

Interactive comment on “Air mass origins influencing TTL chemical composition over West Africa during 2006 summer monsoon” by K. S. Law et al.

Anonymous Referee #2

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General comment:

This paper investigates the origin of air-masses in the West African TTL during the 2006 summer and its relationship with the chemical composition of the TTL. It is mostly based on backtrajectories from a lagrangian model and on aircraft observations from the M55 aircraft recorded during the AMMA summer 2006 campaign. The manuscript is very well-written and structured. This study gives detailed analyses of the transport processes impacting the West African TTL in summer quantifying in particular the relative importance of local convection and of transport from the Asian monsoon. It also provides some interesting clues about the photochemical activity within the lower TTL.

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I therefore recommend the publication of the manuscript with only some very minor corrections listed below.

Minor comments:

- in the abstract and once in the text, CO is mentioned as a short lived species. It may be true relative to CO₂ but CO is a rather long lived species relative to NO and also to O₃.
- Transport from Asia to Africa in the TTL is mostly referred to as “westerly flow” or “westerly transport” throughout the manuscript. I think that transport “primarily from the East” or by the TEJ is easterly or westward. It has to be checked and corrected in the whole manuscript.
- p15498-l12: upper TTL is <100hPa.
- p15506-l16 “. . .influenced primarily by. . .”
- p15507-l28: it is mentioned that “African monsoon is. . .transporting air masses up to at least 360-365 K”. It should be rather “up to a maximum altitude of 360-365”. As mentioned many times in the text and in the conclusion, local convection has its “main influence at 350K”.
- p15511-l6: “. . . the lower TTL is photochemically. . .”
- Fig. 3: caption “crossing 1000-400 hPa” isn't it rather “crossing 400 hPa”?
- Fig 7: why no back trajectories originating below 800 hPa are starting over West Africa? Is there no large scale uplift that could be seen by the model using ECMWF analyses in West Africa ? Or does it mean that the M55 flights did not sample air masses impacted by large scale uplift from West Africa (except on the 11/08 as shown in Fig 9)?.