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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A permanent aerosol layer at the tropical tropopause layer driven by the intertropical convergence zone" *by* Q. Bourgeois et al.

Anonymous Referee #1

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The Tropical Transition Layer (TTL) is a very sensitive region of the atmosphere that can influence the radiative, chemical and dynamical balance of the stratosphere. Being the "entrance door" for tropospheric air into the global stratosphere, any modifications of its physico-chemical properties can have important repercussions on the global climate. Recent field campaigns monitoring clouds, aerosols and gas species in the TTL indicated the frequent occurrence of new particles formation events in the outflow of mesoscale convective systems. High vertical measurements of backscatter aerosol profiles from the space-borne CALIOP lidar have also shown the presence of an Asian Tropopause Aerosol Layer during the summertime (Vernier et al., GRL, 2011a). The authors here have "build up" their analysis based upon the work of this latest study to

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show that this aerosol layer occurs not only during the summertime, but throughout the year following the latitudinal evolution of the Inter-Tropical Convective Zone (between 5E-105E). They have used the CALIOP level 2 aerosol extinction profile product to analyze this feature. The modeling work presented in this paper seems to corroborate those findings. However, due to the lack of a profound analysis of the CALIOP level 2 product and issues in the classification of aerosols and clouds near the tropopause in the same product, the authors have miss-interpreted a tropopause aerosol layer that was in fact misclassified cirrus clouds or convective overshooting as stratospheric features because located above the tropopause as defined by the GEOS-5 model. Aerosol Layers others than volcanic plumes in the TTL don't seem to appear in the CALIPSO level 2 extinction profiles due to the lack of sensitivity of the detection algorithm at the current maximum averaging, 80 km, used to construct those profiles. I will support this statement by providing evidences of this issue in this review that I have included in the supplement material. Therefore, since the authors have felt to analyze rigorously the CALIPSO level 2 aerosol profile product, a major part of the paper, and that the modeling tentative to reproduce this feature cannot fit on its own, I thus have to reject this paper for publication in ACP.

For a complete review, please read the supplementarity material.

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/12/C147/2012/acpd-12-C147-2012-supplement.pdf

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