

Interactive comment on “On the decadal increase in the tropical mean outgoing longwave radiation for the period 1984–2000” by D. Hatzidimitriou et al.

Anonymous Referee #3

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In this paper titled as "On the Decadal Increase in the Tropical Mean Outgoing Longwave Radiation for the period 1984-2000", Dr. Hatzidimitriou et al. calculated the outgoing longwave radiation (OLR) with the FORTH radiative model in the tropical region, based on the ISCCP D2 cloud data and NCEP/NCAR reanalysis atmospheric parameters. Their result shows a smaller OLR increasing trend than that being observed by ERBE data. And with sensitive study, they find the decrease of high-level cloud cover is the primary factor causes the OLR increasing trend from 1984 to 2000.

The topic of this paper is important and the result is meaningful.

Below are some suggestions:

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1. In this paper, the cloud layers are assumed as non-overlapping though in the reality it is far from true. It is difficult to solve this problem, but it will be helpful if the error estimation is given.
2. The humidity data in the NCEP/NCAR reanalysis is rated as "B", which is not as reliable as the "A" class data, for example, the temperature field and wind field. In this paper, the water vapor field from NCEP/NCAR reanalysis rather than the TOVS data achieved in ISCCP is used. Is there any reason for this selection? How much the difference will be if using the TOVS data?
3. In page 2732, first paragraph, there is a question for the sentence, "No significant peak is seen in 1991-92, during the 91/92 El Nino event, probably due to an overall depression of the OLF during that period, caused by the Pinatubo eruption in June 1991, which led to a significant drying of the upper troposphere (see also Soden et al. 2002)." It is well known that drying of the upper troposphere in the tropical region will cause an OLR increase. So if the Pinatubo eruption caused any compensation of the 91/92 El Nino, the direction reason should not be from the drying of the upper troposphere.
4. Non-linear effects of atmospheric parameters on OLR are strong. For example, OLR is much more sensitive to upper troposphere humidity in subsidence region than in convective region. So it is not sufficient to decide which parameter to be included in the sensitive study just based on the average change of the parameters. Maybe it is more convincible if all the parameters used in the OLR calculation are included in the sensitive study.
5. For the high level cloudiness change is the key reason of OLR change, more information will be revealed if a plot of the spatial distribution of the high level cloudiness change can be added.

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