

Use of an agent-based model to reduce loss of life from coastal flood events

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The justification for carrying modelling to estimate loss of life and evacuation times to reduce the risks posed by coastal floods is sometimes questioned. However, there is a need to develop approaches which justify the expenditure on adaptation measures and improved emergency planning. This paper focuses on two case studies where an agent-based model was implemented to evaluate both the number of fatalities from coastal floods and to inform emergency management practices. The agent based model, known as the Life Safety Model, represents people's interactions with a flood and provides estimates of fatalities, as well as the time that is required for them to evacuate the area at risk.

The first case study evaluated the impact of coastal surge flooding on the town of Brunswick, Georgia in the USA. Climate change will increase mean sea levels by up to one metre and will increase the population at risk in Brunswick by 20% for a category 4 hurricane. The modelling shows that managed evacuation could significantly reduce the number of fatalities.

The second case study was Canvey Island, which is located in the Thames Estuary in the UK. Canvey Island is protected from coastal inundation by flood defences. In 1953, the island was inundated by a flood that breached the defences and led to the 58 deaths. A number of emergency management interventions (e.g. safe havens and flood warnings) were tested to see if the loss of life in 1953 could have been reduced.