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Assessing the global risk of climate change to re/insurers using catastrophe models and hazard maps

Sarah Jones, Emma Raven, and Jane Toothill

JBA Risk Management, Skipton, United Kingdom (sarah.jones@jbarisk.com)

In 2018 worldwide natural catastrophe losses were estimated at around USD \$155 billion, resulting in the fourth-highest insurance payout on sigma records, and in 2020 JBA Risk Management (JBA) estimate 2 billion people will be at risk to inland flooding. By 2100, under a 1.5°C warming scenario, the cost of coastal flooding alone as a result of sea level rise could reach USD \$10.2 trillion per year, assuming no further adaptation. It is therefore imperative to understand the impact climate change may have on global flood risk and insured losses in the future.

The re/insurance industry has an important role to play in providing financial resilience in a changing climate. Although integrating climate science into financial business remains in its infancy, modelling companies like JBA are increasingly developing new data and services to help assess the potential impact of climate change on insurance exposure.

We will discuss several approaches to incorporating climate change projections with flood risk data using examples from research collaborations and commercial projects. Our case studies will include: (1) building a national-scale climate change flood model through the application of projected changes in river flow, rainfall and sea level to the stochastic event set in the model, and (2) using Global Climate Model data to adjust hydrological inputs driving 2D hydraulic models to develop climate change flood hazard maps.

These tools provide outputs to meet different needs, and results may sometimes invoke further questions. For example: how can an extreme climate scenario produce lower flood risk than a conservative one? Why may adjacent postcodes' flood risk differ? We will explore the challenges associated with interpreting these results and the potential implications for the re/insurance industry.