

# Pop24/7 Application: Assessing population exposure to flood risk

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Geography and  
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## Overview

- Diurnal and seasonal population variation
- Example applications
  - Case study I: Ulley, S. Yorks (dam burst)
  - Case study II: Cornwall (storm surge)
- Policy relevant applications
- Further improvements/applications?

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## Background to application

- Better population estimations are required for hazard risk assessment
- Censuses typically provide a decadal 'night-time' population estimation
- This does not take into account the large fluxes of temporary populations during the day/month
- Extreme flood and hazard events continue to focus global attention.

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## Case study I Diurnal population trends

## Diurnal population variation

- Commuter flows
- Occupation of 'weekday' work place locations
- Flows to/from places of study
- Leisure activities

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## Case study I: Ulley Reservoir

- EPSRC IAA with HR Wallingford Ltd.
- Location nr. Rotherham
- Risk of sudden onset dam failure
- Following prolonged rainfall and flooding in June 2007
- EMBankment BREach (EMBREA) assessment tool
- Flood modelling (TELEMAC-2D)

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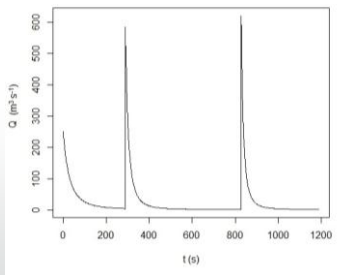
### Flood modelling (TELEMAC-2D)



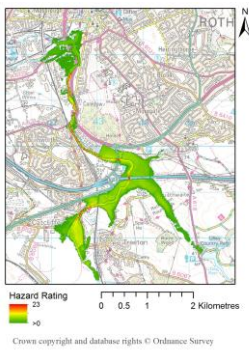
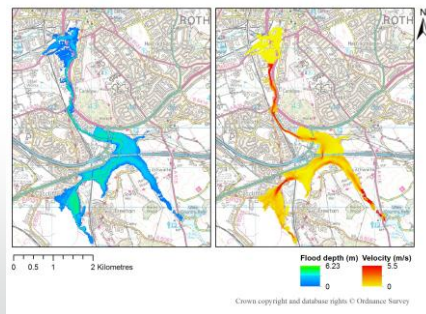
- Destabilized 25/06/2007
- M1 J32-34 closed 40 hours
- 1000 evacuated
- High voltage pylons
- High pressure gas mains
- Sewage treatment works



### 'Flashy' hydrograph (EMBREA)



### Depth & Velocity



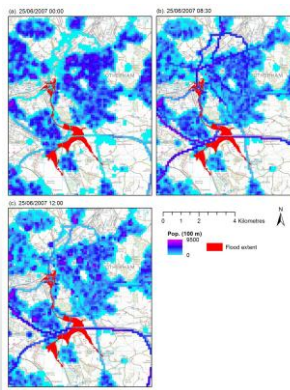
Flood Hazard Rating: a nationally consistent hazard rating.

$$HR = d \times (v + 0.5) + DF$$

> 2 = Extreme. Danger to all including emergency services

### Daytime population

- 100 metre resolution
- 8 x 10 km study area
- Georeferenced UPCs
- Road traffic layer
- Administrative datasets



## Case study II Seasonal population trend

### Seasonal population variation (Cornwall)

- Collaborative case study bringing together:
  - Pop24/7
  - Seasonal tourism estimates (Geography, Leeds)
  - Further flood modelling (Geography, Bristol)
- Documented flood risk (West Cornwall Catchment Flood Management Plan)
- Large seasonal population fluctuations (c.  $\pm 10,000$ )

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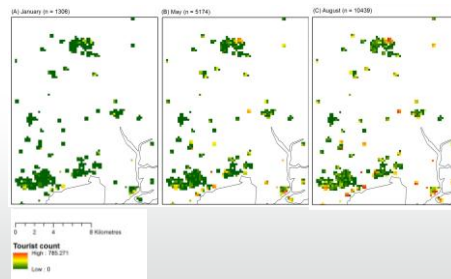
### Case study II: Par and St Austell, Cornwall

- Identified low (Jan), mid (May) and peak (Aug) scenarios
- Vulnerable coastal resorts
- Regional attractions



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### Seasonal population flux



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### Discussion and going forward...

- Continued development of datasets and temporal profiles
- Integration of new/existing models
- Validation of data
- Demonstrate improved exposure estimations
- Advances in natural hazard risk management

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Further details:

[http://www.southampton.ac.uk/geography/research/projects/space\\_time.page](http://www.southampton.ac.uk/geography/research/projects/space_time.page)