

***Interactive comment on “Assessment of atmospheric processes driving ozone variations in the subtropical North Atlantic free troposphere” by E. Cuevas et al.***

**Anonymous Referee #2**

Received and published: 4 January 2013

This paper assesses the processes which determine free tropospheric ozone concentrations in the North Atlantic. This is done by analysing 22 years of ozone data from the high mountain IZO station, combined with trajectory analysis, satellite data and data on other chemical species and aerosols. The paper presents a very comprehensive study of the processes which contribute to the observed ozone concentrations at the IZO station and is generally well written. I would say that it merits publication in ACP after addressing the minor comments detailed below.

Comments:

1. My main comment relates to the use of TOMS TOR data to look at the effect of the

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NAO on ozone, please could you clarify (in the text and the figure 15 caption) which years of TOMS TOR data have been used. In section 2.6.3 you state the data ranges from 1979-2000, whereas in Figure 16 you only plot the NAO index starting in 1988, which is fine since that is when the IZO data starts, but if you have NAO data back to 1979 and have used TOR data from this date then please confirm this. As it stands, comparing what you have plotted in Figure 15 with the NAO index in Figure 16 then you have only 1 year of data for which the  $NAO < -0.5$  (1996), and it is dangerous to draw conclusions based on 1 year of data which could be an anomalous year. The NASA Langley TOR dataset extends up to and including 2005, this data should be included in your analysis and will provide further years for which the criteria  $NAO < -0.5$  is satisfied.

2. Figures 4, 7, 8, 9 and 13 are referred to in the text by figure part (Figure 4a, Figure 4b etc..), the figures themselves should be updated to include these labels as it is unclear which parts of the figures are being referenced, figure 13 it particularly confusing.

3. Figures 5 and 6. Please use a thicker line for the map as it is very difficult to make out.

4. Figure 11. The quality of the plots in the second column of this figure is very bad. The axes lines need to be thicker, and it is almost impossible to see the line for P25th, please use choose a different color to plot this line.

5. Page 28399, line 28 states '(3) transport from North America, is defined much better in this season.' Should read 'Transport from North America is more well defined in this season'

6. Page 28401, line 13, 'A 67% of the hourly ....' Remove the 'A'

7. Page 28410, lines 23-24, 'travelling most of them at levels', should read 'most of them travelling at levels ...'

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Interactive comment on Atmos. Chem. Phys. Discuss., 12, 28385, 2012.