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Interactive comment on “Tropospheric ozone variations at the Nepal climate observatory – pyramid (Himalayas, 5079 m a.s.l.) and influence of stratospheric intrusion events” by P. Cristofanelli et al.

Anonymous Referee #3

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Review of the paper entitled “Tropospheric ozone variations at the Nepal climate observatory – pyramid (Himalayas, 5079ma.s.l.) and influence of stratospheric intrusion events” by P. Cristofanelli et al.

The paper presents two year measurements of surface ozone at a high elevated Observatory (NCO-P, 5km) at S. Himalaya and an attempt to qualitatively describe the role of Stratosphere-to-Troposphere Exchange and quantify its contribution on ozone background. The location of the measurements site is unique and by only this the acquired data set is of great significance. There seem to be two more papers referenced in this

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manuscript (Cristofanelli et al., 2009; 2010-companion) that deal with the entire or part of the same data set and again with the role of stratospheric intrusions. Towards acceptance of this paper there should be clear explanation on the difference between the three papers and thus the need for publishing this work separately. Overall, I suggest that this work merits publication in ACP after some issues are taken into account and are accordingly corrected.

1) The abstract is much too long. Parts of it easily fit to the introduction and the methodology sections. I would suggest removing those parts and stick to major results from this work. The role of ozone as GHG and its radiative forcing is not covered in this work, so there is no place for this in the abstract rather than a short discussion in the introduction.

2) In section 3, there is an interesting discussion on the diurnal patterns and their amplitude during the different seasons. I would like to stress out that in most cases, unless such constant conditions are met at the particular site, the amplitude of the mean diurnal cycle is much smaller than the amplitude one can find during each individual day. This is because the average cycle actually smoothes away the particular characteristics of each day cycle. The correct way to refer to mean amplitudes is to calculate the amplitude for each day and then extract the average and the respective statistics. The amplitudes provided cannot entirely correspond to the processes behind in case of future comparison with any modeling studies.

3) Section 4.1: The way the criteria are presented is not very clear and somewhat gives the impression that since the first set of criteria resulted to a limited number of cases, then an additional set was put into force to increase this number. Moreover, the second set of criteria includes parameters (e.g. AP, PV, TOC) already included in the first set. Do the second set criteria (i-iv) have to apply simultaneously, or they are independent from each other? A RH of 60% is too high, even though it can be found during specific SI cases, it cannot be considered as typical criterion. Overall, this section needs to be reorganized so that one integrated and well justified set of criteria is given. Additional

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discussion on the sensitivity of the results on each criterion and the robustness of the results would certainly help.

4) Section 4.2: A two years period is too short to deduce on interannual variability or possible trends. Please change accordingly.

Technical comments:

1) Please use either TOC or TCO for total ozone column, but not a mixture of both.

2) In Fig. 3 you may correct Ago to Aug in the x-axis

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 1483, 2010.

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