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Flood Foresight: A near-real time flood monitoring and forecasting tool for rapid and predictive flood impact assessment

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The hours and days immediately after a major flood event are often chaotic and confusing, with first responders rushing to mobilise emergency responders, provide alleviation assistance and assess loss to assets of interest (e.g., population, buildings or utilities). Preparations in advance of a forthcoming event are becoming increasingly important; early warning systems have been demonstrated to be useful tools for decision markers. The extent of damage, human casualties and economic loss estimates can vary greatly during an event, and the timely availability of an accurate flood extent allows emergency response and resources to be optimised, reduces impacts, and helps prioritise recovery. In the insurance sector, for example, insurers are under pressure to respond in a proactive manner to claims rather than waiting for policyholders to report losses. Even though there is a great demand for flood inundation extents and severity information in different sectors, generating flood footprints for large areas from hydraulic models in real time remains a challenge. While such footprints can be produced in real time using remote sensing, weather conditions and sensor availability limit their ability to capture every single flood event across the globe.

In this session, we will present Flood Foresight (www.floodforesight.com), an operational tool developed to meet the universal requirement for rapid geographic information, before, during and after major riverine flood events. The tool provides spatial data with which users can measure their current or predicted impact from an event – at building, basin, national or continental scales. Within Flood Foresight, the Screening component uses global rainfall predictions to provide a regional- to continental-scale view of heavy rainfall events up to a week in advance, alerting the user to potentially hazardous situations relevant to them. The Forecasting component enhances the predictive suite of tools by providing a local-scale view of the extent and depth of possible riverine flood events several days in advance by linking forecast river flow from a hydrological model to a global flood risk map. The Monitoring component provides a similar local-scale view of a flood inundation extent but in near real time, as an event unfolds, by combining the global flood risk map with observed river gauge telemetry. Immediately following an event, the maximum extent of the flood is also generated. Users of Flood Foresight will be able to receive current and forecast flood extents and depth information via API into their own GIS or analytics software. The set of tools is currently operational for the UK and Europe; the methods presented can be applied globally, allowing provision of service to any country or region.

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