

Since the year 2000, groundwater flooding has been recognised as a significant issue in the UK. Seasonally rising water levels in bedrock aquifers, especially the Chalk aquifer in Southern England, can cause localised but long-lasting floods and have significant infrastructure impacts. Along river valleys high groundwater levels in unconsolidated deposits exacerbate fluvial flooding, although the role of groundwater is often masked by analyses that focus on the river and ignore groundwater contributions. Over the last 20 years a combination of research, data compilation, mapping and modelling has improved our understanding of how groundwater floods develop, which areas are most vulnerable and the impacts on buildings and infrastructure. Significant challenges remain, especially in understanding the frequency of flood events and the interactions between fluvial flooding and groundwater flooding. Regulatory reform in recent years has devolved much of the responsibility for managing groundwater flood risk to local administrations who must communicate the risk, of what remains a rare event, to vulnerable communities. To help anticipate and react to groundwater flooding events the BGS AquMod model, a simple, lumped-catchment groundwater model is used. It simulates groundwater-level time series at a point by linking simple algorithms of soil drainage, unsaturated-zone flow and groundwater flow. For forecasting the model is run using observed groundwater level data from telemetered piezometers, records of rainfall and evapotranspiration, and probabilistic weather forecasts. Thresholds are set on individual models that relate predicted groundwater level to flooding events. The current operational groundwater flood forecasting system feeds predictions daily to the UK's national flood forecasting centre, where the data are integrated with other flood modelling and disseminated to stakeholders. In smart cities the increased availability of the real time observational data not only from aquifers but from infrastructure such as sewers, coupled with better geological mapping and modelling will offer opportunities for better predictions, and to guide mitigation measures. Keywords groundwater, flooding, model, forecast