RC1: <u>Comment on essd-2023-149'</u>, Anonymous Referee #1, 31 Jul 2023

"A dataset of energy, water vapor and carbon exchange observations in oasis-desert areas from 2012 to 2021 in a typical endorheic basin" provides a comprehensive description of hydrometeorological data observations over 2012-2021 in the Heihe River Basin in northern China. This includes descriptions of station locations, instrumentation and set up, data collection, and data summaries. The data network is located in a narrow, focused area, but provides a great contrast between desert and oases environments. This is a high-quality data description paper with a strong justification for an observational network in this region. I have very few comments for minor improvements.

Thanks for the constructive comments.

Lines 157-158: could the authors provide more details about the cryosphere, given the importance for water supply. For example, snow covered season and typical snowpack magnitude.

Response: The upper reaches of Heihe river basin is the water supply to the middle and lower reaches. In the upper reaches, glaciers, snow cover and frozen ground is widely distributed, and snowfall could occur in any season in the high-altitude mountainous regions (elevation >3800 m). In January and February, snowfall events were rare in historical records due to the relatively low moisture in the atmosphere, while spring and autumn (i.e., March to May, October to November) are considered two main snowfall seasons. The typical snow depth is 15-30 cm with a duration of 90-120 days in the snow-covered regions. However, drifting snow is also commonly observed in the region, which may lead to the redistribution of snowpack in high-elevation regions (Che et al., 2019). The observations in the upper reaches of Heihe river basin were described in Che et al. (2019) and observation data were also released.

We have also added related descriptions in the revised manuscript in lines 158-161. "In the upper reaches, glaciers, snow cover and frozen ground is widely distributed and snowfall could occur in any season (elevation >3800 m). The typical snow depth is 15-30 cm with a duration of 90-120 days in the snow-covered regions (Che et al., 2012; Che et al., 2019)."

Line 167: recommend revising to (Table 1; Section 2.2) so that the reader knows where 'superstation' is defined

Response: We have revised accordingly. Please see lines 170-171. "…regions since 2012 with two superstations and eleven ordinary stations (Table 1; Section 2.2), …"

Line 217 and 253: Figures 2 and 3. It would be useful to provide a scale on this map so the reader can estimate distance between stations

Response: These two figures (Fig. 2 and 3) have been revised accordingly.

Lines 315; 216: This is a great flowchart!

Response: Thanks!

Line 373: What is included in 'etc.?' and can that be added to the list rather than referred to as 'etc'

Response: We have revised accordingly. Please see lines 385-386. "…speed and direction, air pressure, precipitation, soil moisture profiles, infrared temperature, and groundwater table in the lower reaches."

Lines 376, 415, 475: subtitles 4.2.1, 4.2.2, and 4.2.3 should be bold

Response: Done.

References:

Che, T., Dai, L.Y., Wang, J., Zhao, K., and Liu, Q: Estimation of snow depth and snow water equivalent distribution using airborne microwave radiometry in the Binggou Watershed, the upper reaches of the Heihe River basin, Int. J. Appl. Earth Obs., 17, 23-32, https://doi.org/10.1016/j.jag.2011.10.014, 2012.

Che, T., Li, X., Liu, S.M., Li, H.Y., Xu, Z.W., Tan, J.L., Zhang, Y., Ren, Z.G., Xiao, L., Deng, J., Jin, R., Ma, M.G., Wang, J., and Yang, X.F.: Integrated hydrometeorological, snow and frozen-ground observations in the alpine region of the Heihe River Basin, China, Earth Syst. Sci. Data, 11, 1483–1499, 2019.