



A Global Climate Model based event set for tropical cyclone risk assessment in the West Pacific

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We propose a new approach to the creation of a stochastic event set for tropical cyclone risk assessment in West Pacific, for use in the insurance industry in the catastrophe modelling process. The event set is based on both available observational data and a database of tropical cyclones dynamically simulated by a state-of-the-art Global Climate Model.

For an initial proof of concept exercise we focus on the West Pacific region: Japan, China and South-East Asia. A database of tropical cyclone tracks is extracted from over 200 years of current climate simulations by HiGEM1.1, a high resolution, coupled ocean-atmosphere Global Climate Model. A bias correction procedure is applied to model the central pressure of the dynamically HiGEM-simulated tropical cyclones in terms of the observed (IBTrACS) distribution of central pressures. The bias-corrected storm track database is statistically sampled and spatially perturbed to produce a 1000 year database of synthetic storms.

The proposed approach has several advantages:

1. it is based on a long-term, globally consistent source of dynamically simulated tropical storms under current state of the atmosphere/climate; this compensates reliance on limited and/or inconsistent historical data and provides a much larger sampling for the distribution of the tropical cyclone landfalls;
2. it allows assessment of how large scale natural climate variability may influence regional tropical cyclone activity on multidecadal time scales, and how this may alter risk;
3. it allows to analyse teleconnections in weather extremes, and hence potential accumulation of seemingly unrelated risk;
4. it can be further developed to assess how climate change may affect tropical cyclone risk in the future.

Adopting an integrated approach may begin to change the way that weather related risk is understood and assessed in the insurance industry.