General comment:

This manuscript analyzed G6sulfur using CNRM-ESM2-1 to estimate the impact of injected sulfate aerosol on two types of renewable energy: photovoltaic (PV) and concentrated solar power (CSP). It concluded that solar power production potential would decrease under G6sulfur relative to SSP8-8.5 and SSP2-4.5, with CSP efficiency experiencing a greater reduction than PV. This reduction is mainly attributed to the significant reduction in direct solar radiation, which strongly affect the efficiency of CSP, while the increase of diffuse radiation under G6sulfur slightly improves PV efficiency. For both CSP and PV, the cooling effect and reduced cloud coverage under G6sulfur have a positive influence on solar power production. This study is important to fill the gap in understanding how solar radiation modification impacts renewable energy and is a good fit for Earth System Dynamics.

However, there are a few issues that need to be addressed before publication.
1. Please clarify whether you have repeated G6sulfur using CNRM-ESM2-1 with an updated aerosol-light interaction. If so, clearly indicate the difference between the previous G6sulfur simulation and the current one. It might be worth to compare the radiation changes in the two sets of G6sulfur. Also please make those output available.
2. Please explain how the individual forcing of cloudy sky and clear sky was calculated. As far as I know the model output of cloudy sky includes both the effect of aerosol and cloud. How did you separate the surface radiation effect from cloud and aerosol?
3. Correct the supplement figure citations in the manuscript. The color bars in Figure 5 and Figure S11 need to be reversed.

Specific comments:

Line 15: "simulated 1-hour output…are used for the assessment" is not clear what SAI and reference future scenarios are used. It needs to be clarified that SAI is applied under SSP585 to reduce the radiative forcing from SSP585 to SSP245. This is GeoMIP G6sulfur experiment.

Line 18-20: clarify this sentence.

Line 25-27: citation of (de Coninck et al., 2018) right after 'solar geoengineering' confuses readers that this citation is for solar geoengineering, but instead, this is for 1.5 oC temperature target.

Line 51-63: what is the global warming scenario used in this paragraph. I would guess different SSPs have different changes.

Line 86: there are only three different scenarios, not four. SSP2-4.5, SSP5-8.5, G6sulfur

Line 92: "accounts for the aerosol-light interaction". Does this mean diffuse radiation increases after SAI? How about aerosol-light interaction in the troposphere? The G6sulfur output on Earth System Grid from CNRM-ESM2-1 are showing there is less diffuse radiation in G6sulfur

than SSP5-8.5. And the reason is that CNRM-ESM2-1 does not count for the aerosol scattering effect. Since G6sulfur has less cloud coverage than SSP5-8.5, there is less diffuse radiation in G6sulfur. But if the scattering effect is considered, there should be more diffuse radiation in G6sulfur than in SSP5-8.5 (as other models show in G6sulfur). If the authors have re-run G6 simulations, it would be valuable to upload those output on ESG labeled with G6.

Line 106: what is STC?

Equation 1: just to confirm that PV-TP takes direct and diffuse radiation with the same efficiency, since RSDS is used. Does PV panel need to adjust certain setting for better performance under cloudy days?

Equation 3: should c3 be different for direct and diffuse radiation?

Figure S4 and S5 are confusing. Captions of Fig. S4 and S5 are the same. Shouldn't the two panels of figures together be Figure S4?

What is the difference between Figure 2 and Figure S4, S5? They seem like to plot the same variables, but the values are different. Which ones are correct?

Figure 2: PV and CSP are using different scales in the color bars. Please use the same scale for better comparison. The subtitle cannot describe how the values are calculated. It might be better to use '(SAI minus ssp245)/ssp245'? This also applies to other maps later.

Line 205-214: Please be consistent with the format when referring to different panels in one figure. This paragraph used 'Fig. 3a-c', 'Fig.3 d-f', 'Fig. g-I'.

Figure 3: still the subtitle cannot reflect how the values are calculated.

Line 209: please clarify 'cloudy sky' only consider cloud effect on radiation. Also, how was this calculated? The model also output radiation without aerosol effect under SAI?

Line 220: it should be Figure 4a instead of 3a.

Figure 4: How well does CNRM-ESM2-1 simulate dust? Over Sahara region, dust emission and concentration may play an important role.

Figure 4: it seems that PV reduction in winter (DJF in northern hemisphere, JJA in southern hemisphere) is stronger than in summer. What is the reason?

Figure 5: In previous figures, purple was used for negative changes, and green was used for positive. But here the color code is opposite. Please keep it consistent.

Line 322-327: it is important to mention the SAI strategy and climate model used when comparing this study with others.

Line 364: This conclusion cannot draw from Fig. S4, S5, and S13.

Conclusion: It is not necessary to redefine SRM, SAI, PV and CSP.

Code and data availability statement:
The new climate model simulation should be available to public.