

Interactive comment on “Evidence of gravity waves into the atmosphere during the March 2006 total solar eclipse” by C. S. Zerefos et al.

Anonymous Referee #1

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General Comments

The paper presents an interesting and for the most part well-structured analysis of different sources of data in an attempt to document and explain the formation of gravity waves during the March 2006 solar eclipse. The authors formulate the hypothesis that cooling of the stratospheric ozone layer is the source of the gravity waves and then perform an analysis to demonstrate the propagation of the waves downwards into the troposphere and upwards into the ionosphere. The subject is appropriate for publication in ACP, the paper is well written, and the results clearly presented. However, while the ionospheric analysis results are well supported, the tropospheric analysis part appears highly speculative. The paper should be published in ACP after the authors either strengthen the tropospheric analysis part or admit that given the available observations

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the evidence is inconclusive. More detailed explanation of these comments is provided below.

Specific Comments

The authors use surface wind and temperature in their attempt to isolate the characteristics of GWs generated in the stratosphere. As they themselves admit the detection of such a signal is highly unlikely given the complexity of boundary layer processes and the multitude of signals that such processes produce on surface meteorology. The fact that the temperature residuals are extremely small and that no information on the accuracy of the temperature and wind measurements is provided (only a reference to a paper in preparation) makes it hard to obtain any confidence in the presented spectral analysis results. In any case, if the authors want to establish the downward propagation of the stratospheric GWs they could potentially search for some high temporal resolution data that would be a proxy of upper tropospheric activity rather than surface processes. The use of the photolysis rates by themselves does not appear to resolve this issue.

The present paper refers for some parts of the analysis to three papers that are presently in preparation and therefore cannot be accessed by the reader. If the authors insist on publishing the current paper first, they should include more details on the analysis parts currently detailed in the other three papers. This comment refers both to the accuracy of the meteorology measurements mentioned above but also to the method that is used to remove the eclipse and diurnal effects and derive the residuals from the ozone data. This last part is not clearly explained in the paper even though it forms a basic component of the overall analysis.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 7603, 2007.

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