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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The effect of the total solar eclipse of 29 March 2006 on meteorological variables in Greece" *by* D. Founda et al.

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Reply to comments of Dr. S. Eckermann

The authors would like to thank Dr. Stephen Eckermann for his interest to this paper and for his kind comments. We also thank him for his willingness to share his experience on this subject with us and pose several reasonable questions.

1) Q: I was interested in some of the details of the WRF run ... periodic assimilation update cycles?

A: Global Final Analyses are the so called ds083.2 data covering the entire globe every six hours which are operationally prepared by NCEP. The analyses are available on the surface, 26 mandatory (and other pressure) levels from 1000mb to 10mb, boundary and some sigma layers, tropopause and a few others. This dataset is in GRIB format.

More information can be found at http://dss.ucar.edu/datasets/ds083.2/. These fields were used to create initial conditions and update the boundary conditions every six hours.

2) Q: Were all the different domains outlined in Figure 1 ... sponge layer formulation was used?

A: All six domains run with two-way nest option of WRF. We didn't use any sponger layer since the upper level at 100 mbar was considered high enough not to cause any serious problems with reflections taking in mind that the area had a moderate terrain (mostly sea) while for 29th of March (simulation day) good weather was observed in Greece.

3) Q: I was also interested in the way the authors specified time-varying eclipse.... other similar eclipsepath parameter in Figure 1, as an aid to readers.

A: In order to introduce the eclipse path in WRF model, we used data from 'Total Solar Eclipse of 2006 March 29, 29F. Espenak and J. Anderson, NASA/TP-2004-212762, November 2004'. An equation was found associating the exact coordinates of the umbral shadow with time and it was introduced in the radiation subroutine of the model. The umbral shadow has been included in Fig. 1.

4) Q: A particularly interesting finding (Page 10647 L5-9) is the lack of any significant .... related to the wind response to the eclipse on the slopes of mountains found by Vogel et al. (2001)?

A: For the horizontal resolution used for the present simulations, the temperature effect due to the eclipse did not result to significant effects on the wind. Only small effect some hours after the eclipse took place. On the other hand temperature response was immediate, rising up to 4° C in mountainous areas at the time of eclipse maximum.

5) Q: Finally, in Figure 10b, is the temperature response scale saturated (clipped) .... the panel or in the caption. Thanks again for an interesting paper

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A: Yes, the scale was clipped for homogeneity purposes. Maximum response in temperature for Athens domain, was observed in areas with higher altitude while near the sea or large water bodies (e.g. lakes) no significant differences were found, as expected. To be more specific, greater differences in temperature between the eclipse run and the reference case were simulated over mountainous areas rising up to 4 °C while at coastal areas temperature differences remained less than 1.5 °C.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 10631, 2007.