Comments on the manuscript “Analysis on the impact of aerosol optical depth on surface solar radiation in the Shanghai megacity, China” by J. Xu, C. Li, H. Shi, Q. He, and L. Pan

General comments:

This paper discussed the variation of almost 40-years of direct and diffuse surface solar radiation in a megacity in China under clear-sky and all-sky conditions.
The relationship between the surface solar radiation and the aerosol optical depth under clear sky conditions was also investigated. These are important issues that need to be addressed for climate research, especially for the areas under rapid social and economic development such as China. This study is based on solid data and sound research approaches. The role of aerosols on the “dimming” and “brightening” is clearly demonstrated. In my opinion, this paper is acceptable for publication with minor revisions as detailed in the following specific comments and technical corrections.

Specific comments:

1) Page 6, line 11, “... 0.4 um to 14.4 um”.
   Please provide a reference here.
2) Page 8, line 26 & 27
   Rather than less coherent than that of DiSR, the secular variation of DfSR under clear-sky conditions also clearly shows the “brightening”, ”stabilization” and “re-dimming” periods as indicated in Fig. 1, although it is true that there is less coherence for DfSR under all-sky conditions.
3) Page 10, first paragraph.
   The variation of the correlations between AOD and SSR among the four seasons may indicate the differences in aerosol optical properties during different seasons. Since AOD was observed by MODIS, vertical distribution of aerosols at different seasons may also play a significant role. I understand that it would be beyond the scope of this study to investigate the aerosol optical properties and aerosol vertical distributions. However, it is worth to mention here the possible reasons for the differences among the seasons and the authors may address them in a future study.

4) Page 11, line 22
   In Fig. 7, Terra-AOD is lower on Saturday than its weekly average, but not obviously lower.
5) page 11, line 28 and page 12, line 5 & 6
   Figures 7 and 8 show that the weekend effect is to decrease AOD and DfSR, but to increase DiSR. Why are the percentages positive for AOD and DfSR, but negative for DiSR?

Technical Corrections:

1) page 12, line 15
   “Except by” should be “In addition to” or “Besides”
2) page 12, line 18
   “This site is belongs …”, delete “is”
3) Fig. 4
   At the top of this figure, “DiSR vs MODIS AOD (550nm)” should be “DfSR vs MODIS AOD (550nm)”
   At the bottom of this figure, “DfSR vs MODIS AOD (550nm)” should be “DiSR vs MODIS AOD (550nm)”
4) Fig. 5
   Similar to Fig. 4, switch the “DiSR vs MODIS AOD (550nm)” and “DfSR vs MODIS AOD (550nm)”. The Y-axis labels should be switched as well.
5) Fig. 6
   Similar to Fig. 5, switch DiSR and DfSR