Review of "Evaluation of OAFlux datasets based on in situ air-sea flux tower observations over the Yongxing Islands in 2016" by Dongxiao Wang. et al.

General comments:

In this paper, the authors did a nice job to design a high quality air-sea flux tower (YXASFT) in Yongxing Islands for air-sea boundary layer flux-related observations. The instrumentation and the real-time data acquisition system were well designed. Then the authours evaluated the widely used WHOI OAflux reanalysis datasets using in suit data observed from YXASFT. Seasonal comparisons were quantitative analyzed between the OAflux and YXASFT observations by calculating the coefficient of determination, root-mean-square errors, and biases. Through seasonal comparison, the authors get innovative conclusions that the relaibility of OAFlux reanalysis datasets is associated with the monsoon system in SCS, which mainly manifested in the following aspects: 1. OAFlux provides a better estimation of U (Q_a) in the spring and winter characterized by a stronger (drier) northeast monsoon than in the summer_autumn characterized by a relatively weaker (wetter) southwest monsoon 2. The OAFlux *LHF* performance is better during the spring and winter than in the summer_autumn, which is further associated with the monsoon climate in the SCS.

The authors also quantified the biases in SHF and LHF of the OAFlux datasets and investigated the reasons that may be responsible for the biases. They found that the bias in Qa is the main source of error for the LHF in winter monsoon period. Meanwhile, both biased in Qa and U are responsible for controlling the biases in LHF during summer monsoon period. Biases in Ts are responsible for controlling the biases in SHF, and the effects of biases in Ts on the biases in SHF during the spring and winter are much greater than that in the summer_autumn period. At last, the authors suggest that both Ts and SHF in OAflux are the most unreliable data which should be used with considerable cautions to drive ocean models. Additionally, U, Qa and LHF should be used with proper consideration due to their seasonal reliability

variations. Researchers should feel more at ease using these data during the winter monsoon than in the southwest monsoon.

In general, the paper is well-written. Given the importance of the OAflux reanalysis products in the air-sea interaction community, it is worthwhile to systematically evaluate the accuracy of each variable. South China Sea is a region that is lack of sufficient air-sea interaction observations. The authors carried out in suit observations from air-sea tower in this region within relatively long periods, which is of great significance to improve the reliability of reanalysis datasets. The presentation of the results and conclusions are clear. Thus I recommend the paper to be accepted and published in AMT with minor to moderate revisions. I give the following suggestions to help the authors further improve the paper.

Specific comments:

1. In sec 2.1, the description of sensor wiring and data acquisition system is too simple, with only a single sentence “The sensor wiring and data acquisition diagram for the YXASFT is shown in Fig. 2.” in Page 3, line 19. Readers other than professional engineers are difficult to understand this observation system. What’s the meaning of SEx, VXx, Px, Ixx…, it’s a signal, or protocol standard, or sensor hardware interface? I sugget the authors to give more detailed description of the data acquisition system. For instance, Young-05106 wind sensor with impulse output signal is connected to CR3000 datalogger through Px (channel or protocol standard?). 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? Wheather the necessary data quality control is taken? I visited the data sharing website listed in Page 3, line 17 and found that the web is in Chinese, it’s not convinent for non Chinese readers, also I could not found the data download link.

2. In sec 3.1, the authors did a nice job to validate COARE3.0 using the direct eddy convariance 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 trubulent data. The authors can also add a figure to express the ECF data processing flow more clearly. For instance, which algorithms were adopted for coordinatate rotation and WPL compensation?

3. According to the description of in suit 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.

Technical corrections：

1. Page 1, line 24, suggest changing “observed” to “calculated”.
2. Page 1, line 25, suggest changing “product” to “dataset”.
3. Page 1, line 28, delete “an”.
4. Page 2, line 7, change “SHF” and “LHF” to “*SHF*” and “*LHF*”.
5. Page 2, line 12-13, “uncertainties in the measured values of basic observational quantities involved in the calculation of fluxes” this sentence is not clear, suggets change to “uncertainties in the turbulent exchange coefficient were also involved in the fluxes calculations”.
6. Page 2, line 15, change “a flux” to “fluxes”.
7. Page 2, line 16, change “;” to “,”.
8. Page 2, line 27, change “a shore-based air-sea boundary flux tower” to “a shore-based boundary layer air-sea flux tower”.
9. Page 3, line 3, change “SHF” and “LHF” to “*SHF*” and “*LHF*”.

10. Page 3, line 27, suggest changing “The in situ datasets comprise observations from the YXASFT” to “The in situ observations obtained by YXASFT”

11. Page 4, line 12, i suggest changing “parameters” to “variables”.

12. Page 4, line 15, delete “variable”.

13. Page 5, line 7, change “SHF” and “LHF” to “*SHF*” and “*LHF*”.

14. Page 6, line 17,19,20,22, change “LHF” to “*LHF*”.

15. Page 6, line 26, change “SHF” to “*SHF*”.

16. Page 7, line 7, suggest adding “before further application” at the end of the sentence.

17. Page 9, line 19, change “SHF” and “LHF” to “*SHF*” and “*LHF*”.

18. Page 10, line 5, change “^{the}” to “the”.

19. Page 10, line 6, change “or” to “ and”.

20. Page 11, line 9, “estimates of both T_s and *SHF* using OAFlux ” it not clear, suggest changing to “Both T_s and *SHF* in OAFlux”

21. Page 11, line 9-10, suggest removing “, including driving regional ocean models for the SCS” as OAFlux is not just used to drive ocean models.

22. Page 21-28, suggest adjusting the colour of the figures to make it unified.

23. Some parts of the text have repeated descriptions. For instance, in Page 2, line 15 “Thus, the appropriate evaluation of a flux dataset in necessary prior to use them in specified study area”. In Page 7, line 6-7 “It is therefore necessary to evaluate the OAFlux dataset to assess its applicability in the SCS”, these two sentence has almost the same meanning to this paper, no need to repeat in the paper. I suggest the authors to read the article carefully and polish the article to make it more smooth and clear.