

# Enhanced surface water flood forecasting and monitoring

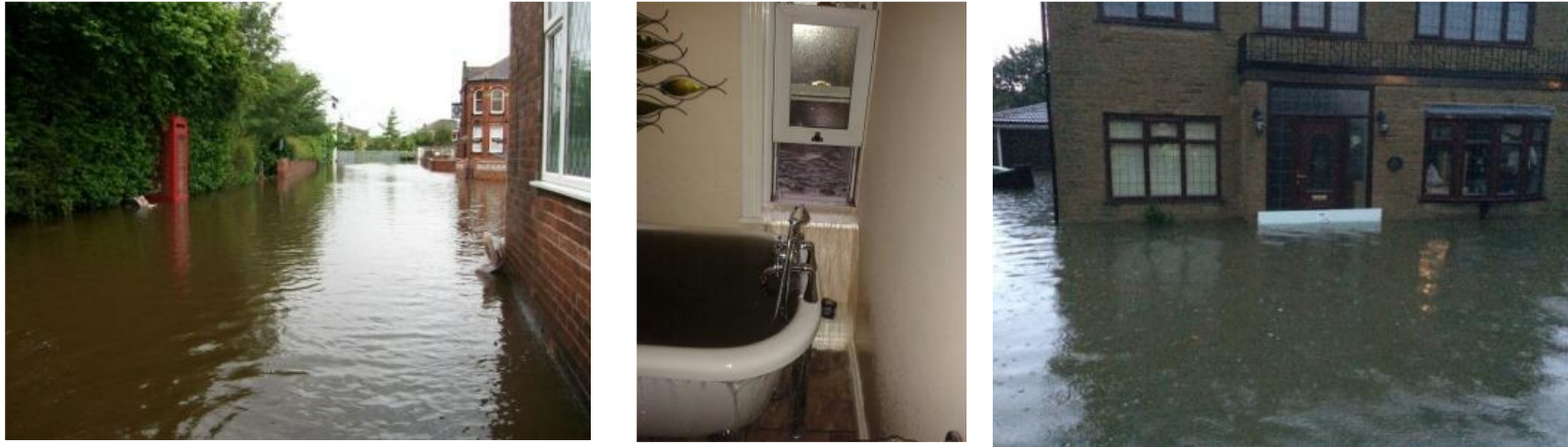
Prof Cathryn Birch<sup>1</sup>

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<sup>3</sup>Flood Forecasting Centre <sup>4</sup>University of Oxford



Section 19 Flood Investigation Report, South East Leeds 8<sup>th</sup> & 10<sup>th</sup> August 2014

- Heavy rainfall creates a flood before reaching a major watercourse.
- Usually due to heavy, localised convective summer rainfall.
- Forecasting challenging because it requires accurate:
  - **Rainfall estimates:** duration, amount, location
  - **Catchment information:** topography, soil moisture, drainage
- Phase 1 of iCASP project 2018-2019 – interviews with local authorities that identified need for more detailed flood forecast provision

# Flood fOREcasts for Surface Water at a Regional Scale (FOREWARNS)



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## Example forecast Sheffield floods 16<sup>th</sup> Aug 2022

### FOREWARNS

#### Current flood forecast provision

Flood Guidance Statement  
10:30hrs Tuesday 16 August 2022



Significant surface water flooding impacts are possible for parts of England and Wales on Tuesday and Wednesday. The surface water flood risk is LOW.

#### Specific Areas of Concern Map 1: Tuesday 16 August 2022

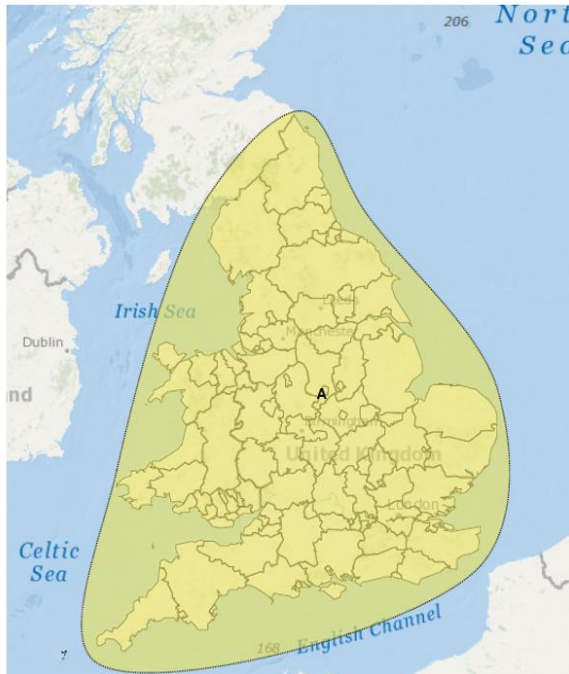
**RISK AREA A**  
Impact **SIGNIFICANT**  
Likelihood **LOW**

Source **Surface**  
Likely duration 1 Day

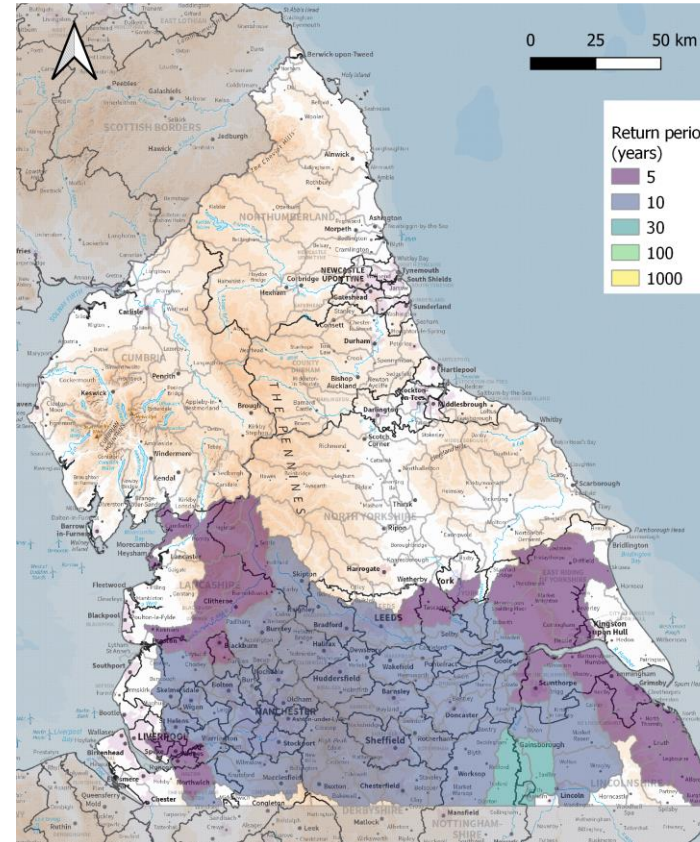
Heavy showers and thunderstorms.



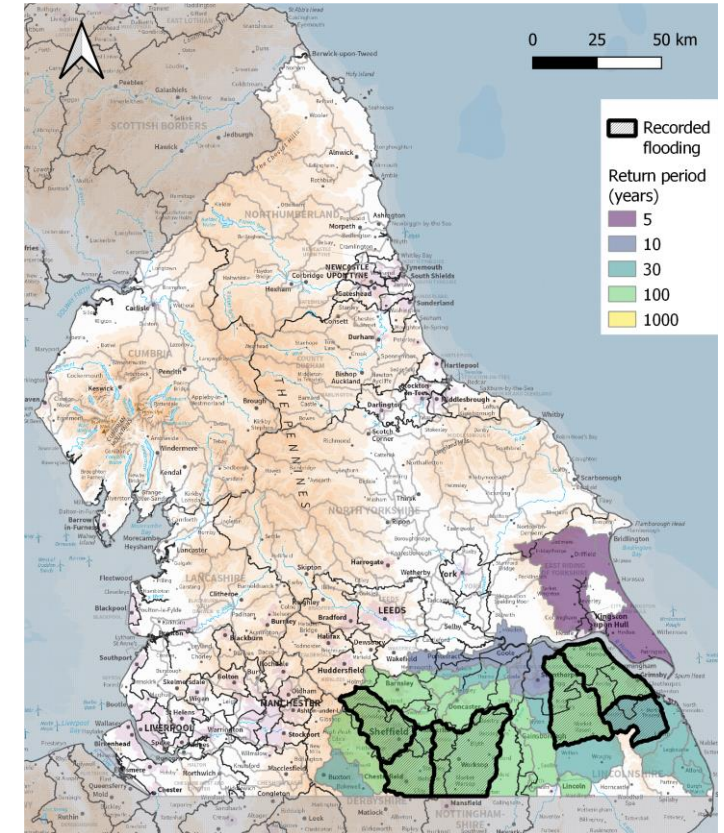
Tuesday  
16 Aug 2022 10:30-23:59  
Trend since last FGS  
Steady →



#### Reasonable-worst case scenario Issued afternoon 15<sup>th</sup> Aug 2022



#### Observed floods



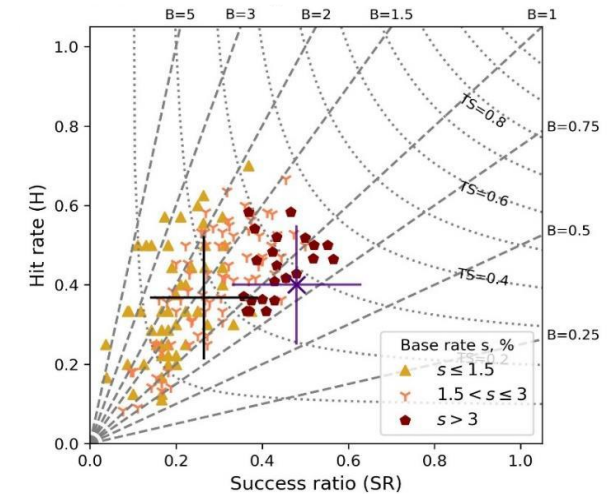
Maybe, Birch et al. Nat Haz  
Earth Sys Sci, in review

# Co-production and testing



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- Flood responder workshop in Nov 2022
  - Case studies
- Met Office Summer 2023 testbed
  - Scientists and forecasters
  - 5 weeks in June+July: 1 hour daily
  - Forecasting exercises and surveys
- Full quantitative evaluation



All users stated FOREWARNS would be useful to their organisation.

Easy to understand 'at a glance' – reasonable worst case scenario

“Major” floods are of primary user concern and are better forecast.

Lower false alarm rate

But.....no impact information

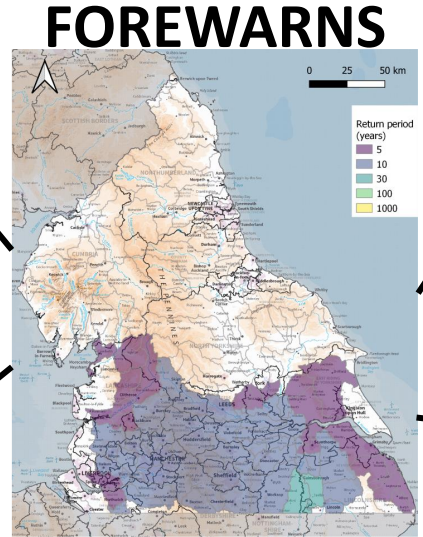
Same day forecasts critical → need for improved nowcasting integration.

# Next steps



FOREWARNS will be run operationally at Met Office from 2024 to aid national forecasting

Getting FOREWARNS direct to users more challenging



Enquires from Environment Agency and Danish Weather Service

Test for Nowcasting (0-6 hours in advance) in 2024

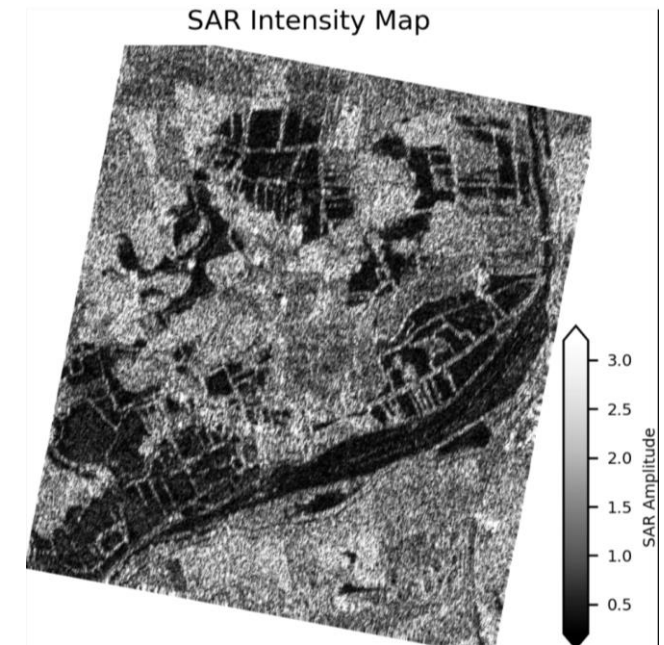
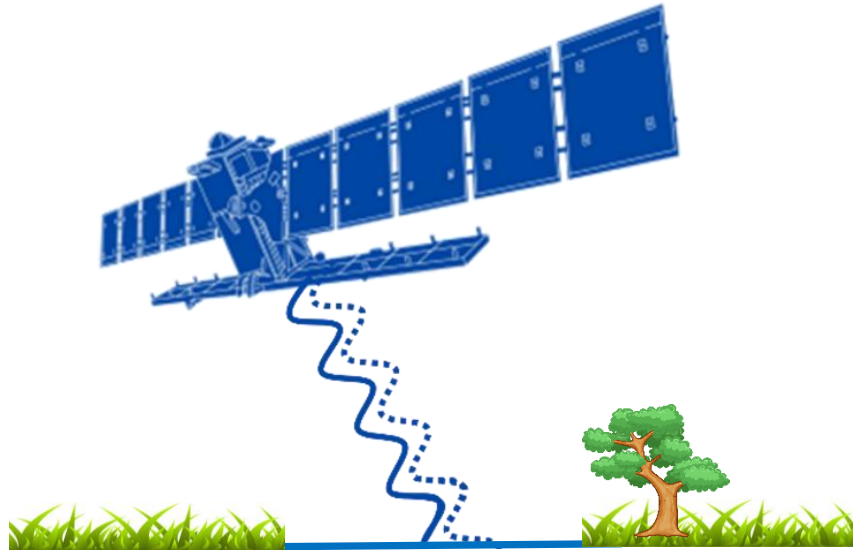
National Surface Water Flood 'Strategic Group' membership

Working with Environment Agency to form a network of surface water flood practitioners and academics

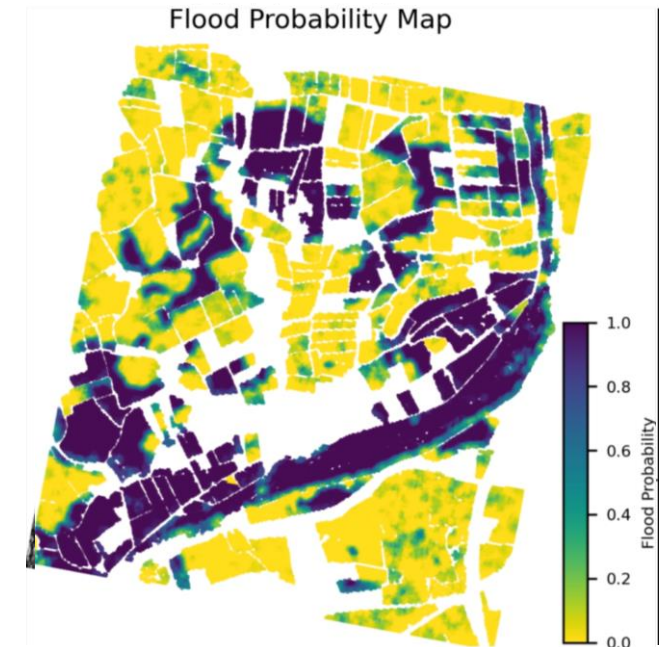
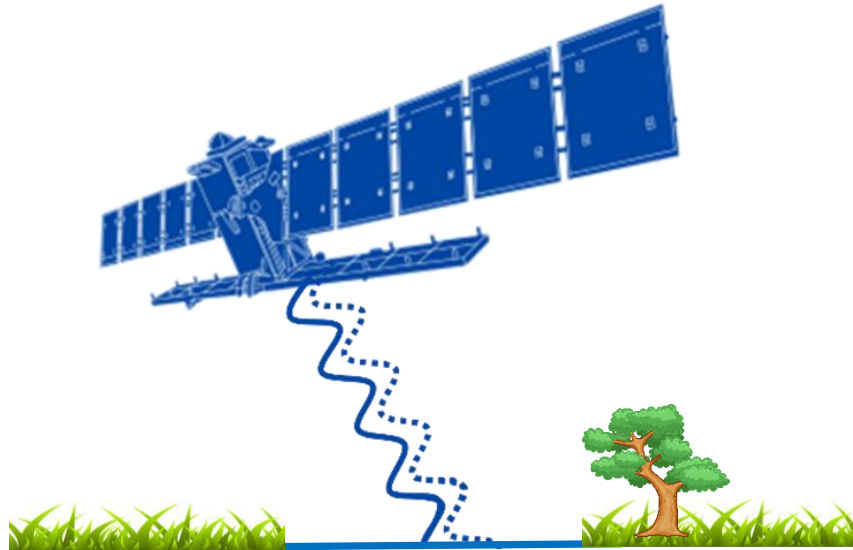
New projects



- **Aim:** develop recommendations for improved flood warnings in Yorkshire
- **Who:** Trusted Intermediaries = **Flood Wardens**, Flood Groups, Community Emergency Shelters, Charities, Parish Councils, Business Groups
- **Specifically:** recommendations for best practice: how professionals should interact with them, info/help needed, should the role be formalised/funded
- **How:** interviews based on case studies such as Storm Babet



- **Problem:** floods difficult to monitor in real-time & no UK-wide past flood record
- **Aim:** use satellite observations to detect floods in Yorkshire (semi)urban areas
- Challenging due to tall buildings → surface elevation data + long timeseries
- Future satellite launches will provide observations every day/hour by ~2030



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