

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

**Fenghua Zhou et al.**

zhoufh@scsio.ac.cn

Received and published: 21 March 2018

Thanks for your time, We are pleased to note the favorable comments of anonymous reviewer in his (her) review of our manuscript entitled “Evaluation of OAFflux datasets based on in situ air-sea flux tower observations over the Yongxing Islands in 2016”. We have studied the comments and suggestions carefully and have made corresponding corrections which we hope meet with his (her) approval. All the corrections are underlined in red and the revised manuscripts was also enclosed as .pdf supplement in AMTD open forum.

Response to specific comments: 1. As mentioned in the first question of the Specific

C1

comments, the reviewer suggest us to add more detailed observation system description mounted on YXASFT.

Response: The hardware and online data acquisition programme of the observation system was jointly designed by the first author and the CSI (Campbell Scientific, Inc) engineers. We think this part is not very much related to the core study content of the paper, so we just use a brief sentence introduces the system architecture and fig.2 are enclosed for your information. We also applied for the Chinese invention patent of this air-sea boundary layer observation system, if the readers want to know more about this YXASFT and its observation system, can send E-mail to the corresponding author, we will send hardware and data acquisition programme for your reference.

2. What’s the meaning of SEx, VXx, Px, lxx..., it’s a signal, or protocol standard, or sensor hardware interface?

Response: Abbreviations such as SEx, VXx, Px, lxx appears in Fig.2 are different signal output or input channels in CR3000 datalogger. Take channel SEx for example, it’s the channel Single-Ended Analogy input (CR3000 has 16 channel of SE). I added a reference of CR3000 USER’S MANUAL in Figure 2’s caption.

3. In addition, I pay more attention to the data sharing and data quality. Whether the data can be open access directly by contract the communication author after the publication of the paper? What is the data format? Whether the necessary data quality control is taken?

Response: Of course, after the publication of the paper, the field observation data used in the YXASFT can be obtained from the authors via email to the corresponding author, we welcome more researchers using the data to verify the conclusions in this paper or carry out more in-depth research study. The data was provided in the form of .dat, .xls and .txt with a data description header such as: Time stamp (YY/MM/DD HH:MM:SS), Wind speed (m/s), Wind direction (°), Air temperature (°C) and so on. Yes, we indeed do the necessary data quality control by despiking and averaging. The

C2

first hand observation data was obtained directly from data tables stored in CR3000 CF card, CR3000 scan sensors in a 1Hz frequency, an average value (the average value of the 1800 sets of data) was stored in data tables in every 30 mins, despiking was performed before averaging. For each variable, a spike is defined as a value that exceeding window mean  $\pm$  3.5 standard deviations over a certain time window (set to 5 min). Detected spikes were identified and replaced based on a linear interpolation of neighboring values.

4. I visited the data sharing website listed in Page 3, line 17 and found that the web is in Chinese, it's not convenient for non Chinese readers, also I could not found the data download link.

Response: Thanks for your suggestions and visiting our data website. Yes, the first version of this data sharing website was developed in Chinese language. After all the functions of the website passed running test, we will upgrade this website to both Chinese and English editions. The Login: CSL-CER and password: ruhuna mentioned in the paper is only for real-time data and historical data curve display, to download the data files readers should contract the corresponding author for a new authorized username and password and a data sharing agreement must be signed, you can re-login the system with this new username and password, then data download link works.

5. In sec 3.1, the authors did a nice job to validate COARE3.0 using the direct eddy covariance flux (ECF) measurements, the verifying results are convincing. However, they didn't give descriptions of the EC data processing steps and the algorithm taken by each step. As I know that the EC method is mathematically complex, and significant care is required to set up different processing steps for different sites, measurements and study purposes, the difference in the processing algorithm can result in the difference between the turbulent fluxes results. I suggest the authors to add a brief description on how the fluxes are parameterized and calculated for the ECF turbulent data. The authors can also add a figure to express the ECF data processing flow more clearly. For instance, which algorithms were adopted for coordinate rotation and WPL

C3

compensation?

Response: Thanks for your suggestion, in this paper the directly measured eddy covariance heat fluxes by IRGASON ECF system was used to verify the performance of COARE3.0. The online flux calculation program EasyFlux\_DL developed by CSI was run in CR3000, the turbulent data processing steps are as follow: despiking [Vickers et al., 1997], Coordinate rotation [van Dijk et al., 2004], frequency correction [Moncrieff et al., 2004], WPL compensation [Wallace et al., 2006]. As suggested by reviewer, I added figure 3 to show the data processing flow of EC data in the paper.

6. According to the description of in situ data in the paper, I realized that the wind speed range in the YXASFT observed data covers typhoon force winds, as there were at least 2 strong typhoons (No.1603 "MARINAE" and No.1624 "SARIKA") passed through Xisha sea area. So I suggest the authors to add discussions on how COARE3.0 algorithm performs compared to observed exchange coefficients for high wind conditions.

Response: Parameterization of exchange coefficients in high wind is a hot topic in recently years. Both laboratory results [Haus et al., 2010] and field observations [Zhang et al., 2008] indicated that the variations of exchange coefficients in high wind were quite different from that in moderate wind. Some of our observed wind speed reached the high wind level, however, for parametric studies, high frequency observations from several Hz to tens of Hz are essential based on the eddy covariance (EC) method. In this study, the EC system installed on YXASFT only worked for two months from 1st Feb to 29th Mar, and no typhoon passed through Xisha during this period. Consequently, the exchange coefficients could not be obtained from in situ data and the observational LHF was calculated by the bulk method COARE 3.0. Our limited knowledge of the parameterization of exchange coefficients would probably, to some degree, lead to uncertainties in the estimates of LHF under high wind conditions. This is a problem remains to be ameliorated with more available observational data under extreme conditions in the future. It is also an important way to develop more reliable and applicable parameterization schemes for exchange coefficients to improve performances of

C4

the LHF products.

Response to technical corrections: We found the referee's comments on this part are most helpful, we accepted the corrections and suggestion listed from 1st to 21th in the technical corrections, and make corrections in the corresponding place with underlined in red. With regard to the 22th and 23th suggestion, we adjusted the colour of all the figures and deleted the relevant passage since they are not essential to the contents of the paper.

Please also note the supplement to this comment:

<https://www.atmos-meas-tech-discuss.net/amt-2017-456/amt-2017-456-AC1-supplement.pdf>

---

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-456, 2018.