Reviewer 2:

Q1. Lines (57-91): A comprehensive comparison between the different studies could benefit this introduction. Is there a patter of what is usually over/underestimated?

Response: In Section 2.3 of this paper, the total cloud cover calculation method, mentioned in lines 125-130, starts from the radiative transfer equation, takes into account the emissivity of the cloud, preserves the spatial resolution of the original observation image, and improves the subimage problem in principle, but the cloud amount computed by satellite will appear to be low when compared with the cloud amount observed by ground observation stations. We supplement this part of the article in lines 130-133.

Another method of calculating total cloud cover is to divide pixels into clear sky pixels and complete cloud cover pixels after cloud detection. For the pixel matrix, the total cloud cover can be expressed as TCC = N_{cld} / N (where, the number of total pixel in the pixel matrix is N, and the number of complete cloud pixel is N_{cld}). The advantage of this method is that it is simple to calculate and similar to the ground-based manual total cloud cover. However, the observed pixel matrix is considered in the calculation, and the subpixel cloud cover is ignored, which may cause overestimation of the cloud cover and decrease the spatial resolution of the data.

Q2. Lines 92-106: The region of interest is already being introduced in 2.1. and you are giving here more detail about the data, than in the actual section. At this point it would be better to outline the paper rather than introducing things in detail.

Response: Thanks for your great advice. We have reorganized this section on the presentation of FY-2 satellite data into section 2.2 Research data. In this part, the significance and outline of the paper are described. The specific modification are in Line 91-100 of the revised article: Xinjiang is a typical arid and semi-arid region, and the shortage of water resources has become a "bottleneck" problem in the development of social economy and ecological construction in Xinjiang. It is a vast and sparsely populated area with extremely low spatial coverage rate of ground-based conventional observation stations, which is more suitable for satellite observation. How to use satellite observations to complement ground-based observation has

become an urgent issue. The accuracy assessment of cloud cover retrieved by satellite is the basis of application and also a challenging task. In this paper, the examination and evaluation of the cloud total amount products of FengYun-2F stationary satellite (FY-2F/CTA) are carried out using ground-based manually observed TCC and considering complex underlying surface (subsurface types, temperature and altitude conditions) and different weather conditions (dust effects and different cloud cover levels) with Xinjiang as the examination region, with a view to providing valuable references for the application and research of FY-2 cloud products.

Q3. Figure 1: text slipped out of image caption.

Response: We apologize for our carelessness. We have change this part into " Overview of the geographic location and topography of Xinjiang with three mountain ranges (Altai Mountains, Tianshan Mountains and Kunlun Mountains) and two basins (Tarim Basin and Junggar Basin). The red dashed polygons indicate the three sub-regions (NX, SX, and Tianshan), Black flags represent the 66 TCC ground observation stations in the Xinjiang region". The specific modification are in Line 111-113 of the revised article.

Q4. Section 2.2: Link should probably be a citation. How is the data collected? What is the satellite instrument? Radiometer?

Response: The FY-2F/CTA products were downloaded from the National Satellite Weather Center Data Service (http://satellite.nsmc.org.cn/portalsite/default.aspx).

FengYun-2F (FY-2F) is the fourth geostationary satellite developed by China independently, which can provide observation data every half an hour, enabling better monitoring of the whole process of cloud formation, development and extinction. This part is introduced in lines 121-123.

Q5. Abbreviations Ac, TCC and CTA: It is unclear whether Ac is derived for satellite or observations since TCC is used to describe the observations and not satellite. So make sure, that your variables are easy to distinct for someone not familiar with your work.

Response: Thanks for your great advice. TCC is the abbreviation of Total Cloud Cover. In the process of quoting the formula, the original formula used A_C to represent the total cloud cover, now we have been unified in the article, modified to TCC to represent the total cloud cover.

The specific changes were made in line 128-129:

$$TCC = (I - I_{clr})/(I - I_{cld})$$

Where TCC is the total cloud cover.

FY-2F/CTA stands for the abbreviation of Cloud total amount products of FengYun-2F stationary satellite, this is the fixed abbreviation for the FY-2 Total Cloud Cover product on the data website of National Satellite Weather Center.

Q6. How many pixels are taken out of Sat data? What's the area you are considering? Does the manual cloud cover extend over the same area?

Response: Thanks for your great advice, another expert raised a similar question. We have added a note about sample size and matching data to the description of each figure. And the research area is Xinjiang, the manual cloud cover extend over the same area with satellite.

In line 209-211: Figure 2. The precision, consistency and error spatial distribution map of FY-2F/CTA products in Xinjiang. Where, From Figures (a) to (i) denote PR, FR, MR, CR, SR, WR, Bias, AE, RMSE respectively. The total number of all valid matches is 80855, among them, 29750 are distributed in NX, 10884 are distributed in Tianshan and 40221 are distributed in SX.

In line 235-237: Figure 4. The precision, consistency and error of FY-2F/CTA products in complicated underlying surface of Xinjiang. In this case, the number of samples is 9196, of which 1650 are distributed in snow and ice underlying, 1596 in desert underlying, 992 in city underlying, 1653 in grassland underlying, 1653 in forest underlying, 1652 in plowland underlying.

In line 253-254: Figure 5. The scatter plot of FY-2F /CTA and ground-based manual TCC observations in Xinjiang. The total number of all valid matches is 264, among

them, 66 in January, 66 in April, 66 in July, and 66 in October.

In line 283-285: Figure 7. The precision, consistency and error of FY-2F/CTA products at different altitudes conditions of Xinjiang. Among them, the number of samples is 37939 for altitude less than 1000 meters, 27080 for altitude between 1000 to 1500 meters, 11232 for altitudes between 1500 to 2000 meters and 4604 for altitudes greater than 2000 meters.

In line 305-306: Figure 8. The precision, consistency and error box plot of FY-2F/CTA products in dust and non-dust effect period of Xinjiang. In this case, the number of samples is 153 in Tazhong and 151 in Qiemo.

In line 336-337: Figure 10. The precision, consistency and error comparison box plot of FY-2F/CTA under different TCC levels in Xinjiang. The number of samples is 24931 for clear sky, 7954 for partly cloudy, 9557 for cloudy, and 38413 for overcast.
In line 244-246: The correlations between FY-2F/CTA and ground-based manual TCC observations are best in July and October, and worst in January, and all of them pass the significance test of 0.01 except for January.

Q7. Figure 2: Fonts too small, cannot see any results.

Response: We modified Figure 2 by enlarging all the points and legends in the figure to make the image clearer, and added the markings (a), (b).....(i) to each figure. We added the description for the figures in Line 209-211,

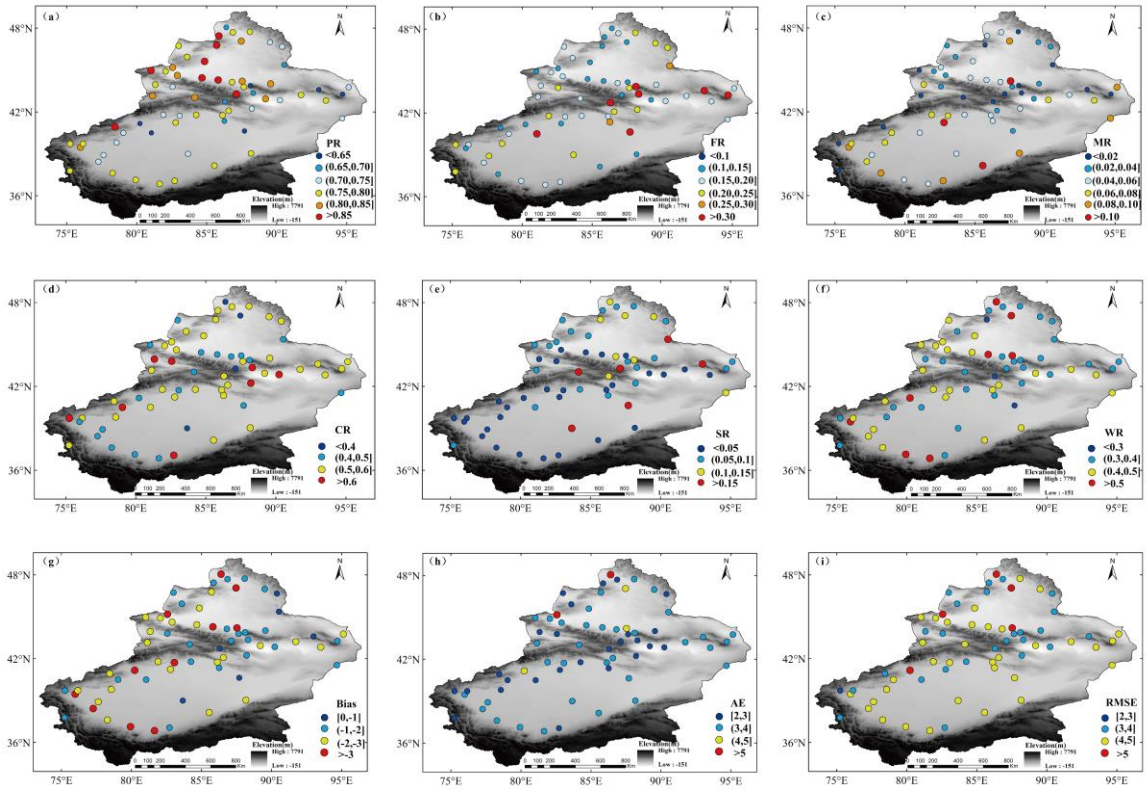

Figure 2. The precision, consistency and error spatial distribution map of FY-2F/CTA products in Xinjiang.

Where, from Figures (a) to (i) denote PR, FR, MR, CR, SR, WR, Bias, AE, RMSE respectively.The total number of all valid matches is 80855, among them, 29750 are distributed in NX, 10884 are distributed in Tianshan and 40221 are distributed in SX.

Q8. Figure 3: Green does not translate well visually. Maybe dark green.

Response: We have adjusted the green line in Figure 3 to dark green.

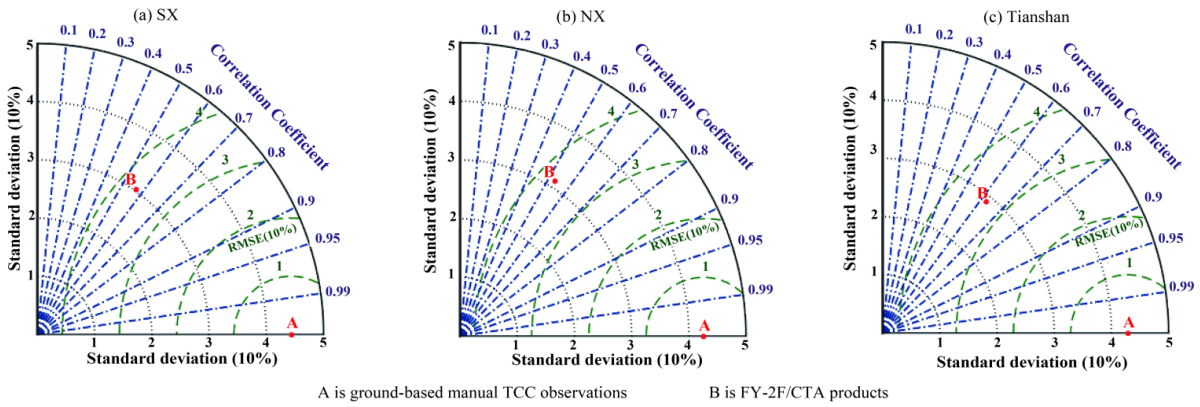

Figure 3. Taylor diagrams between FY-2F/CTA products and ground-based manual TCC observations in different regions of Xinjiang.

Q9. Line 175: What is Figure 2 actually showing?

Response: We added the description for the figures in Line 209-211, the specific content is “Figure 2. The precision, consistency and error spatial distribution map of FY-2F/CTA products in Xinjiang. Where, from Figures (a) to (i) denote PR, FR, MR, CR, SR, WR, Bias, AE, RMSE respectively. The total number of all valid matches is 80855, among them, 29750 are distributed in NX, 10884 are distributed in Tianshan and 40221 are distributed in SX.”

Q10. Line 195: Why is the same as NOAA/AVHRR TCCP? Where are the results for NOAA presented?

Response: The two kinds of satellites use the same calculations, and they have similar observational capabilities. This results are cited in the article of Liu et al. (Liu et al, 2016, 2017).

The specific article is:

Liu, J., Yang, X. F., and Cui, P.: Validation of total cloud amount in 2007 derived by NOAA/AVHRR, Plateau Meteor. (in Chinese), 35(4), 1027–1038, https://doi.org/10.7522/j.issn.1000-0534.2015.00029, 2016.

Liu, J., Cui, P., and Xiao, M.: The bias analysis of FY-2G cloud fraction in summer and winter, J. Appl. Meteor. Sci. (in Chinese), 28(2), 177–188, https://doi.org/10.11898/1001-7313.20170205, 2017.

Q11. Figure 5-10: All too small.

Response: The resolution of all the graphs in this article has been adjusted to 300dpi.

Q12. Most of the figures are too small and the paper still contains many typos and spelling mistakes (capitol E for Earth for example)

Response: We apologize for the language problems in the original manuscript. We have double checked and modified the word spelling.