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A spatial analysis of historical river flood events in Norway and Sweden

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As part of a study to produce a flood risk model for Norway and Sweden an investigation of historical flood events was undertaken, which included a spatial analysis using GIS. For this investigation, a river network was defined including the major rivers of the region and a flood history database was compiled which combined data from a variety of sources. The full flood history database included events back to the 17th century, however, for the analysis a sub-set of more recent events was selected dating back to 1910 for which daily discharge data was obtained from the state hydrological services. An index was derived using the ratio of peak discharge to the 2 year return period discharge in order to define the severity of each flood event. The values for this index were then mapped using GIS for the study network with colour-coding to represent the index magnitude. An analysis of the patterns of these events, which considered the locations of the affected rivers, the severity of the flooding, and the meteorological and hydrological factors which caused the flooding, led to the defining of 10 different event classes. These event classes then formed the basis for the derivation of a set of synthetic flood scenarios which were used in a model to predict the depth, extent and probability of flooding for the major rivers of Norway and Sweden.