sites when events are large
- Measurements are transformed to be on the same numerical scale
- A 100 year event is observed at site 1, we want to know the values that could be observed at site 2 and 3

Next Steps
- Further assess the existing methods that are used by JBA Consulting
- Prioritise the ways in which to improve the statistical models
- Work out how we can use rainfall to produce more realistic predictions of flood events along the river network

How I have benefited from the KTP
- Attended the first KTP module
- Writing up papers from my PhD and previous work with the JBA Trust
- Gained experience of presenting at an international conference
- Helping to supervise a MSc dissertation project

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