Dear Editor,

We thank the two anonymous reviewers for their invaluable and constructive comments to improve the manuscript. Our point-by-point response to the review comments are listed below as shown in black. Any page and line numbers in our response refer to the revised manuscript.

Anonymous Referee #2

The manuscript provides several analysis regarding the behaviour and main controlling factors of H. LE and CO_2 fluxes using more than 10 years. Despite the very relevant and valuable database, the manuscript does not provide any relevant results beyond the analysis of relationships between variables and a visual and statistical description of the behaviour of flows at different time scales. Additionally, regarding the structure of the manuscript, the results section mainly shows several “numbers” that are not easy to follow and the discussion section does not provide any relevant explanation to the behave of the fluxes or their main factors.

Author’s Response: We have made more in-depth analysis, discussion and relevant explanation, and improved the manuscript according to your comments. It mainly includes the following aspects.

1. We added **the representativeness analysis of the study station**.

Over the southeastern extension of the Tibetan Plateau (TP), that is, the transitional zone between the TP and Yunnan-Guizhou Plateau (YGP), there are many basins distributing in mountain valleys. The cropland is the main land-cover type and most residents live in these basins. Dali flux station, surrounded by open and flat agricultural field, is located in the basin between Diancangshan Mountains (DCM) and Yu’anshan Mountains. Erhai Lake, a highland shallow lake, is also located in here (Fig. 1b). This basin is similar to most basins and a typical representative in mountain environment over the southeastern extension of the TP. Furthermore, according to the footprint model analysis proposed by Kormann and Meixner (2001), it can be found that 95 % of source area contributing to the measured fluxes approximately came from 700 m in the southeast direction and 500 m in the northwest direction of the study site during 2007 to 2018 (Fig. 2). Although several roads, trees, buildings and irrigation channels were located in the source area, the underlying surface of source area was primarily covered by croplands, which satisfied the requirement of eddy covariance measurements, implying that the observed fluxes were reliable and mainly contributed by the croplands. Consequently, the flux measurements at this study site could be representative to the atmosphere-land interaction parameters over the transitional region between the TP and YGP.

2. We enhanced the analysis and discussion on **the diurnal, seasonal, and inter-annual variability in surface energy fluxes**.

It is found that the energy balance components including net radiation, sensible heat, latent heat, and soil heat fluxes all have similar diurnal courses, reaching their maximum values around noon and attaining their minimum values around early evening. Turbulent exchanges of energy fluxes are greatly influenced by the change of vegetation cover around the flux tower after 2014. The magnitudes of annual fluxes present remarkable trends with a large range. It is also found that the amplitude of LE is obviously larger than that of H_s throughout the year, which indicates that the LE plays a dominant role in surface heat exchange. Through comparative analysis, it is suggested that the characteristics of energy exchanges over the Tibetan Plateau, Yunnan-Guizhou Plateau, and their transitional zones are similar in the rainy season but obviously different in the dry season.

3. We enhanced the analysis and discussion on **the diurnal, seasonal, and inter-annual variability in CO_2 flux**.

It is found that the study area acts as a weak carbon source at night because of plant and soil respiration, but acts as a carbon sink during the day thanks to CO_2 uptake from pant photosynthesis significantly exceeding CO_2 release though pant and soil respiration. The study area behaves as a carbon sink in all years. The annual total Fc shows distinct jumps in magnitude, rapidly increasing after 2014 and varying widely from –966.9 to –75.6 g C m^{-2} yr^{-1} with an average value of –522.0 g C m^{-2}. This is possibly because of the change of the underlying surface.

4. We enhanced the discussion and explanation about **the relationships between turbulent fluxes of sensible heat, latent heat, and CO_2 and meteorological factors from half-hourly to yearly timescales**.

It is found that the wind speed is the most important controlling factor for sensible heat flux over all timescales, with their correlation coefficients becoming higher when the timescales becoming longer. It is likely caused by the local circulation existing in the Diancangshan Mountains and Erhai Lake, which may create more turbulent eddies and could promote the vertical exchange of heat, H_2O, and CO_2 between the atmosphere and cropland. The product of WS and VPD is the main environmental variable controlling LE. The effect of WS is not significant as VPD on LE when timescale is below monthly scale, whereas WS plays a decisive role in affecting LE on yearly scale. The relationship between CO_2 flux and meteorological factors are weak on half-hourly scale. The net radiation and soil temperature have the largest effects on Fc from the daily to monthly scales. Similar to sensible and latent heat fluxes, wind speed is most significantly related to total CO_2 flux on yearly scale, which may be because of the climate effect of local circulation. Overall, the turbulent exchanges of energy, H_2O, and CO_2 fluxes are largely influenced by the WS, in particular on the yearly scale. This phenomenon is likely caused by the climate effect of local circulation in the complex terrain region.

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