Reply on CC1
Yan Chen et al.

Author comment on "An all-sky 1°km daily land surface air temperature product over
mainland China for 2003–2019 from MODIS and ancillary data" by Yan Chen et al., Earth
Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2021-31-AC1, 2021

We would like to thank Dr. Fisher for the constructive comment on our manuscript. We have read the article you provided us. In the study conducted by Famiglietti et al. (2018), the near surface air and dew point temperatures were obtained by hypsometrically interpolating the MOD07 Level-2 atmospheric profile product to surface pressure level, and the results were in good agreement with surface measurements from 104 global stations. This is a classical and valuable study, which provides a feasible method for estimating surface air temperature using remotely sensed atmospheric profile products. Estimation of surface air temperature using MODIS atmospheric profiling products is also mentioned on page 3, lines 66-69 in our manuscript:

In principle, the atmospheric profile products from satellite observations include temperature profile of the entire atmosphere, but usually require additional processes to obtain Ta. The Moderate Resolution Imaging Spectroradiometer (MODIS) atmospheric profile product has been used for this purpose (Bisht and Bras, 2010; Borbas and Menzel, 2017; Zhu et al., 2017).

However, in general, there are some limitations to the method of estimating surface air temperature using atmospheric profile products. Since MODIS atmospheric profile product have available values only under clear-sky conditions, the surface air temperature obtained by interpolation is usually also under clear-sky conditions. Moreover, the relatively coarse spatial resolution (5 km) of MODIS atmospheric profile product limits the spatial resolution of the generated surface air temperature.

Thank you very much for letting us know and learn about this study. We decided to quote it into the above part of the manuscript, so that those who are interested in this method can learn about this study.