EGU2020-12337
https://doi.org/10.5194/egusphere-egu2020-12337
EGU General Assembly 2020

Potential Tropical Cyclone Disaster Loss Assessment based on Multiple Hazard Indicators

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Tropical cyclones could cause large casualties and economic loss in coastal area of China. It is of great importance to develop a method that can provide pre-event rapid loss assessment in a timely manner prior to the landing of a tropical cyclone. In this study, a pre-event tropical cyclone disaster loss assessment method based on similar tropical cyclone retrieval with multiple hazard indicators is proposed. Multiple indicators include tropical cyclone location, maximum wind speed, central pressure, radius of maximum wind, forward speed, Integrated Kinetic Energy (IKE), maximum storm surge, and maximum significant wave height. Firstly, the track similarity is measured by similarity deviation considering only the locations of tropical cyclone tracks. Secondly, the intensity similarity is measured by best similarity coefficient using central pressure, radius of maximum wind, maximum wind speed, moving speed, wind, storm surge, and wave intensity indices. Then, the potential loss of current tropical cyclone is assessed based on the retrieved similar tropical cyclones loss. Taking tropical cyclone Utor (2013) that affected China as an example, the potential loss is predicted according to the five most similar historical tropical cyclones which are retrieved from all the historical tropical cyclones. The method is flexible for rapid disaster loss assessment since it provides a relatively satisfactory result based on two scenarios of input dataset availability.