



## A downward counter-factual climate risk analysis of the impact of tropical cyclones in the Caribbean islands

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Climate risk analysis and assessment studies are typically conducted relying on historical data. These data, however, represent just one single realization of the past, which could have unfolded differently. As an example, Hurricane Irma might have struck South Florida at Category 4 and, had it done so, damages could have been as high as 150 billion, about three times higher than damage estimated from the actual event. To explore the impacts of these potentially catastrophic near-misses, downward counter-factual risk analysis (Woo, Maynard and Seria, 2017) complements standard risk analysis by exploring alternative, plausible realization of past climatic events. As downward counter-factual risk analysis frames risk in an event-oriented manner, corresponding more closely to how people perceive risk, it is expected to increase climate risk awareness among people and policy makers (Shepherd et al., 2018).

We present a counter-factual risk analysis study of climate risk from tropical cyclones on the Caribbean islands. The analysis is conducted using the natcat impact model CLIMADA (Aznar-Siguan and Bresch, 2019). Impact is estimated based on forecasts of past tropical cyclones tracks from the THORPEX Interactive Grand Global Ensemble (TIGGE) dataset, as they all represent plausible alternative realizations of past tropical cyclones. The goal is to study whether, and to what extent, the estimated impacts from forecasts provide new insights than those provided by historical records in terms of e.g. cumulated annual damages, maximum annual damages and, in so doing, perform a worst-case analysis study to support climate risk management planning.

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Shepherd, T.G., Boyd, E., Calel, R.A. et al.: Storylines: an alternative approach to representing uncertainty in physical aspects of climate change. *Climatic Change* 151, 555-571, doi.org/10.1007/s10584-018-2317-9, 2018.

