Nat. Hazards Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/nhess-2019-375-SC1, 2020

Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Estimation of Tropical Cyclone Wind Hazards in Coastal Regions of China" *by* Genshen Fang et al.

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Received and published: 19 February 2020

Comments on Manuscript submitted to NHESS which is entitled "Estimation of Tropical Cyclone Wind Hazards in Coastal Regions of China":

General comments: This article presents a detailed study on the estimation of TC-wind hazards in southeast coast of China. Values of key parameters of TCs, i.e., RMW and Holland-B, are firstly estimated by fitting TC best-track records from JMA via a TC wind field model. These results are then utilized to generate a number of recursive models for corresponding parameters of TC activities and TC wind field. The proposed recursive models are further exploited in conjunction of the TC wind field model to estimate TC extreme winds associated with different return periods at several selected coastal

cities. Finally, results of TC wind hazards obtained from this study are compared with those stipulated in codes or the ones documented by peers. Overall, this work is well written and the analysis process is scrupulous, which makes the findings convincing. It is expected that the findings can provide further insights to better understand the design speeds at coastal areas of China. This reviewer actually has few specific comments for the improvement of this article, but there are still some issues that should be clarified.

Detailed comments: 1. RMW and Holland-B are two key parameters whose values can influence the simulation results of TC wind field severely. Actually, some researchers pointed out that the majority of uncertainty for assessing TC wind hazards should be attributed to the estimation of these parameters. In this regard, great efforts are encouraged to pay to accurate estimation of their values. Basically, there are two kinds of methods which are driven by wind speed records and pressure records, respectively. According to the pioneering work by Holland (1980), RMW and Holland-B are defined under the context of TC pressure field, which potentially indicates that the pressure-data driven method is more straightforward, and possibly more effective. As stated in my general comments, the authors choose the speed-data driven method. Besides the above consideration, there are also several uncertainty sources: (1) even though the authors explain much for choosing TC records from JMA, the basic records herein still belong to the "best-track" data, which means they may differ from the real noticeably. (2) TC wind field possesses asymmetric features, while according to the statements in this study, the best-track information for estimating these two parameters may practically account for symmetric TC wind field. If this is the case, the estimation accuracy could be degraded. (3) The authors use a height-resolving model to depict TC wind field, while the best-track TC information is given at a fixed level. Please detail in the context how to deal with the inconsistency in terms of height level between model and dataset (including what altitude should the best-track data best account for). It is also suggested that the obtained values of RMW and Holland-B be statistically compared with their counterparts in previous

studies. 2. Why do the authors choose a height-resolving TC wind field model rather than others, e.g., a slab model, in this study? To match it with the best-track data which account for a height beyond near ground range? Please clarify. 3. Another comment is about the gradient height. It is assumed in this study that the gradient height is equal to 500 m. However, observational results show that TC depth tends to deepen when TCs get close to coastal areas. Will the inaccuracy of TC depth influence the estimation results? If so, to what an extent? 4. Some minor comments: 1) Line 21: under TC climates climate 2) Lines 225-226: The critical value of K-S test (n = 161) is 0.1059 at a 5% significance level larger than the test statistics. . .

Please also note the supplement to this comment:
https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2019-375/nhess-2019-375-SC1-supplement.pdf

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