Supplement of Atmos. Chem. Phys., 23, 743–769, 2023
https://doi.org/10.5194/acp-23-743-2023-supplement

Atmospheric Chemistry and Physics
Open Access
EGU

Supplement of

Diurnal cycles of cloud cover and its vertical distribution over the Tibetan Plateau revealed by satellite observations, reanalysis datasets, and CMIP6 outputs

Yuxin Zhao et al.

Correspondence to: Jiming Li (lijiming@lzu.edu.cn)

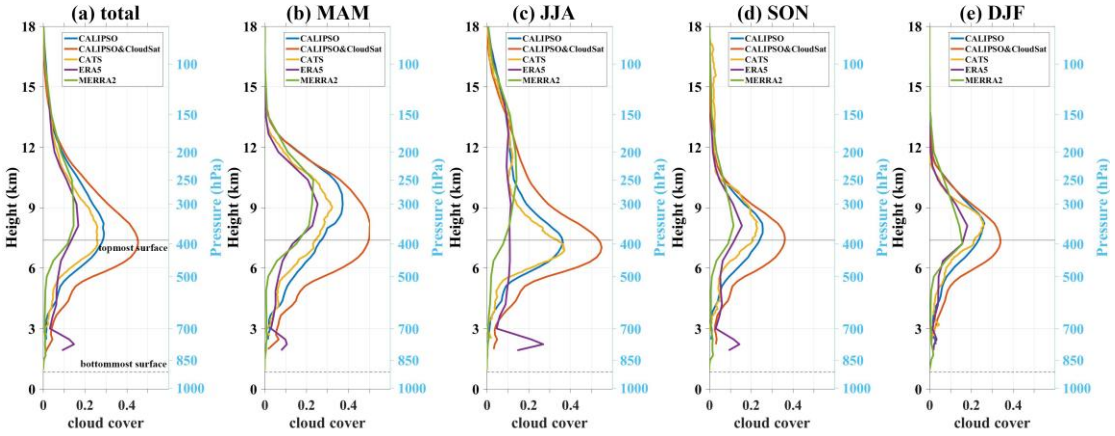

Figure S1: The cloud vertical distribution in different seasons of the TP based on CALIPSO (blue lines), 2B-GEOPROF-lidar (CALIPSO&CloudSat, red lines), CATS (yellow lines), ERA5 (purple lines), MERRA-2 (green lines) at the hour closest to the CloudSat and CALIPSO daytime overpass time. (a) The results of annual average (b) The results of spring (c) The results of summer (d) The results of autumn (e) The results of winter. All seasons here are northern hemisphere seasons. The height here represents the height above the mean sea level. The horizontal solid black lines represent the topmost surface altitude and the dashed black lines represents the bottommost surface altitude obtained in CATS DEM elevation.

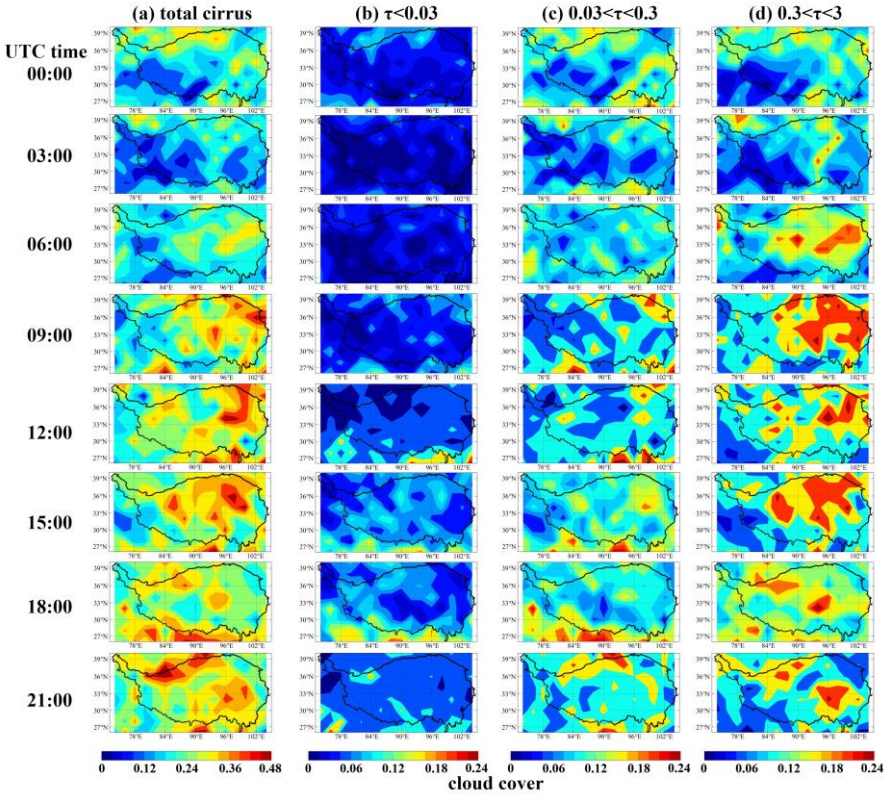

Figure S2: The spatial distribution of 3-hourly cloud cover of cirrus over the TP based on CATS. (a) The cloud cover of all cirrus. (b) The subvisible cirrus (optical thickness less than 0.03). (c) The thin cirrus (optical thickness between 0.03 and 0.3). (d) The opaque cirrus (optical thickness between 0.3 and 3).

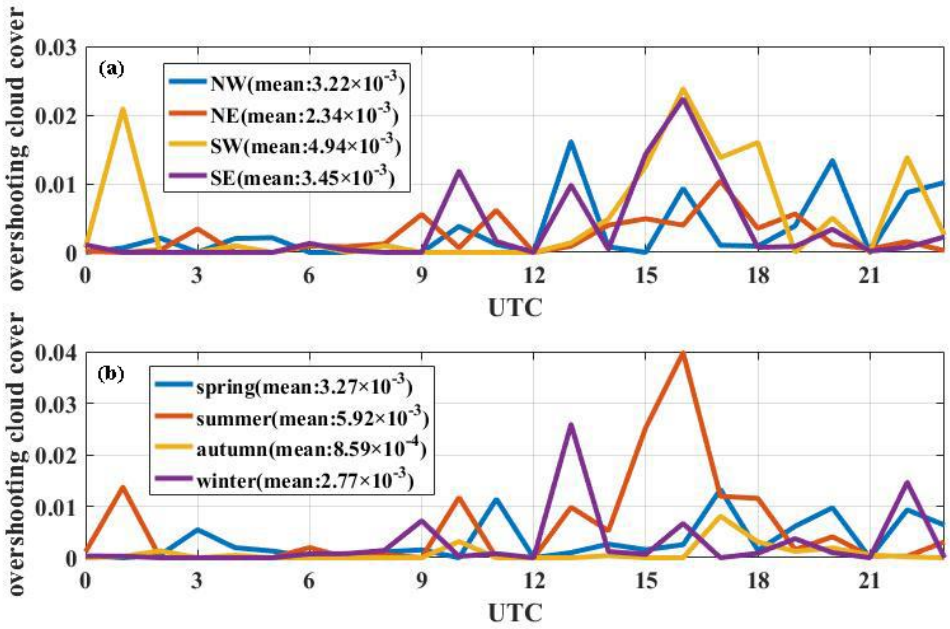

Figure S3: The hourly cloud cover of cirrus shooting over tropopause based on CATS for different subregions (a) and different seasons (b). The regions are divided by latitude and longitude lines of 33°N and 89°E and the boundary of TP (shown in Fig. 1). The average of the whole day of each region and season is indicated in the legend. All seasons here are northern hemisphere seasons.

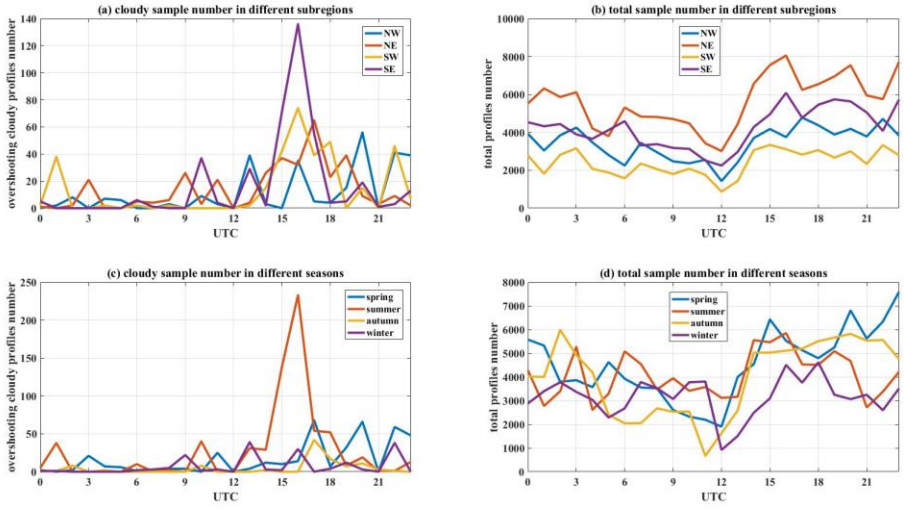

Figure S4: The number of overshooting cloudy profiles (a, c) and total samples (b, d) in different subregions (a, b) and different seasons (c, d).

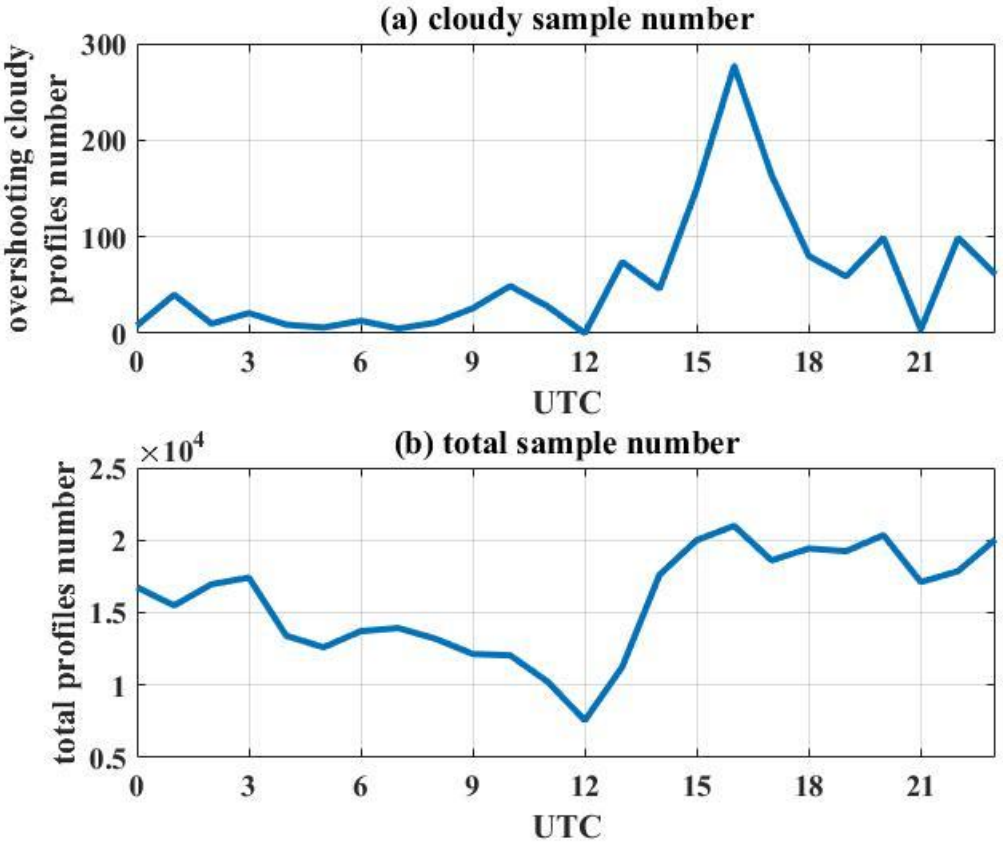

Figure S5: The number of overshooting cloudy profiles (a) and total samples (b) over the TP.

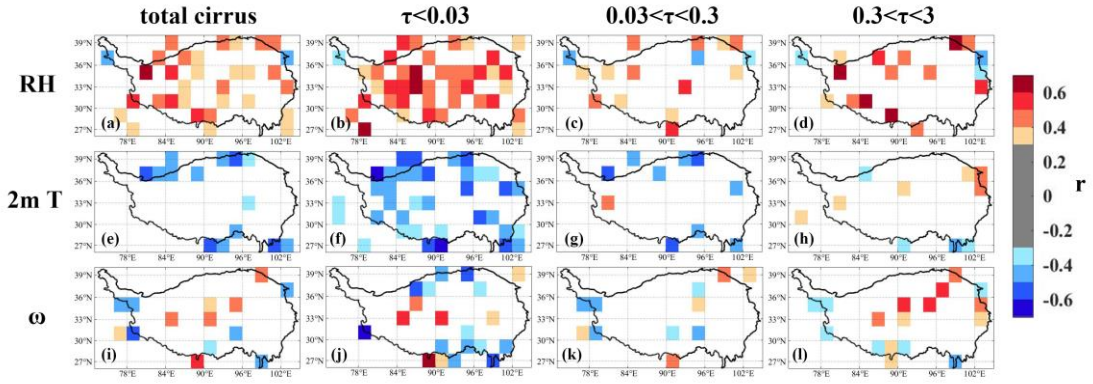

Figure S6: The correlation coefficient between different types of cirrus (first column: all cirrus, second column: the subvisible cirrus (optical thickness less than 0.03), third column: the thin cirrus (optical thickness between 0.03 and 0.3), fourth column: the opaque cirrus (optical thickness between 0.3 and 3)) and 250 hPa relative humidity (%) (first line), 2-m temperature (K) (second line), 250 hPa vertical velocity (Pa/s) (third line) at each 2 degree grid over the TP. The correlation coefficient is shown on the graph only if the correlation passes the significance test by 90%, otherwise it is shown as blank.