

Initial comments

This paper needs a revision before it can be accepted for publication.

Recommendations for the changes:

- 1) Page 2, line 15. Change "general circulations model" to "general circulation model".
- 2) Page 3, line 3. Change "a course spatial" to "a coarse spatial".
- 3) Page 2, line 19, on "...of the past decades very accurately". I do not think the reanalysis datasets have such a merit. As a matter of fact, many published studies reveal there are discontinuities in reanalysis time series in the context of climate trend detection.
- 4) There are a significant number of published studies comparing long-term changes in cloudiness from different observing systems including weather stations, satellite radiance derived, and NWP output. Those studies were done without using the cloud simulator method but they help understand and solve issues in long-term cloud monitoring. I think the authors should add one paragraph in Introduction discussing this topic. They should cite some papers on that discussion, including:
 - a) Dai et al. (2006): Recent trends in cloudiness over the United States: A tale of monitoring inadequancies. *BAMS*, 87, 597-606.
 - b) Sun et al. (2015): Variability and trends in U.S. cloud cover: ISCCP, PATMOS-x, and CLARA-A1 compared to homogeneity-adjusted weather observations. *J Clim*, 4373- 4389.

Of course, the authors are encouraged in their paper to comment/discuss/quantify what impact would be for those long-term time series comparisons that cloud simulator was not utilized.

- 5) Free et al. (2016): Comparison between total cloud cover in four reanalysis products and cloud measured by visual observations at U.S. weather stations. *J Clim*, 2015-2021. This paper pointed out that the reanalysis products including ERA-Interim underestimate cloud cover and overestimate downward solar radiation. This paper should be cited in the authors work to support their finding.
- 6) A suggestion: Do the author compare their products with PATMOS-x that is virtually derived from the same satellite instruments? it maybe a good idea to include the results from that comparison for discussion.