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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Impacts of the solar eclipse of 29 March 2006 on the surface ozone and nitrogen dioxide concentrations at Athens, Greece" *by* C. Tzanis et al.

Anonymous Referee #3

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General Comments This paper presents the effect of a solar eclipse on the concentrations of surface ozone and nitrogen dioxide and on the surface temperature at four sites in Athens, Greece. As the authors note, a solar eclipse is a rare natural phenomenon. The solar radiation is cut off on a short time scale, and the increase/decrease in the atmospheric constituents should provide an important insight into the photochemical equilibrium of the atmosphere. In light of this comment it would make the paper more significant if the ozone and nitrogen dioxide data were presented at a higher temporal resolution. In general the paper lacks focus. The Conclusion consists of a list of the findings, but these findings are not brought together into a cohesive statement of the impact of the eclipse on the atmospheric chemistry.

Specific comments (1) As noted above, the shorter the time resolution, the more important the data becomes. The time resolution of the nitrogen dioxide data is good. Although ground ozone stations report their data at hourly intervals, that data is usually the average of several measurements taken during that hour. If such data exists, it should be used in this paper. (2) No errors for the ground based ozone measurements are given. Only when the errors are presented can the reader ascertain the significance of the shapes in the plotted data. (3) In Figure 5 the nitrogen dioxide data for March 28 is obviously different from that of the March 29 data. It does give some indication of the relative pollution levels for that day. But the fact that the two days have similar meteorology raises the question of why the nitrogen dioxide curves are so different. The authors need to explain the differences. (4) The anti-correlation of the temperature and relative humidity curves shown in figure 6 would indicate that the absolute humidity did not change throughout the day. It is the absolute humidity which is of importance to the photochemistry. Do the water vapor measurements discussed on page 14335, line 12, give additional information? (5) Line 11, page 14336. ‘The above mentioned behavior of SOZ during the solar eclipse may ………..’. If there are other possibilities then they need to be discussed at this point.

Technical

(1) Paragraph beginning on line 11, page 14333. The wording is confusing, and the sentence is too long.

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