

## Response to anonymous referee #1

*I have reviewed the responses and revision made by the author and find the paper is a better shape to be published. Just two minor points:*

Reply: We thank the reviewer for their positive comments

*Regard to the 1st half of my previous 1st major comments: (iii) increased low-level evaporation of precipitation. It is not very convincing. The 'precipitation' is the non-evaporative part of the water mass flux going toward the grounds, so I do not think an increase in precipitin will lead to surface cooling by itself. The (ii) point of cloud coverage makes more sense to me.*

Reply: Agreed... In light of the fact that we did not output evaporation rate near the surface, we cannot justify this conclusion. Hence, the evaporation of increased precipitation as a potential cause of low-level cooling is not discussed in the manuscript.

*Regard to the 1st point raised by the other reviewer: The reviewer challenged the suitability of comparing the model runs (with the year 2000 emission inventory) with the MODIS AOD observed for the last 20 years or so. The authors may want to check the technical description of CMIP emission data source further. The "2000" emission is not from the year 2000 alone as may have been misperceived. The the emission may actually an averaged estimate about 2000-2005 or 2000-2010, or 1995-2005 average, rather than a single year, because the tabulation of social-economic data is also at 5-10-year basis. Similarly, the prescribed SST is also not from the single year of 2000, but a 20-year average. Therefore, to the author's credit, I see less of a problem in comparing the model simulation with MODIS (especially in the early 2000s as in the revised version). The authors may want to add these discussions as clarification and defense.*

Reply: We clarify the time period used in simulating "year 2000" SSTs on line 175, "The simulations are run with prescribed climatological sea surface temperature and sea ice cover averaged from 1982-2001 (Hurrell et al., 2008)." The following sentence, which describes anthro emissions used, has been modified to read, "The greenhouse gas concentrations and anthropogenic aerosol and precursor gas emissions are prescribed at the level for the year 2000 from the Intergovernmental Panel on Climate Change's 5<sup>th</sup> Assessment Report"