

Interactive comment on “Impacts of electronically photo-excited NO₂ on air pollution control strategies in the South Coast Air Basin of California” by J. J. Ensberg et al.

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Received and published: 16 December 2009

General comments:

Reviewers indicated that the work presented in this article is insightful in quantifying the potential effects of NO₂ photoexcitation on pollutant formation. However, they identified several shortcomings in the original manuscript that questioned the reliability of some conclusions from the present work. Several comments were repeated among reviewers. In consequence, authors believe that one consolidated document is the best means to address in a concise manner all the questions and comments formulated by the reviewers.

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The main concern raised by most reviewers was that the 1987 emissions were too old to provide relevant information on the impact of the new reactions on emission control strategies. This has been addressed by analyzing ozone and PM isopleths using 2005 emissions. As indicated in the point-by-point response to reviewers, results do not vary qualitatively, although the magnitude of the impacts of NO₂ photoexcitation using updated emissions is smaller than in the case with 1987 emissions.

A second concern was that the paper somewhat implied the validity of the reaction rate proposed by Li et al. was demonstrated by presenting an improvement in overall model performance. Authors agree that this assertion is unfounded and the discussion and conclusions have been corrected and clarified. Additional discussion on model uncertainty has been included as per reviewers' request.

A third concern was related to the chemical mechanism, the implementation of chemical reactions and the discussion on the mechanisms that drive the observed changes in ozone and particulate matter concentrations. Part of the confusion was caused due to the omission of the chemical mechanism description in the original manuscript. The chemical mechanism is now described and referenced, and the discussion on the reactions and mechanisms that cause pollutant concentration changes is revised based on the reviewers' comments.

These main comments and the rest of specific comments have now been addressed, and as a result, the quality and clarity of the paper has been improved substantially. A point-by-point response is included as a supplement to this comment. Individual comments by reviewers are listed in blue, followed by its corresponding response in black.

The authors wish to thank all the comments by the reviewers, which contributed to produce a scientifically sound manuscript that merits the interest of the readership of Atmospheric Chemistry and Physics.

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Please also note the supplement to this comment:
<http://www.atmos-chem-phys-discuss.net/9/C8589/2009/acpd-9-C8589-2009-supplement.pdf>

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 18985, 2009.

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