Response to Anonymous Referee #3:

General comments

#1 The submission by H. Chen et al. entitled, Typhoons exert significant but differential impact on net carbon ecosystem exchange of subtropical mangrove ecosystems in China, is appropriate for publication in Biogeosciences once minor changes below are addressed. Their paper is of interest to several groups including mangrove ecologists, ecologists studying ecosystem response to disturbance, and to interdisciplinary groups studying coastal carbon cycling.

Our reply: We thank the reviewer for the positive evaluation and thoughtful comments. We have revised our manuscript according to the comments as shown below.

#2 General comment Adding an additional figure or table presenting monthly and/or annual NEE, GEP, and RE for the two mangrove forest sites would improve the quality and broader interest in the paper. Such results will provide some context regarding the importance of these forests for carbon cycling and of the productivity of these forests relative to mangrove forests elsewhere.

Our reply: We added an additional table (Table 4) presenting the mean annual NEE, GEP and RE for the two mangrove forest sites. We also added the corresponding text in the Results (3.3) and Discussion (4.2) sections.

Specific comments

#1 p.9423 l.3-4 – Change text to, "…in China have been greatly lost since the 1980s with only 22700 ha remaining…" l.6 – Change text to something like, "…of tropical cyclones are likely to change in …" l.12 – Change "ecology" to "ecological". l.23 – Change "ecosystem" to "ecosystems".

Our reply: We changed these sentences or phrases as suggested.

#2 p.9425 l.24 – Change text to, "…has been included in the Ramsar List…" p.9426 l.26 – Change "tripping" to "tipping". p.9430 l.12 – Are these units in g of dry biomass? Specify here. p.9431 l.26 – Change "litter" to "little".

Our reply: We changed the text accordingly.

#3 p.9432 l.8 – Why did strong winds result in lower daily RE? What is the mechanism (or mechanisms)? The statements that follow (p.9433 l.1,2) seem to contradict this result by suggesting that wind results in litter production and increased RE following typhoons. Are there other processes that may have contributed to reduced RE following disturbance?

For instance, could lowered leaf area index following high winds contribute to lower dark respiration of foliage (and therefore lower RE)?

Our reply: Sorry for not providing enough explanations for this phenomenon. Intensive rainfall and reduction in leaf area index (LAI) during typhoons may contribute to lower daily RE following typhoons. Though the rainfall did not show significant correlation with RE directly, the monthly total rainfall was positively related to the maximum wind speed for our study sites. The reduced respiration was observed during the summer monsoon which mainly caused by the intensive and consecutive rainfalls (Kwon et al. 2010). Li et al. (2007) also reported that lower soil respiration was best explained by the reduction in LAI following the hurricane disturbance. We added these explanations in the revised manuscript.

#4 p.9434 l.25 – Change text to "They interact with each other, …" p.9435 l.1 – Change "ecosystem" to "ecosystems". l.4 – Should read, "Hurricane disturbance has…" l.7 –Change "who" to "which". l.9-10 – Reword sentence to begin something like, "However, a significant increase in NEE was observed at our study site…" l.15 – Change "typhoon" to "typhoons".
Our reply: We made these changes as suggested.

#5 Table 2 – Could p-values be added to this table to indicate significant differences in parameters comparing before and after disturbance?
Our reply: We added the *p*-values to Table 2.

#6 Figure 5 – The figure caption should provide some details regarding how NEE residuals were computed. Or, refer the reader to the methods section.
Our reply: We revised the figure caption to add this info as suggested.

Response to Anonymous Referee #4:

General comments

This is an interesting paper, which evaluates the typhoon effect on carbon and water flux at ecosystem level. As a type of less extreme disturbance, typhoon is not well studied when compared to other extreme events. However, within the context of global climate change, the frequency and intensity of typhoon are predicted to increase, and thus it is urgent to evaluate the typhoon effect on coastal ecosystem. This work presents a creative but thorough evaluation of typhoon effect, which could contribute to our current and future understanding of responses of subtropical coastal ecosystem to disturbance.

Our reply: We highly appreciate the reviewer's positive evaluation and thoughtful comments about our manuscript. We revised the manuscript according to all comments of this reviewer as explained below.

Specific comments

#1 The authors used data from two sites, which experience different environmental conditions, like tidal activity, weather condition, and dominant plant species. We would expect the two ecosystems exhibited different response to typhoon events. But this is not clear in this manuscript. For example, authors can separate the typhoon events occurred in two sites in Fig 4.

Our reply: We now used different patterns of bars in Fig. 4 to separate the typhoon events occurred in two sites as suggested.

#2 As the typhoon is generally accompanied by spring tide, and the water amount is undoubtedly larger than the rainfall, we would expect rain play an minor important role when compared to tides. However, the authors concluded rainfall was among the most important factors controlling CO2 flux, but this didn't make any sense. Meanwhile, the author should consider the interaction between tides and typhoon.

Our reply: Since mangrove plants grow in intertidal zone where tide brings in large amount of water, rainfall from the typhoons should play a minor role in controlling CO_2 flux in term of water availability. However, large amount water from the rains induced by the typhoons could significantly reduce the salinity in the tidal water surrounding the mangrove forest within the footprint of the eddy flux tower, which could exert significant effect on CO_2 flux by increasing light use efficiency as shown in Table 3. We agreed that

it would be better if we could examine the interaction between tide and typhoon, but the tidal data we collected were not good enough for this purpose. We will look at this issue in future paper after we have more tidal data.

#3 The authors should check parameters used in the manuscript. In the manuscript, there are two parameters representing ecosystem respiration, RE and R, which could confuse readers. Also, the dark respiration is generally used at leaf scale, and thus dark ecosystem respiration is somewhat ambiguous. GEP is a parameter used in biology/ecology field, and its values are generally positive, but in this manuscript, it is better to use GEE.

Our reply: We changed "R" as "R_d" to represent ecosystem respiration during daytime, and the GEP_{2000} values were presented as positive values in Table 2.

#4 The manuscript discussed the resilience of mangrove ecosystem to typhoon, but no data described the changes of NEE before and after typhoon in detail, like day to day. 5-day binned data is a good option to show the typhoon effect, but it can't tell us how quick the ecosystem recovers from the typhoon.

Our reply: We totally agreed with this reviewer in that the data we present here are not enough to address weather mangrove ecosystem CO_2 exchanges have high resilience to typhoons. Instead, we now just concluded that mangrove ecosystem CO_2 exchanges may respond differently to typhoons of different characters (see last sentence in the abstract and the conclusion sections).

#5 How about the relationship between monthly mean wind speed and litter production? Or does there exist a wind speed threshold for litter production? Did the maximum litter production occur after maximum wind speed was recorded, or it depends on the duration of certain wind speed?

Our reply: In our study sites, monthly leaf and twig litter production was significant positive correlated with monthly maximum wind speed (see Results section 3.2). We did not find a wind speed threshold for litter production. Due to the litterfall collection time interval was one month, we could not determine whether the maximum litter production occur after maximum wind speed was recorded or it depends on the duration of certain wind speed. In future study, we will shorten the litterfall collection interval from monthly to weekly so the relationship between litter production and wind speed can be determined as suggested.

Technical concerns

P2L2 replace 'litter' with 'little' P2L8 delete 'following typhoon disturbance' P2L10 delete 'were' P2L12 delete 'were' P2L13 daily NEE responses to what factors? P3L3 replace 'has' with 'undergoes' P3L12 replace 'ecology' with 'ecological' P3L18 replace 'litter' with 'little' P4L10 replace 'resulted' with 'resulting' P4L20 replace 'microclimate' with 'micrometeorology' P4L20 What is Re? P4L22 replace 'is produced' with 'occurred' P5L4 replace 'microclimate' with micrometeorology' P5L20, P6L2 use 'tidal water salinity ranging' P6L11 replace 'digital micrologger' with 'data logger'. P6L26 replace 'tripping' with 'tipping' P6L27 the TE525mm is the product of Texas electronics. P8L17 add explanations for alpha, GEP2000, and R P9L15 replace 'microclimatic' with 'meteorological' P10L12 is the unit g dw g m-2 yr-1? dw stands for dry weight. P11L26 replace 'litter' with 'little'. Table 2 I would suggest put the model in the main text; No units for all parameters. Fig 2 the axis titles for a and c should be maximum wind speed. Fig 4 the title of y axis for (c) should be RE.

Our reply: We provided more information for tables and figures, and changed all these phrases or words, as suggested.