

EGU21-5416, updated on 19 Jan 2022

<https://doi.org/10.5194/egusphere-egu21-5416>

EGU General Assembly 2021

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An analysis of the meteorological compound hazard of typhoons

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An assessment of the compound hazard – extreme wind and extreme precipitation, of tropical cyclones (TCs) is of importance due to the enormous potential impact of TCs to the economic development and societal welfare of coastal regions. Recently, a new method to construct a large physically consistent TC event set (roughly 10,000 years of events) based on numerical weather prediction models has been developed (Ng & Leckebusch, 2021). However, a systematic method for the detailed analysis of the compound nature of the TC hazard with respect to damage relevant impacts is not yet available. In this presentation, we propose a new metric, TC compound meteorological hazard risk index (CMRI) to assess TC compound meteorological hazard risk in terms of potential economic loss for mainland China. CMRI considers TC-related extreme wind and extreme precipitation which are identified based on an impact-oriented tracking algorithm. CMRI is closely linked to the normalised economic loss in China between 1979-2014. We also present preliminary results of the application of CMRI in estimating the return period of the TC-related potential economic loss in mainland China.