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Atmospheric Measurement Techniques Discussions

Interactive comment on "Evaluation of OAFlux datasets based on in situ air-sea flux tower observations over the Yongxing Islands in 2016" *by* Fenghua Zhou et al.

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Thanks for your comments on our MS entitled "Evaluation of OAFlux datasets based on in situ air-sea flux tower observations over the Yongxing Islands in 2016", we have studied your comments carefully and found your comments are very helpful, especially you found out an inconsistent between the Fig.7 and the corresponding description in the paper. We have revised the manuscript according to your comments, and the revised parts were underlined in red. We kindly remind you that the revised manuscript (2nd) is modified based on the revised manuscript (1st) of the first reviewer's opinion. Response to Specific comments: 1. The function/aim of COARE3.0 should be given

some more explanations. Why you choose COARE3.0 instead of other method to derive SHF and LHF? Response: Due to the limited text, there is no specific description of the COARE3.0 algorithm in this paper. Readers can read the following references for more information of COARE3.0 (Fairall et al., 2003; Lisan et al., 2008). Compared to COARE2.5, the updated COARE3.0 has some noted improvements. The range of wind speed validity is now extended to 0–20 ms-1 after modifying roughness representation. The transfer coefficients are redefined in terms of conservative quantity rather than the measured quantity, thus eliminating the need for a Webb et al. (1980) correction to latent heat flux. The COARE 3.0 is shown to be accurate within 5% for wind speeds of 0–10 m s-1 and 10% for wind speeds between 10 and 20 m s-1. There are several forms of bulk flux algorithms acuurently avaliable (Brunle et al., 2002). The differences between the algorithms reside in the differences in treating the parameterizations of the transfer coefficients Ce and Ch, conditions of light wind and stable stratification, influence of sea spray, treatment of sea state (swell, directional effects), appropriate averaging scales, parameterization of mesoscale gustiness, and the behavior of scalar sublayer transfer. In this paper, the OAFlux reanalysis SHF and LHF data were calculated by the state-of-the-art COARE bulk flux algorithm version 3.0, in order to avoid the devation caused by different algorithms in the process of comparison and evaluation, so we also adopted COARE3.0 to derive SHF and LHF to keep consistent with OAFlux. 2. Authors pointed out that the sea surface temperature Ts is the key variable to determine the differencesof sensible heat flux from OAflux products and in-situ observations. It seems that Ts has better accuracy in winter and spring than in summer and autumn. In Page 8, Line 28-30, author mentioned the influence of cloudy days could be the reason for the inaccuracy of Ts derived from AVHRR and the cloud mount can be related to the outgoing long wave radiation (OLR) shown in Fig. 7. OLR is related to the cloud amount, but as I know that OLR is generally obtained by the satellite remote sensing. It cannot be directly observed by the instrument installed on the flux tower introduced in the paper. Besides, the variable shown in Fig. 7 is downward long wave radiation (DLR), so the content of this part is inconsistent and

confusion. Response: Thank you very much to point out this inconsistent in the text. Actually, at the begging the authors thought that using OLR to infer the cloud cover directly. However, no remote sensing OLR datasets available during this period of observation was found. We used DLR observed from YXASFT to estimate cloud cover indiretly instead of OLR. As we know, DLR is mainly depends on the air temperature, which can be affected by cloud cover. When the sky was covered with large clouds and thick clouds, the probability of rising air temperature will be bigger, which will further increase the DLR. We drawed the curve of observed DLR in fig.7, but forget to modify the corresponding in the article. Thanks again for reading this paper carefully and find this confusion, we are pleased accepcted your suggestions, and change OLR into DLR in the article.

Response to Minor comments: 1. The abstract is not concise and coherent enough, and needs to be revised. Response: We have already revised the abstract based on #1 Reviewer's comments. You could read the new abstract from the revised manuscript in the supplement. 2. The authors should adjust the range of X-axis, Y-axis and the regression line in Figs 3c and 3d. Same problem appears in Fig 6, Figs 8-10. Response: The figures after adjusted were shown on the revised manuscript. 3. Line 21, 'diminish' should be 'were diminished' Line 21, Definition of 'Ta, U, Qa, Ts' should be given as these variables are first mentioned in the MS. Line24, 'is observed' should be 'was observed' The label of each subset in Figure 1 should be placed in order. Response: The aboved mentioned suggestions were accepted and revised in the corresponding place of the article

Please also note the supplement to this comment:
https://www.atmos-meas-tech-discuss.net/amt-2017-456/amt-2017-456-AC3-supplement.pdf

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