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Climate of the Past Discussions

Interactive comment on "China's historical record in the search of tropical cyclones corresponding to ITCZ shifts over the past 2ka" *by* Huei-Fen Chen et al.

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Dear referee #2 and editor,

We have finished the data analysis of NAO and wavelet analysis of our data in LIA. We want to add the section 4.3 for discussing more. We will revise in our manuscript and add table 1, figure 8 and figure 9.

4.3 Track of TCs corresponding to the NAO during LIA

Since the ITCZ and Westerlies both link to the Hadley Cell, and the position of middle-latitude storms are dragged by the westerlies which is influenced by the North Atlantic

Oscillation (NAO)(Hurrell, 1995; Morley et al., 2014), we try to compare the NAO with the track of TCs. In order to compare our tracks of TCs with NAO, we created an index of TTC1 which means the track of TCs moving to southern China or northern China (TTC1 = ïČěXiFi). Xi means the numbers of typhoon landfall in that provinces, and Fi means the location factor of landfall locality (Table 1). When the value of TTC1 is higher, it indicates more typhoon landfall in northern China (Fig. 8). The TTC1 also can be normalized to 0∼1. Furthermore, we used digitalization to get the average data of 10-year from 2 ka NAO index according to the results of Trouet et al. (2009) and Ortega et al. (2015). The results calculated from Trouet et al. (2009) and our TTC1 have the same variation (Fig. 8). However, our records were fragmentary before 1470 A.D. and we lacks the historical data from Japan. The results in figure 8 reveals that our normalized TTC1 corresponding to the NAOtouet during LIA stage, and the 3-point smooth of the TTC1 has very good relation with NAOtouet. This result proves that NAO influence the moving of westerlies and gently affect the tracks of TCs.

After we do the wavelet analysis, we found the TTC1 has 30-35yrs and 55-65 yr cycles during LIA stage (Fig. 9). This result is also consistent with the frequency of typhoon landfall over Guangdong Province of China during the period 1470 A.D.∼ 1931 A.D. based on different data source (Chan and Shi, 2000). The 60 yr cycle is clearly present in the Pacific Decadal Oscillation (PDO) and the Atlantic Multi-decadal Oscillation (AMO), with phases coherent with a planetary signal since at least 1650 A.D. to 1850A.D. (Scafeta, 2012; Solheim, 2013). This implies the PDO cycle synchronous with our TTC1 cycle.

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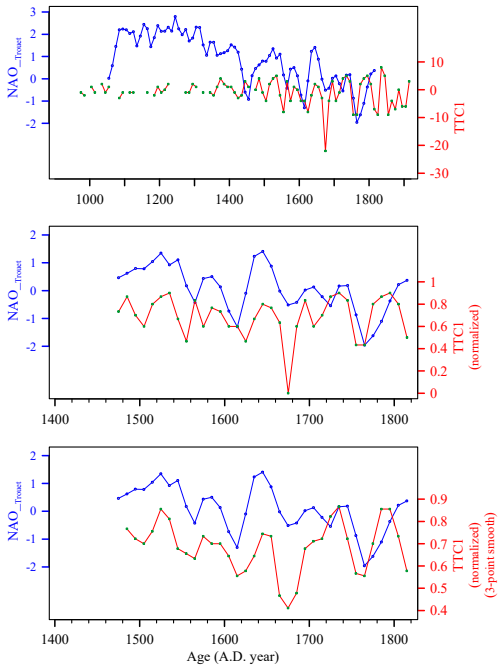

Fig. 1. Fig. 8 The relation between the NAOtrouet (Trouet et al., 2018) and TTC1

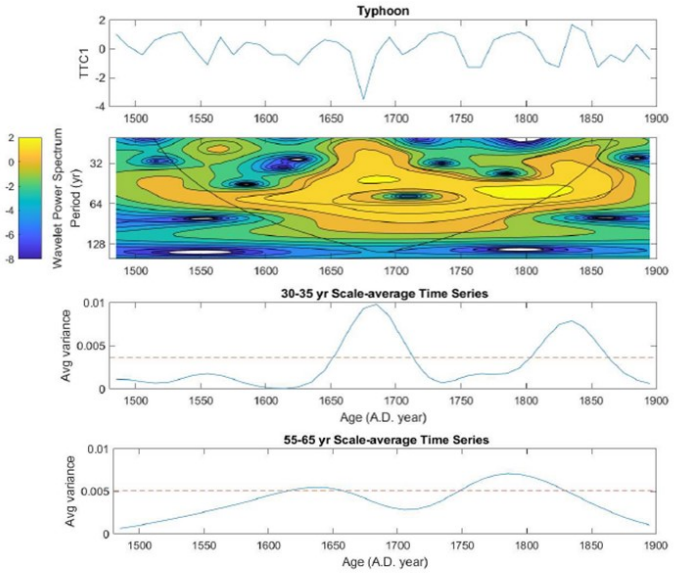

Fig. 2. Fig 9. The wavelet analysis of TTC1 during LIA