

Summary

The manuscript evaluates the compound inundation in Ho Chi Minh City in Vietnam during Typhoon Usagi. Their main purpose was to determine which flood mechanism drives the flood along the Saigon-Dong Nai river system. The analysis was performed by analyzing observed data and remote-sensing products. Their finding suggests that the estuary system is mainly dominated by coastal processes, despite the fact that the typhoon event only brought rainfall inundation.

General Comments

The manuscript presents a challenging problem to assess in a data-scarce region subject to extreme hazard events, especially the interaction between coastal and hydrologic processes. I have mixed feelings if this manuscript has “enough novelty” to be accepted in a peer-review journal. Since the authors did not develop a new technique or method to investigate the proposed issue, and the results are very specific to this region. Thus, they do not either present broader and general results for the region. However, the compound flood assessment is in high demand, and this manuscript could be a good resource in the literature once it goes under a major revision.

First, there is a lack of novelty in the manuscript, not in the approach selected. In the current version of the manuscript, the novelty of applying the skewness of surge to determine which flood driver dominates it is not highlighted enough, for example. Like this, several other components of the methods are “novel enough” to be published but need to get more attention in the introduction. Thus, I highly recommend including a literature review in the manuscript that summarizes other studies that have used similar techniques to the authors and identify the missing gaps of previous works and how this manuscript tries to fill them.

Second, the authors should focus the theme of the manuscript on a “compound flood assessment” rather than a study of the hydraulic/hydrology response of the watershed. The authors are underselling their work and should put more emphasis on the “hot topic” of compound floods, which is, in reality, what the authors are doing since they are also considering coastal processes and their impacts. I strongly suggest rewriting and refocusing on this theme, including the title.

Third, the manuscript format can be improved substantially to follow a “storytelling” rather than a report. For example, the authors have a “Results and Discussion” section, but a “Discussion” section follows this one. The “Discussion” section is, in reality, a sub-section of the results since they focus on the flood impacts at the urban center, whereas the discussion section should be for comparing their results with previous findings and the physics. The authors did a great job discussing their results in the “Results and Discussion” section. Thus, I strongly recommend separating the discussion from the “Results and Discussion” section and making it a stand-alone section called “Discussion”. In addition, the current “Discussion” section should be a sub-section on the new “Results” section.

Lastly, there needs to be a more coherent nomenclature and wording with the current published studies within this field. This could be from a translation from their native language to English. For example, the authors used the word “continental” to refer to hydrologic effects on the flood. However, current studies use the word “inland” more to differentiate from the coastal process in a compound flood event. Thus, the authors assess the “inland and coastal effects” on the hydrosystem, not the “continental and coastal effects”. Similarly, the word “evacuate” is being used oddly for the field when referring to the

riverine water leaving its banks and flooding the community. Also, the authors used the term “extreme water levels events”, whereas the community uses more “extreme flood events”.

Specific Comments

- L24: remove the word “coastal” from “coastal engineers” since it can also help water resources engineers. I will also remove the word “reliable forecasting” there is a lot of effort needed to get to this point, such as computational resources, meteorological forecast inputs, accurate models, and not just the basic understanding of the hydrodynamics of the system.
- L25: researchers almost never do decision-making activities, as this statement suggests.
- L35: give an example of population density from another major city (e.g., New York, Hong Kong, Mumbai, etc.) so the reader can have a fair comparison for this statement.
- L55: be consistent with your acronyms. The authors first used LECZ to refer to a low-elevation coastal zone, but in this statement did not use the acronym. Similarly happens with HCMC throughout the entire manuscript.
- L60: quantify the “short spatial scale”. Give an example.
- L64: describe what it means to have a negative discharge value on this gauge.
- L68: Where the tides dominate in the river? Until what river length from the outlet or it is complete?
- Figure 1: Need to add a map that shows where HCMC is within Vietnam and then zoom into the basin and the city. Panel (a) add the label for the Vietnam-Cambodia border and the name of the main rivers. What are the grey lines in panel (b)? need to add it to the legend.
- L85-91: the authors give too many details about the classification of the typhoon in this paragraph. I would condense this since it is not pertinent to the manuscript.
- L94: did the authors consider soil type? They only have datasets of topography and land use, but they talk about infiltration and groundwater recharge as one of the main processes during the flood but do not talk anything about the soil types which govern these processes.
- L95: as the statement is written, it says that extreme events, like a typhoon, would have an effect on the astronomical tides. However, they do not alter this response.
- Figure 3: all the components in the diagram are talked about in the main text of the manuscript, with the exception of the “mapping and characterization”. The authors should explain this more. Also, on the figure label, the focus is on the “hydrological system”, but it also talks about coastal processes. I recommend changing the wording toward “estuarine system” which implies both coastal and hydrologic processes.
- L110: the authors lack a justification for the selection of a 3-day rainfall total for this analysis. All the datasets have a maximum daily time scale. Why not select a daily accumulation rather than a 3-days total? Also, the word “adequate” needs a quantification. What is adequate for the authors might not be for other readers.
- L112: What criteria the authors used to “deem sufficient” the quality of the observed data?
- Table 1: the nomenclature for the correlation coefficient equation is missing. What represents “cov(P,O)”?
- Table 3 is in the text before being cited. The table should be cited first and then shown. Also, how can the authors visualize a semi-diurnal tidal behavior if the time resolution of the tidal gauge has a daily time step, meaning only one value per day?

- L173: what was the time window for the moving average performed for the monthly tide values?
- L177: mention the amount of tidal constituent used in the resynthesize analysis.
- L185: generally, you should not refer to a figure before presenting other ones. For example, the authors cite Figure 7, but only have presented three figures.
- L216-217: the authors should justify why they used the selected thresholds of dH and dt.
- L260-261: have other studies found similar results with ERA5?
- L303-304; L320-322: are these findings also been found by other researchers? Find additional literature that supports or refutes your findings. That should be part of your new discussion section.
- Figure 6: why the observed discharge is higher in the wet season than in the dry if the observed water level is higher in the dry season than in the wet? Discharge is computed from the water level, so they should have the same behavior, which is not the case.
- L343: where the coastal water level is the main driver and not the rainfall?
- L381-387: move out from results into methods and data collection. This will explain to the reader why the authors also consider wind data. It was quite strange when I saw wind vectors in Figure 2.
- Figure 7: add a legend to the figure explaining each color of the lines. Also, add the datum to which the levels are referenced.
- L410-424: these are not results and more a description of the study area. I would move them out and into the study area section, including the figures. Maybe the wind vector panels in figure 2 can be swapped with the top three panels in Figure 8.
- Figure 8: panel a) the track line in the legend is green but in the map is purple. Panel b) add the datum of the elevation from the DEM.
- Conclusion: Add a paragraph about the limitation/assumption the method used by the authors may have.