

## ***Interactive comment on “The Total Solar Eclipse of March 2006: overview” by E. Gerasopoulos et al.***

**E. Gerasopoulos et al.**

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We would like to thank the reviewers for their insightful comments that have really helped us improve this final version. Their suggestions have been taken into account and all raised issues are answered one by one. Technical corrections and all other minor comments are also implemented in the manuscript. Below is a point by point answer to the comments:

Response to K. Aplin

1. It was difficult to distinguish amongst the references the papers that are intended for the Special Issue from the general eclipse literature, particularly as some papers discuss the same eclipse but are not part of the Special Issue. Some cited papers are also not listed in the references (e.g. Zerefos et al, 2007) and it is not clear whether this is intentional or not. This could be made clearer if Table 1 was organised by the experiments carried out, to drive it by science rather than administrative entities.

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References to the Special Issue papers arising could then be included. Clearly some iteration will be needed as the specific papers go through the review process, but this would better define the role of the overview paper.

Combining this comment with comment 1b from reviewer #1 we have added Table 3 supplementary to Fig. 9, in which science objectives were linked to the component papers in the special issue.

2. The abstract should be modified so that it contains qualitative scientific results rather than just a description of the experiments carried out. What is the single most important scientific finding from the suite of experiments undertaken?

We have rewritten the abstract following the approach suggested by the reviewer. 3. It is not universally accepted that Eddington's experiment proved general relativity see *The Golem* by Collins and Pinch for an alternative discussion.

There has been a rephrase as follows "For instance, an attempt to provide solid evidence of a theory that has changed history was related to an eclipse:" to cover possible different beliefs on whether Eddington's experiment did prove general relativity.

4. Rather than a list of the meetings organised on eclipses, which does not show anything, it would be more interesting to see a list of the scientific applications of eclipses to get a feel for why astronomers are especially interested in them.

Following the reviewer's suggestion we have added the following paragraph and removed all unnecessary parts: "Solar eclipses offered for many years of scientific research the only opportunity to observe and study the solar corona. Sophisticated methods were used from the ground to analyse all parts of the highly structured white-light corona. Coronal absolute intensities and line emissions, including their polarization, were also studied to analyze density and temperature inhomogeneities, velocities and magnetic fields. The space age noted a revolution in the study of the solar corona, which now is mainly supported by many orbiting solar observatories. However, eclipse

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observations from Earth are still of big scientific interest. The biggest benefit comes from co-ordinating modern ground-based eclipse observations with space measurements. There are still new discoveries to be made from eclipses, by using the latest methods of investigation (very accurate timing, fast rate of measurements, wavelengths not covered from space, new experimental techniques)."

5. Figure 2: is difficult to see because the countries and the isobars are the same thickness. What is the star in the middle? What is the red text at the top?

The isobars lines have been removed to make countries borders easier discriminated. The star was the center of the map domain and has been removed, while the red text shows the pressure at the Low Pressure systems centre.

6. It would be interesting to see a discussion of if and how the synoptic weather conditions were suppressed by the eclipse.

From our observations we have no clear evidence of eclipse impacts on the synoptic weather conditions, as indicated by synoptic weather maps and satellite cloudiness images.

7. Figure 5: The comments made in the technical corrections before publication of the discussion paper still stand. They are repeated here: "The use of a single line for eclipse maximum is misleading as the maximum occurs at a slightly different time at each of the locations used. Also for the KAST station the single line for "maximum" is not appropriate since totality lasts a finite period of time." Also - is it necessary to have a second, identical, y-axis?

The reviewer is correct that the eclipse circumstances occur at slightly different time at each station and this is well presented in Table 2. We have replaced dotted lines with dotted windows to represent the above differences, however the resolution of the image and its role in the discussion does not make it necessary to go into deeper details e.g. the duration of totality at Kastelorizo. We retain the second y-axis to make

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comparisons between pre- and post- eclipse total ozone levels easier.

8. Figure 6 would be more useful if it were modified to show the region studied (like Figure 3).

Changes in total ozone are observed on a synoptic scale and thus we believe that the hemispheric view in Fig. 6 is appropriate to see the changes over Europe.

9. The Dst and Ae indices should be explained, as not everyone with a general interest in eclipses will have heard of them.

The Dst index monitors geomagnetic field perturbations near the equator and it is used as an indicator of the geomagnetic activity level in terms of geomagnetic storm occurrence. The AE index monitors geomagnetic field perturbations in the auroral zone. It is indicative of the auroral electrojets' intensity, which are activated during magnetospheric substorm events. A short discussion on Dst and AE indices is also added in the text.

10. Figure 7 needs to be labelled (a), (b), etc and a legend added to the plot (a) should be rescaled. Are (a) and (b) averages?

Figure 7 has been modified accordingly. Hourly values of both indices were used in our analysis obtained from World Data Center for Geomagnetism, Kyoto (<http://swdcwww.kugi.kyoto-u.ac.jp/>).

11. Aspects of section 3.4 contained terms that not all readers of ACP will be familiar with. This section should be re-written to be understandable to the average atmospheric chemist or physicist, for example, defining terms such as mesophytic. The last sentence of section 3.4.2 was particularly difficult to understand. We have included definitions to terms not being in common use such as mesophytic.

12. The use of colour is heavily relied upon in the figures and the authors should take special care to make sure they are legible when printed out in black and white (e.g. Fig 4 could have one of the traces as a thicker or dotted line).

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Fig. 4 has been changed accordingly

13. Throughout the paper the authors refer to "last contact", when the astronomical term is "fourth contact"

Changes were made throughout the text.

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 17663, 2007.

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