

Interactive comment on “Observations of ozone production in a dissipating tropical convective cell during TC4” by G. A. Morris et al.

Anonymous Referee #1

Received and published: 4 October 2010

This manuscript presents an interesting study from a unique set of ozone profiles obtained in a convective event in Panama during the TC4 campaign. The amount of ozone produced from lightning generated NO_x is an important source of uncertainty in constraining the tropospheric ozone budget. This paper uses a series of ozone profiles over a period of a couple of hours to produce an estimate of the amount of ozone produced in an individual convective cell. Possible confounding factors are explored to give an estimate of the uncertainty in this result. In addition a number of other approaches for estimating the amount of ozone produced are investigated to validate the estimate for the balloon observations. This is a thorough and well written paper that works hard at keeping the conclusions from the observations within the limits of the available information. This paper is a very worthwhile contribution for publication in ACP.

C8280

However, in determining the extent to which the increase with time observed in the ozone profile in the convective cloud is due to ozone production from lightning produced NO_x the discussion becomes very detailed with a number of scenarios explored. At the end of the discussion four possible alternatives are described as possible explanations for the observed profiles seen in the unique balloon observation. I was left with the rather unsatisfying feeling that this observation did not help nail down what was happening. From the various observations of convective activity extent, lightning NO_x production, modeling the aircraft data, entrainment estimates, etc., I would like to see the authors take a shot at what scenario they think best fits what was observed. Something stronger than “future measurement campaigns and modeling campaigns will be required” (of course) is warranted and needed.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 18953, 2010.

C8281