Improvement of the Hazard Risk Assessment of Land-affecting Typhoon in the Western North Pacific using an Ensemble Prediction System Approach

Kelvin S. Ng and Gregor C. Leckebusch

School of Geography, Earth and Environmental Sciences, University of Birmingham, Birmingham, United Kingdom (k.s.ng@bham.ac.uk)

The tropical coastal areas in the Western North Pacific (WNP) are under the threat of strong land-affecting tropical cyclones (TCs). One way to mitigate the impacts of land-affecting TCs on different sectors of society is the development and application of financial instruments for risk transfer. Parametric insurance requires no physical damage assessment after an event such that it has low administrative cost and quick disbursement. As soon as a certain threshold (i.e. response trigger point) is exceeded, the insured party receives the agreed compensation from the insurer. However, the modern historical record of land-affecting TCs in WNP is insufficient to produce a statistically reliable TC risk assessment due to limited number of land-affecting TCs in WNP per year. Consequently, the current response trigger point is not optimized. With the aim of addressing this problem, we use the THORPEX Interactive Grand Global Ensemble (TIGGE) dataset to increase the number of "observations" by including storms which were forecasted by the multimember ensemble, but not subsequently observed in reality. This allows for a wide range of theoretically possible events over 40,000 model years and a much larger sample size. This increases the confidence in the land-affecting TCs risk assessment in WNP.

In this presentation, we first present a method (and its verification) to identify TCs which have damage potential using the objective WiTRACK approach and logistic regression classifier. Then we present our initial results with a limited number of ensemble members and verify that tracks of TCs within TIGGE are an accurate representation of the climate system, with reference to the best track data and reanalysis. Finally, the initial hazard risk assessment of land-affecting TCs in the WNP is discussed.