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Tools to improve the emergency response to floods

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Flood risk management policies have evolved significantly in various European countries during the last two decades. It is now widely acknowledged that flood risk cannot be completely eliminated through structural measures such as embankments and that flooding needs to be dealt with in a holistic manner to reduce residual risks.

Many countries in the EU have developed flood emergency plans. The principal emphasis in the development of any flood emergency plan should be on the response to the flood incident and not the cause of the incident. Any flood emergency plan should be tested to ensure that it encompasses all the reasonably foreseeable risks. At present, this is normally done through "table top" exercises or in some cases full-scale live exercises of a response. However, these approaches, although useful have their limitations in terms of cost, time and the number of scenarios that can be undertaken. At present, tools such as emergency planning software are rarely used in either flood event planning exercises or to improve the effectiveness of emergency plans.

This paper details the application of a number of emergency management tools that can be used to represent emergency management scenarios, and estimate evacuation times and loss of life for flood events. This paper will focus on agent-based models where individual receptors (e.g. people and cars) dynamically interact with the floodwater. Such models offer a scientifically robust method of assessing residual risk behind flood defences and downstream of dams in terms fatalities. They also allow the comparison of different emergency management strategies (e.g. the use of alternative escape routes) that can assist in reducing the loss of life during floods. The paper will outline a number of case studies from Europe (including the UK and the Netherlands) and North America where such models have been applied to assist in improving emergency planning.