

Interactive
Comment

Interactive comment on “Lightning-produced NO_x over Brazil during TROCCINOX: Airborne measurements in tropical and subtropical thunderstorms and the importance of mesoscale convective systems” by H. Huntrieser et al.

Anonymous Referee #2

Received and published: 30 March 2007

The paper describes in-situ observations of trace gases in the outflow of thunderstorms over South America. The data presented include in-cloud and cloud-free observations from 4 different case studies, illustrating the different meteorological conditions under which tropical convection can take place. The data is generally of high quality, with the exception of ozone data during cloud penetrations, for which the authors report high values, that they believe to be artificial. The discussion of the meteorological context of the various convective systems is very detailed including soundings, aircraft observations, satellite images and Lagrangian modelling. In general the paper provides

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a wealth of data, is well written and should be published after some minor modifications:

General points:

As an experimentalist I would prefer a more detailed discussion of the ozone measurements in clouds to get a clearer view of the potential reason for the artificial enhancements. E.g. is the ozone enhancement correlated with NO (lightning source) or CO (boundary layer transport)? Is it observed only in clouds or do you also observe unexpected enhancements outside from clouds? Personally, I believe that the question whether O₃ is produced in lightning strikes is not settled yet and your data could be an important contribution. Along the same lines, I would appreciate to see the ozone data added to Figure 1. I would also prefer to differentiate in this figure between in-cloud and cloud free observations.

On transport modelling: You use backward trajectories to identify the air mass origin in the convective outflow. How reliable are back-trajectory calculations that pass through convection?

Minor points:

Abstract, page 2562, line 18: Please specify whether the cited enhancements are absolute mixing ratios or enhancements above a background.

Section 3.3.2, page 2575, line 5: Is the decrease in the maximum LNO_x mixing ratio from 2 to 1 ppbv deduced from a model forecast, or where does this number stem from?

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 2561, 2007.

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