Natural Hazards and Earth System Sciences Discussions

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2
https://doi.org/10.5194/nhess-2021-82-RC2, 2021

Comment on nhess-2021-82

Anonymous Referee #2

Referee comment on "Evaluation of the resilience of fishery ports to typhoons: a case study on Dongsha fishery port" by Yachao Zhang et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2021-82-RC2, 2021

Paper: **Evaluation of the resilience of fishery ports to typhoons: a case study on Dongsha fishery port**

The paper presents a methodology to assess the impact of typhoons on fishery ports, with a specific application to Dongsha. The authors make a determination of the worst typhoon that produces a major impact on the port, and from which, through the use of numerical modeling, they determine the degree of typhoon that would exceed the stability thresholds of the port defense structures, the level of flooding of the surrounding area, the breakage of fishing boat moorings and anchorage areas.

The paper is well structured and the subject matter is of great interest to the scientific community.

In general, I consider that the paper presents a methodology that is very simple and whose application introduces much uncertainty in the estimation of the impacts of typhoons on the coast, and more specifically in fishing ports. The method is purely deterministic in the analysis performed, lagging far behind other methods used and present in the literature for the analysis of typhoon trajectories and their impact on the coast. The method is too simplified, and the determination of the degree of the typhoon for the analysis of the impacts on the coast is not very accurate. The deterministic degree of the approach followed is one of the weakest points of the work and far from the state of the art on this subject.

Another aspect that I would like to highlight is that both the text and the title speak of resilience. However, the paper does not perform a resilience analysis. The methodology

presented is a pure methodology for analyzing the impacts of typhoons on the coast. It does not talk about the resilience of the port or its instigations, but only an analysis of the exceedance of a threshold in different impacts on the coast, due to the effect of exceeding a value of wave height or level. I ask the authors to remove the word resilience from the title and its references in the text.

Regarding the assessment of impacts, I believe that the authors are using very simplified methods and do not detail very well other important processes. For example, in the seawall analysis, they use the exceedance of the design wave height of the structure to determine a failure of the structure. This is not entirely correct, since the stability of the structure can be compromised not only by the height value of the structure, but also by the water level. Failure can occur for a lower wave height value, with a higher water level value, as is possible as a consequence of the water level rise caused by typhoons. In the case of the coastline, I believe that the use of half the wave height for the calculation of the wave run-up, and subsequent assessment of flooding, is very rough. There are other methodologies based on the determination of the wave run-up, which do not require a higher computational cost, and allow a better estimation of this impact. Regarding the other two impacts, the anchorage area and the resistance of the moorings, I consider that the approximation used is correct.

Regarding the hydrodynamic processes studied, I consider that the validation is not quite optimal, although the authors think so. I believe that the results show a clear underestimation of the storm surge elevation at the moments of maximum intensity in almost all the stations used to validate the model. This is key and very relevant in this case, since the methodology is based precisely on the worst case scenario and the maximum over-elevation, which is precisely when the storm surge value is most underestimated, and as a consequence, the impact.

There is an additional aspect that is not discussed in detail and that is relevant, and that is the depth of study and the limitation of the wave height by depth. No data is given as to what is the depth in front of the seawall (I would use the word breakwater, instead of seawall; this is used for an element attached to the shore) and whether wave breaking affects the structure. The same comment applies to the characterization of wave run-up on shore. Another important aspect is that it is not detailed which wave height statistic is used. In the figures and in the text "wave" is mentioned, but it is not known if it is a significant wave height. Please detail.

For all these comments I consider that the paper should be rejected for publication in the journal. First of all, the paper does not present a methodology for the analysis of resilience, but for the impact on the coast. I consider that the methodology presented is neither novel nor meaningful for impact calculation and that it presents many uncertainties in the results that make the impact assessment inadequate. In general, the work is far from state of the art.