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Using HAZUS-MH for modelling past coastal flooding events in Japan

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In regions at risk from natural hazards, the ability to pre-determine the vulnerability and exposure of buildings (residential, commercial, industrial and government) from multiple hazard scenarios, allows policy makers and businesses to put forward appropriate policies, planning and intervention methods to mitigate the financial impact. For this purpose, a number of catastrophe models have been developed to provide the decision makers with quantitative risk assessments based on science and engineering knowledge. One of the most sophisticated open source models currently available is HAZUS-MH. The software is a powerful tool for analysing potential losses from floods, hurricane winds, and earthquakes. It was initially designed by FEMA to work with US datasets and has proven to be a great resource for disaster management at both national and local level in order to plan and increase the awareness of the recovery process after a natural disaster. Methodologies have been introduced to export the HAZUS-MH model for global applications. However, currently the international community have been slow to act on this technology breakthrough.

The applications of this project will focus on adapting the HAZUS-HM model to provide a reliable vulnerability assessment of Japan's building stock from tsunami flooding. A review of the different methodologies will be carried out and presented as guidance on the best practice. The numerical assessment reports will be compared to real scenarios based on field observations, financial bulletins and government reports. A sensitivity analysis will be carried out on the generation of bespoke datasets based on the quality and density of the available regional data. These results will be compared against results using proxy US datasets. In addition, the significance of regional building standards and practices will be incorporated into the model through the development of new damage functions. The level of confidence and sensitivity (building stock, vulnerability functions) of the results will be used in order to quantify the ability of the tool (and user) to accurately predict building damage and financial loss.