

## Response to Report #2:

### Overview:

This study uses the GeoMIP G4 simulations to look at surface temperatures over China. The radiative effects are separated and analyzed singularly, leading to some interesting insight in the partitioning of the causes of the observed changes. The authors also carefully evaluate the models over the area of analysis for the historical period, which is always very commendable. I read the previous reviews, and I appreciate the changes performed by the authors (even if I don't really agree with the original reviews. Yes, exactly like there are studies focused on every region for climate change, any study focusing - and using local expertise - on regional impacts of geoengineering is important in my view). I think the manuscript is overall well written and robust. I have some minor comments below, but believe the manuscript is publishable for ACP.

### Minor Comments:

(1) Line 25: In the text you say that the observed warnings are "weak and insignificant" (line 223). That's not what one would gather from this phrase in the abstract.

**Response:** The "warming" has been changed into "insignificant warming" for clarity (Line 24).

(2) Lines 67-68: The introduction is very clear and well written, but just a minor point: far more recent studies have shown that most of the ozone changes at low latitudes in the stratosphere are driven by dynamical changes in stratospheric circulation rather than heterogeneous chemistry, whereas SAD-induced changes are more dominant at high latitudes. See for instance Tilmes et al. (2022) and Vioni et al. (2021). Eastham et al. (2018) used solar reduction, hence it's not a good example here (see the comparison in Vioni et al. (2021) about solar dimming experiments versus the presence of stratospheric aerosols).

**Response:** As you suggested, the SAI-induced stratospheric ozone depletion is affected by both the heterogeneous chemistry and stratospheric circulation changes. We have rewritten this sentence and added appropriate references in the revision (Lines 65–67).

(3) Line 69: Maybe substitute “The” with “An appropriate SRM geoengineering strategy” just to make clear there can be multiple ones.

**Response:** Text revised (Line 68).

(4) Line 120: “perform” instead of “finish”.

**Response:** Text revised (Line 119).

(5) Lines 327-331: The beginning of this paragraph is just wrong (lines 327-328) and needs some work. Equatorial injections tend to overcool the tropics because most of the aerosols are confined to the tropical stratosphere due to the strong confinement of the BDC. Eventually the aerosols are moved out of the tropical pipe - and allowed to reach higher latitudes. But what Kravitz et al. (2019) showed is that injecting at other latitudes in order to achieve a more comprehensive strategy where tropical overcooling is avoided tends to minimize many of the adverse impacts projected under equatorial injections. So the end of the paragraph is correct and well written, but it needs to be tied in with better wording over the stratospheric circulation.

**Response:** We have rephrased this part and added an appropriate reference in the revision as you suggested (Lines 326–329). Accordingly, the original reference (Kravitz et al., 2019) has been moved to Line 333.