Reply to the first reviewer.

This manuscript evaluated eleven different parameterization methods in Tibetan Plateau using three ground stations. I don't see any errors as all eleven methods are well-established and have been extensively evaluated otherwise else.
Reply: Thanks.

My questions are as follows.
Lines 115 -117: Zhu et al. (2017) evaluated 13 clear-sky and 10 all-sky DLR models based on hourly DLR measurements at 5 automatic meteorological stations. What are the differences between your work and Zhu's work in 2017?
Reply: Our major point is that clear-sky DLR parameterization may be seriously impacted by clear-sky data samples that are very likely contaminated by cloud residuals if human observations of cloud or hourly DLR measurements are used as the unique criteria in selecting data samples. Our result (Fig 3) clearly showed that clear-sky DLR in the previous studies was very likely overestimated by cloud residuals, which would significantly affect studies that take the clear-sky DLR estimation as their prior requirement, for example, cloud DLR forcing. Moreover, we studied the relationship between cloud base height and DLR that has never been investigated in the TP before. We consider these are our original contributions to our understanding of DLR parameterization in the TP. This research would be not possible if a comprehensive measurement project had not been performed. As one of important parts of a cooperated field campaign, the state-of-the-art pyranometer and pyrgeometer with ventilation and heating system are used to respectively measure downward shortwave and longwave radiation with 1-minute resolution, in addition, Lidar measurements provide much more information about clouds than before. To our best knowledge, installation of radiometers and Lidar side by side has never been performed, furthermore, 1-minute measurements are very rarely reported in the TP. These should be our novel aspects of experimental method, which indeed favors for our DLR parameterization study.

Lines 188 191: Can you use the actual SSA value, for example from any satellite product, instead of one mean value for three station? Surface albedo varies with time. Can you use any satellite product or measure it in situ?
Reply: There are few satellites providing aerosol SSA product except OMI. Given aerosol loading is very low, it is nearly impossible to retrieve precise SSA from satellite, therefore, we used a mean climatic value of SSA in study.
       We did not measure surface albedo in TP and then used surface albedo observation results in same sites and periods from other researchers. Because our observations cover a short period, temporal variation of surface albedo is not likely a key issue in this study.

Reply to the second reviewer.

The manuscript evaluated and locally calibrated 11 clear-sky and 4 cloudy DLR parameterizations using high temporal resolution radiation measurements over TP in summer months. Three methods were combined to discriminate clear sky from clouds, which play an important role in improving the accuracy of parameterizations. The influence of CBH on DLR under overcast conditions was analyzed and a parameterization considering CBH was introduced. The topic is of sufficient interest to the communities of study on solar modelling and climate change. I recommend this paper for publication after revision.

Reply: We greatly appreciate the reviewer's opinions and revised the manuscript according to your valuable comments and suggestion.

Comments:
1. "W•m-2", "Wm-2", and "W/m2" appear in the manuscript and they should be unified.
Reply: We thoroughly revised the manuscript and unified them into "$W \cdot m^{-2}$".

2. Line32: Is the overestimation of clear-sky DLR found in one pervious study or some studies? The statement should be changed to "in one previous study" or "in previous studies".
Reply: Done, thanks.

3. Line 56: If "those remote regions" refer to some particular regions?
Reply: No, we just mean regions without surface observation. We corrected "those" into "some" in manuscript.

4. The abbreviation "T" refers to screen-level temperature in Line 64 and air temperature in Line 295. Different abbreviations should be used.
Reply: Thanks, we corrected this content in manuscript.

5. Line 97: Two predicate verbs appear in one sentence.
Reply: Thanks, we corrected this problem.

6. Line 105: Change "of highly significance" to "of high significance" or "highly significant".
Reply: Thanks, we change it to "of high significance".

7. Line 120: Change "root mean square" to "root mean square error".
Reply: Done, thanks.

8. Line 151: Change "make it having" to "make it have".
Reply: Done, thanks.

9. Line 157: If you want to express "side-by-side"?

Reply: Yes, thanks, we corrected the word into "side-by-side" in manuscript.

10. Line 161: What does "the dataset" refer to?
Reply: "the dataset" means all data we used in this article, we added explanation in the manuscript.

11. Line 187-188: The machine model of Cimel sunphotometer is usually expressed as "CE-318".
Reply: Thanks, we changed "CIE-318" to "CE-318" in manuscript.

12. Line 188-189: Why did the authors adopt the same Angstrom wavelength exponent and Angstrom turbidity in NQ as that in AL? Please confirm the rationality. In addition, the rationality of adopting mean SSA in Lhasa should also be explain.
Reply: NQ and AL have similar altitude (4507 m ASL and 4287 m ASL) and climate (relatively dry) in three sites. Therefore, using Angstrom wavelength exponent and Angstrom turbidity data in AL rather than that in NC is rational.

Considering the extreme low aerosol loading in TP, we simplified the influence of aerosol on DSR_{cal} by using climatic values. Lhasa, which has long-period SSA observation, can provide relatively stable climatic value of SSA in TP. So we decided to use the mean SSA at Lhasa in this study.

Thanks for the suggestion, and we added this content in manuscript.

13. Line 189: Units of latitude and longitude should be added.
Reply: Thanks, we found that we mentioned the latitude, longitude and altitude (with units) of Lhasa in Line 164, so we deleted this content in Line 189.

14. Line 228: Change "an abruptly changes" to "an abrupt changes".
Reply: Done, thanks.

15. Line 262: Change "Previous studies suggests" to "Previous studies suggest".
Reply: Done, thanks.

16. Line 283-285: It is suggested to explain the bad performance of parameterization proposed by Swinbank (1963) and Idso and Jackson (1969).
Reply: We added this content, thanks for suggestion.

17. Line 371: References are needed.
Reply: Done, thanks.

18. Line 388-389: Change "introduce" to "introduction" and "significance" to "significant".
Reply: Done, thanks.