



Urban flood early warning systems: approaches to hydrometeorological forecasting and communicating risk

Michael Cranston (1), Linda Speight (1), Richard Maxey (1), Amy Tavendale (1), and Peter Buchanan (2)

(1) Flood Forecasting and Warning, SEPA, Perth, Scotland, United Kingdom (michael.cranston@sepa.org.uk), (2) Met Office, Aberdeen, Scotland, United Kingdom

One of the main challenges for the flood forecasting community remains the provision of reliable early warnings of surface (or pluvial) flooding. The Scottish Flood Forecasting Service has been developing approaches for forecasting the risk of surface water flooding including capitalising on the latest developments in quantitative precipitation forecasting from the Met Office. A probabilistic Heavy Rainfall Alert decision support tool helps operational forecasters assess the likelihood of surface water flooding against regional rainfall depth-duration estimates from MOGREPS-UK linked to historical short-duration flooding in Scotland. The surface water flood risk is communicated through the daily Flood Guidance Statement to emergency responders.

A more recent development is an innovative risk-based hydrometeorological approach that links 24-hour ensemble rainfall forecasts through a hydrological model (Grid-to-Grid) to a library of impact assessments (Speight et al., 2015). The early warning tool – FEWS Glasgow – presents the risk of flooding to people, property and transport across a 1km grid over the city of Glasgow with a lead time of 24 hours. Communication of the risk was presented in a bespoke surface water flood forecast product designed based on emergency responder requirements and trialled during the 2014 Commonwealth Games in Glasgow.

The development of new approaches to surface water flood forecasting are leading to improved methods of communicating the risk and better performance in early warning with a reduction in false alarm rates with summer flood guidance in 2014 (67%) compared to 2013 (81%) – although verification of instances of surface water flooding remains difficult. However the introduction of more demanding hydrometeorological capabilities with associated greater levels of uncertainty does lead to an increased demand on operational flood forecasting skills and resources.

Speight, L., Cole, S.J., Moore, R.J., Pierce, C., Wright, B., Golding, B., Cranston, M., Tavendale, A., Ghimire, S., and Dhondia, J. (2015) Developing surface water flood forecasting capabilities in Scotland: an operational pilot for the 2014 Commonwealth Games in Glasgow. *Journal of Flood Risk Management*, In Press.