

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

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1. Quantification of the cloud overlap effect on the OLF is a difficult problem, as noted by the referee. However, for example, based on the maximum overlap scheme without conservation of the optical depth, described in Chen et al. (2000), we estimate that the observed trend in the OLF, would be increased by up to $0.2 \text{ W m}^{-2}/\text{decade}$. On the other hand, assuming conservation of the optical depth with maximum overlap, there is an equivalent decrease in the OLF trend.

Chen, T., Y. Zhang, W. B. Rossow, 2000, "Sensitivity of atmospheric radiative heating profiles to variations of cloud layer overlap", J. Clim., 13, pp. 2941-2959

2. The TOVS water vapor datasets available within ISCCP are only given in two layers (1000–680 mbar and 680–310 mbar). Our code requires specific humidity values at

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several levels in order to construct the humidity profile of the atmosphere. Therefore, the TOVS dataset was not suitable to use with the particular code. We have investigated the use of water vapor and temperature data from other reanalysis (GEOS-1, ERA-15). The period covered by these datasets is limited reaching only the year 1993. However, we have calculated the outgoing longwave flux at the top of the atmosphere using these different datasets and have constructed corresponding anomaly timeseries. Although there are small differences, the general traits of the curves are similar.

3. We agree with the referee's comment. The text has been accordingly changed.
4. Anomaly time-series were constructed for all parameters. Sensitivity tests were also conducted for all parameters. However, we only show in the table parameters that showed some significant overall effect on the observed OLF trend.
5. Indeed the spatial distribution of the high cloud anomalies would be important to consider, however, in the current paper we are only concerned with the overall behaviour of the anomaly time-series in the tropics. A more detailed analysis of the spatial characteristics of the observed trends of all parameters is underway and will be the subject of a future paper.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 4, 2727, 2004.

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