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Piloting a real-time surface water flood nowcasting system for enhancing operational resilience of emergency responders

Dapeng Yu (1), Mingfu Guan (1), Robert Wilby (1), Wright Bruce (2), and Mark Szegner (1)

(1) Department of Geography, Loughborough University, Epinal Way, Loughborough, LE11 3TU, United Kingdom (d.yu2@lboro.ac.uk), (2) Met Office, FitzRoy Road, Exeter, EX1 3PB, United Kingdom (bruce.wright@metoffice.gov.uk)

Emergency services (such as Fire & Rescue, and Ambulance) can face the challenging tasks of having to respond to or operate under extreme and fast changing weather conditions, including surface water flooding. UK-wide, return period based surface water flood risk mapping undertaken by the Environment Agency provides useful information about areas at risks. Although these maps are useful for planning purposes for emergency responders, their utility to operational response during flood emergencies can be limited.

A street-level, high resolution, real-time, surface water flood nowcasting system, has been piloted in the City of Leicester, UK to assess emergency response resilience to surface water flooding. Precipitation nowcasting over 7- and 48-hour horizons are obtained from the UK Met Office and used as inputs to the system. A hydro-inundation model is used to simulate urban surface water flood depths/areas at both the city and basin scale, with a 20 m and 3 m spatial resolution respectively, and a 15-minute temporal resolution, 7-hour and 48-hour in advance. Based on this, we evaluate both the direct and indirect impacts of potential surface water flood events on emergency responses, including: (i) identifying vulnerable populations (e.g. care homes and schools) at risk; and (ii) generating novel metrics of accessibility (e.g. travel time from service stations to vulnerable sites; spatial coverage with certain legislative timeframes) in real-time. In doing so, real-time information on potential risks and impacts of emerging flood incidents arising from intense rainfall can be communicated via a dedicated web-based platform to emergency responders thereby improving response times and operational resilience.