RC2: 'Comment on essd-2023-149', Anonymous Referee #2, 02 Aug 2023

This study with a title of "A dataset of energy, water vapor and carbon exchange observations in oasis-desert areas from 2012 to 2021 in a typical endorheic basin" has been seriously reviewed. Overall, this paper is well organized, including written English and structures. Importantly, I believe that this dataset can provide valuable data to explore the water-heat-carbon process and its influence mechanism, calibrate and validate related remote sensing products, simulate energy, water vapor and carbon exchange in oasis and desert areas. Now, I have only several suggestions for this study, and recommended it to be accepted after a minor revision.

Response: Thanks for the constructive comments.

1. In section 3, it is better to show more detailed information about the post-processing of the data, e.g., missing values, and energy imbalance (which method was used for this data).

Response: Thanks for the valuable suggestions. As suggested by the reviewer, we have added a more detailed interpretation in section 3, as follows:

lines 291-295 "The unclosed energy balance of EC system is a universal problem. There was approximately an average of 17% energy imbalance in our study area (Xu et al., 2017; Zhou et al., 2018), which was reasonable compared with previous results (Stoy et al., 2013). The Bowen-ratio correction method is recommended to close the energy balance (Twine et al., 2000; Xu et al., 2020)"

lines 310-314 "There are approximately 10–20% missing or rejected values of EC or scintillometer data. The look-up table (LUT) method is recommended to fill the gaps when data were missing (Xu et al., 2020). The maximum missing values of AWS data were no more than 10%, and linear interpolation method is recommended to fill the missing values."

lines 321-322 "Seven days moving averaged method is recommend to eliminate noise from the daily LAI observations (Qu et al., 2014)."

2. In section 4, how did the authors process the data points with missing values before drawing these figures?

Response: Missing data is inevitable in long-term observations due to instrument malfunction, maintenance and calibration, bad weather, power loss, etc. There are approximately 10–20% missing or rejected values of eddy covariance or scintillometer

data. Relatively few missing data (less than 10%) were found in meteorological observations, and the green chromatic coordinate (GCC) and leaf area index (LAI) data were relative continuous. In this manuscript, we mainly draw the figures using the released data which were not filled the gaps. Generally, figures in section 4 were plotted using the days with less or no missing data.

3. Maybe it is better to show figure 10 using the shaded maps (like Figure 11) for each time of a day. Why figure 10 was drawn with data of typical days rather the whole observation period (e.g., multi-year mean)?

Response: Thank you for the suggestions. The study area of this paper is in oasis-desert areas, and the interactions between oasis and desert will change the observations of wind speed, air temperature and humidity gradient, especially in the afternoon during summer. The air temperature inversion occurred frequently in the afternoon during July and August, and sensible heat flux transferred downward (Liu et al., 2011). The wind directions also changed with the height (Fig. 9 in this manuscript). The data showed in figure 11 is a daily averaged value for a whole year; however, the diurnal variations of wind speed, air temperature and relative humidity profile in a day were plotted in figure 10 intending to show the oasis-desert interaction characteristics. Therefore, the profile picture was used in figure 10. Additionally, we also plotted the multi-years mean values (Fig. R1) and found that it could not capture the changing characteristics of wind speed, air temperature and humidity in oasis-desert areas. Therefore, in order to better reflect the oasis-desert interaction characteristics in oasis-desert area, typical days were selected in this manuscript.
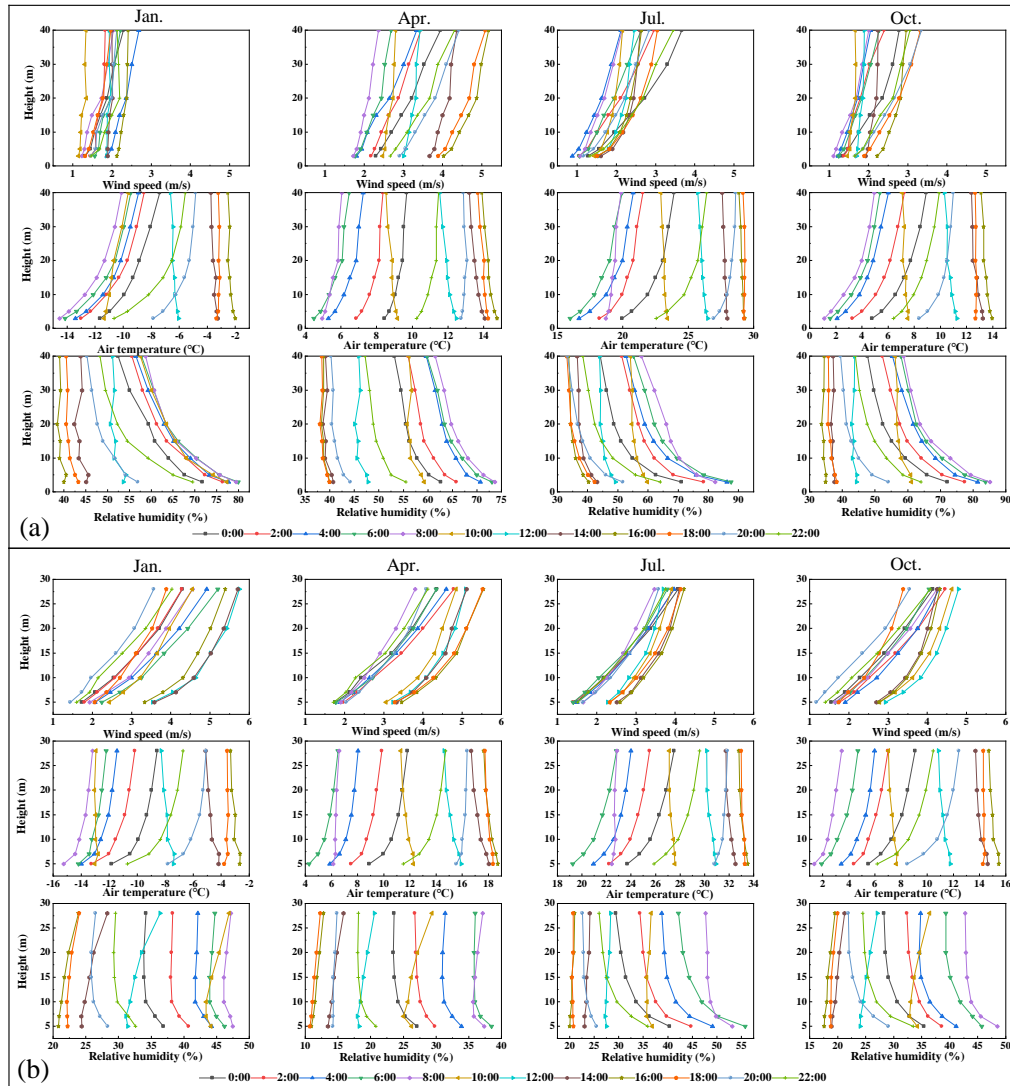
Fig.R1 The profile of wind speed, air temperature and relative humidity in January, April, July and October (2012-2021, a: artificial oasis in middle reaches; b: natural oasis in lower reaches)

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