Towards a global risk index for hotels and tourism destinations for natural disasters

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Over past years, the hotel industry has seen major losses due to natural disasters. In 2017, the continued hurricane losses in the Caribbean and the USA, caused many hotels to go out of business. For many islands in the Caribbean and Pacific, over 25% of their output is associated with the tourism industry.

An exposure database has been developed from various datasets over a number of years including hotel websites, OpenStreetMap, hotel authorities, tourism websites and open data repositories. Around 900,000 hotels globally have been collected using these methodologies in many tourism destinations around the world.

Global hazard modelling has been undertaken over the globe in a combination of methodologies including stochastic earthquake and tropical cyclone modelling as well as probabilistic models for tsunami, flood, fire and climatic effects.

Vulnerability functions are built using various empirical vulnerability functions from past disasters for each typology. As buildings are not directly known for each individual asset in the database, an estimated range of potential storey heights, material types and hotel typologies is given for each administrative zone or tourism destination.

Globally, well over $10 trillion in economic losses and over 10 million deaths can be attributed directly to natural disaster events historically (CATDAT - Daniell et al., 2016). Where hotels fail to protect their assets and customers, this has added to the toll in recent years such as in the 2004 Indian Ocean tsunami, 2013 Typhoon Haiyan. The losses in the tourism industry have been reviewed from PDNAs, and have been used to calibrate the vulnerability functions.

A preliminary risk index is produced for comparing hotels and tourism industry globally by assessing the comparative risk of direct loss due to various natural disasters and climate change based on stochastic and historic hazard models, as well as semi-empirical vulnerability models.

This index is of use for: hotels wanting to reduce their potential losses, become resilient and know their risks, insurance companies wanting to insure hotels, governments concerned about the loss of industry and the potential for employment loss. It will continue to be improved with additional information on the hotels and destinations as it becomes available.