Analysis of an intense O_3 pollution episode in the Atlantic Coast of the Iberian Peninsula using photochemical modeling: characterization of transport pathways and accumulation processes.

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Reply on RC2

We want to thank the referee for his/her dedication, time, and thorough examination of our manuscript. We have followed the suggestions provided to us to enhance the manuscript in accordance with the recommendations.

line 21: heading --> accompanying ?

Thank you for your suggestion, we are modifying it properly.

line 70: I'm not sure what "pathway in the Atlantic axis of the IP" means

We wanted to express the northern region of the Iberian Peninsula in the Atlantic Axis, not in the Mediterranean one. We have rephrased that line with the following (changes highlighted in red):

Valdenebro et al. (2011) proposed the existence of a potential transport pathway for O_3 and pollutants along the Atlantic axis of the Iberian Peninsula, in NAI.

Figure 5: ERA5 surface and 750 hPa winds for August 6 and 7 is not called in the text

Thank you for noticing this detail. We are calling them in the text.

Section 3.1.2: Should point out that there is a greater observed amplitude of the daily cycle of wind speed at both Spanish stations than in the model. But it is interesting that the reverse is true for the stations in Portugal.

We have added the following at the end of the first paragraph:

We have observed a more pronounced diurnal variability in wind speed at both Spanish stations compared to the model, suggestive of the influence of this local breeze phenomena. The intensity difference may affect the extent of the emitted O_3 precursors' dispersion.

line 492: ppm-m is a rather strange unit. How is this calculated? Why not use something more customary for vertical columns, such as molecules per cm2 ? Figures 13 and 16 look like they use this unit also.**

We selected this measurement method because it doesn't encompass the entire ozone column but rather aims to swiftly estimate the 'average' concentration across a specific atmospheric thickness. We focused on an atmospheric with a thickness of 2,500 meters above sea level, where we anticipate the significance of higher atmospheric layers. Observations in Portugal demonstrate the potential mixing of air masses between surface and higher altitudes. Our calculation involved multiplying the simulated ozone concentration of each layer by its thickness. For example, if two layers exhibit an identical concentration of 0.060 parts per million (ppm) and have a thickness of 20 meters each, the integrated ozone for 40 meters above sea level would be obtained by multiplying 0.060x20 + 0.060x20. This unit becomes useful when dividing ppm by the total integrated height, offering a rapid estimation of the 'average' concentration throughout that particular atmospheric thickness. However, it's important to note the uncertainty as the higher layers progressively increase in altitude, and the concentrations of thicker layers might carry more weight in the overall assessment.

line 501: ...O3 concentrations to values exceeding....

Now corrected.

line 605: ...from August 2 to August 7.

"2" was missing, now corrected.