

Interactive comment on “Late Holocene environmental reconstructions and the implications on flood events, typhoon patterns, and agriculture activities in NE Taiwan” by L.-C. Wang et al.

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Dear Reviewer:

We would like to thank for your appreciation of our work and for your careful reading as well as constructive comments to our manuscript. Your comments had been respond carefully in below.

R#2: To discriminate the flooding event from typhoon rainfall event in the proxies is not easy since flooding may also result from typhoon. According to the authors, typhoon is

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indicated by coarse sediments, Lagerstroemia pollen (infer denudation during typhoon) and P/B ratio of diatom (infer high lake level), but the denudation is not necessary due to typhoon, it may also due to other events in this area, i.e. sliding et al; and index of P/B ratio is only exists in samples where diatom fossil appeared and it is not available through the whole core. Thus, both of them are not the only necessary evidences of typhoon. Flooding event is possibly indicated by rapid sedimentation, and high ratio of UMF pollen, but they can also infer a typhoon event. Thus, some sentence in the abstract and conclusion may need to modify. But for the discussion of Fig. 9 it is still accepted (OK) because flooding and typhoon are combined together there IN Fig. 9.. In addition, usually the sedimentation of flooding can be episodic; i.e. large amounts of sediments deposited within short duration during flooding, and this makes the age/depth estimation difficult sometimes. Thus, the age assignment of interval of short dry such as 940-1010 AD should be very careful.

Reply: We agreed to reviewer's comment that sedimentary proxy is difficult to discriminate flooding event from typhoon rainfall event. Therefore, we revised some sentences in the section of abstract and conclusion according to reviewer's suggestions.

R#2: The dry / wet trend of MWP and LIA: If accepted the dates of this study, the increase of Poaceae in LPZ 2 (MWP) might indicate it is drier than LPZ 1 although fossil concentration are low indicating still some floods. Thus, LPZ 2 may be relatively drought even though flooding still occur red sometimes. In this paper, drought occurred at the lower part of LIA, i.e. LPZ 3 near MWP, although illite + muscovite still high in LPZ 3. However, studies in South China and Taiwan (Chen et al., 2005; Chu et al., 2002; Wang et al., 2012; 2013; Chen et al., 2009) reported a relatively wet during LIA and drought during MWP. Or, the drought (LPZ 3) might be still in MWP? if consider the dating data is not so dense before the drought event (1400AD) and the sediments below 1400AD is still not exactly homogeneous-containing silt and clay etc, that make the estimation of age controversial. And, diatom inferred precip in fig. 8. is drought during MWP.

Reply: We agreed review's comment, the uncertainty of the age model is occurred due to the few date control points. Combining it with the editor's comment, we assumed that the shallow lake condition during 940-1010 AD and LIA1 could be just a short phase of alluvial plain development. For this, we removed the climate interpretation, and only described the stability of environment according to the fluctuation of pollen-PC2. Liew et al. (2014) summarized the past 4000-years palynological records in Taiwan, and suggested the relative dry and stable climate during 760-1300 AD. Their climate interpretation is probably agreed by our study, which pollen-PC 2 represented low flood frequency during 940-1010 AD and relative stable hydrological condition during 1010-1200 AD. The new description represents as below.

"Pollen PC-2 varies little, inferring the higher environmental stability. The stable hydrological condition during 1010-1200 AD in LPZ 2 , and shallow lake criteria during 940-1010 AD in LPZ 1 is appropriately supported by the summary of 4000-years palynological data in Taiwan, which indicated relative stable climate during 760-1300 AD (Liew et al., 2014)."

"The continuously high percentages of Cyperaceae pollen and epiphytic diatoms reflect that the wetland expanded in the vicinity of DHL. Although the climate records in Taiwan indicated a wetter LIA (Liew et al., 2014; Wang et al., 2013, 2014), the reduction of flood events in Ilan Plain during early LIA may relate to the local depositional environment in the transition phase of alluvial plain."

Reply on suggestions

R#2: "Title" : "typhoon" instead of typhoon patterns No discussion about the typhoon patterns in the text. But only mention their routes.

Reply: revised.

R#2: "Abstract": Line 2 of the floodplain lake should better be "lake in the floodplain of Ilan Plain".

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Reply: revised.

R#2: Line 8 the 940-1010 AD is not so convinced due to date uncertainty, thus better only mentioned “even though shortly dry phase existed”

Reply: deleted.

R#2: Line 12-13 “high percentage of Lagerstroemia “; better to be “coarse grained sediments and sometimes with local shrubs like Lagerstromia or planktonic diatoms” because Lagerstroemia is not found in LPZ 4 and planktonic diatoms not in LPZ 1.

Reply: revised.

R#2: Line 17. better to delete “dry events and frequent typhoon events happened during La Nina like stage”. Because not so easy to discriminate typhoon and flooding.

Reply: deleted.

R#2: “Conclusion” Line 2-3: better to modify the sentence. Please consider the difficulty from the sediments to discriminate between flood and typhoon event.

Reply: We deleted the sentence “The used proxies in this study for paleofloods (pollen-PC2) and agriculture activities (pollen PC-1), which are implied by the PCA results, the high percentages of Lagerstroemia pollen, and the increase of diatom P/B ratios are used to indicate frequent typhoon events”.

R#2: Line 6-8: intense (intensity) of typhoon frequency? Evidence is not shown in Fig. 5 (Fig. 5 show benthic diatom also abundant). Better to “possibly indicate frequent typhoon. . . .where the plankton diatom reaches its culmination.”

Reply: revised.

Reply on technique corrections

R#2: It is better to ask a reviewer of mother language to modified the sentences to make manuscript more clear.

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Reply: We revised the mistakes one by one according to reviewer's comments. After this, we used the commercial English check service to modify our sentences to make it correct and clear.

R#2: 1. p. 1979 line 24 "is locates" should be "is located".

Reply: revised.

R#: 2. p. 1981 line 21 should be "is located"

Reply: revised.

R#2: 3. p.1982 line 10 are occurred should be "occurred"

Reply: revised.

R#2: 4. " line 17 delete "carbon"

Reply: deleted.

R#2: 5. p. 1984 line 19 composite of mineral content should be "composed of clastic sediments". line 20 uppermost 70cm should be" the uppermost 70 cm". line 22 are consist should be "consist"

Reply: revised.

R#2: 6. p. 1985 line 23 delete "which is"

Reply: deleted.

R#2: 7. line 25 upper part of the core should be "of the zone"

Reply: revised.

R#2: 8. p. 1986 line 5 "has" better changes to "reaches"

Reply: revised .

R#2: 9. p.1987 line 15 is consists should be consists. Line 16 " sediment core can be

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seen” better use ”sediments of core can be looked”.

Reply: revised.

R#2: 10. p.1988 line 1 form should be “from” line 5 can be contributed to the deposition should be ”contributed from the deposition” line 11 “. Although “ should be “, although” line 27 Fig. 6 should be Fig. 8. Line28 low latitude should be “low altitude”

Reply: revised.

R#2: 11. p. 1989 line 20 agriculture activates should be “activity”.

Reply: revised.

R#2: 12. p.1990 line 22 indicted should be “indicated” line 9 Inlan should be “ Ilan” line 24 “is indicating” should be “ indicates”

Reply: revised.

R#2: 13 p. 1991 line 5 latitude should be altitude line 26 should be “examined”.

Reply: revised.

R#2: 14. p. 1992 line 14 millennia

Reply: revised.

R#2: 15. p. 1993 line 15, typhoon induced landfalls should be “ rainfalls”.

Reply: revised.

R#2: 16. p. 1994 line 9 should be 1250-1300 AD

Reply: added “AD” after “1250-1300”.

Reference Liew, P.-M., Wu, M.-H., Lee, C.-Y., Chang, C.-L. and Lee, T.-Q.: Recent 4000 years of climatic trends based on pollen records from lakes and a bog in Taiwan, *Quat. Int.*, (in press), doi:10.1016/j.quaint.2014.05.018, 2014.

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Interactive comment on Clim. Past Discuss., 10, 1977, 2014.

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