Atmos. Chem. Phys. Discuss., 9, S1190–S1193, 2009
www.atmos-chem-phys-discuss.net/9/S1190/2009/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Exposure-plant response of ambient ozone over the tropical Indian region" *by* S. Roy et al.

A. Jones

ajones165@gmail.com

Received and published: 31 March 2009

The present paper by Roy et al., presents the study related to the distribution of the exposure plant response index over the Indian tropical region. Although this paper addresses one of the important issues of ozone exposure to the vegetation over the Indian region but manuscript need further clarification about following points. Through this short comment I would like to request editor to ask authors to attend to the following points.

In the introduction (p 4143; l 22) authors have missed out references by saying that valid and long term measurement of ozone in India are very small. I agree with the fact that there are no reports of AOT40 over Indian region. But if you have systematic, valid (means published), and long term measurements then deriving AOT 40 is merely math-

ematical formulation. Hence authors are requested to do additional literature review or remove sentence that “Number of measurement sites in India having valid and long term representative measurements of surface ozone is too small”. There are at least following valid (published) long term ozone measurements:

Khemani et al., 1995 at Pune; Debaje et al., 2003 at Tranquebar; Lal et al., 2000 at Ahmedabad ; Naja et al., 2002, 2003 at Mt Abu, Gadanki ; Jain et al., 2005 at Delhi., Srivastav et al., 2001 at Agra; Taneja et al., 2004 at Agra; Pulikesi et al., 2006 at Chennai; Reddy et al., 2008 at Anantpur; Singh et al., 2008 at Darjeeling; Kuniyal et al., at Himalayan region; Chand et al., 2004 and some other. In addition I would requests authors to extract the ozone measurements from few of the literatures and try to derive and compare AOT 40 values with their standards. This will rather strengthen their claims about model study.

Using a REMO-CTM 3-D regional, offline model authors have tried to simulate first the ozone concentration and then derived AOT 40 values over the Indian region as AOT 40 can not directly be simulated by the present model. Authors have tried to validate the model in Roy et al., 2008 JGR paper by comparing model results with observed precipitation and other trace gases obtained from in-situ measurements (only for one observational site) and remote sensing techniques. However, such derivation and comparison for ozone and subsequently for AOT 40 does not make much sense at least for the reasons pointed out by reviewer 1. In view of this authors should try to evaluate their model by comparing with real time AOT 40 data for rural site. As I have already mentioned scores of valid measurements are available over rural part (where most of the crops are harvested) of India, authors can try one of the stated sites. One can not compare oranges with apples just because they are growing in same soil. The comparison with rural site is of additional importance when observational site in the present study is of urban category and while addressing issue of AOT 40.

Again as rightly pointed out by reviewer 1 one month AOT 40 values or time series of AOT 40 values does not make any sense as far as vegetation exposure response of

ACPD

9, S1190–S1193, 2009

ozone is concerned. Before and since I saw present paper I did not see the time series or seasonal description of the AOT 40 values (references are welcome from authors). Instead try to consider showing frequency distribution plot of AOT 40 values.

Specific Comments:

There is something indistinct in figure 1 and figure 2a. A careful look at figure 2a indicates two possibilities 1. Observational data is missing from approximately 75th day (meaning mid of March) till 135th day (meaning mid of May) with few data points around 120th day (meaning end of April). If data is missing for the month of April and possibly for March and May as well, then how come figure 1 shows the observational data? 2. A detailed look at figure 2a for model values (blue line) shows a consistent red background line between 75th and 135th day (if we consider data is not missing) a one-to-one agreement between observed and simulated values is noticed. If it is a case then why there is significant difference in observed and modeled values for the months of March, April, and May in figure 1? May authors can consider using different colors to avoid the confusion.

In figure 2b and 2c authors have shown a time series of daily 8 h average of ozone concentration and daily maximum ozone concentration (averaging time is not mentioned in the caption, but assumed over 1 hr) respectively. I would like to request authors to double check the 8 hr ozone concentration values (or mention for clarity that how 8 h average ozone was calculated) as there is no significant difference in 8 h average and 1 h average values specifically during winter season. On the contrary a significant difference is expected in 1 h and 8 h averaged ozone concentration for this particular observational site. Figure 2b and 2 c: Why model underestimates 8 h and 1 h average ozone during winter and summer and overestimates 8 h and 1 h average ozone during monsoon? This needs to be explained since present model is regional model which is competent of confining the local phenomenon.

As mentioned kindly reconsider figure 3 with one month AOT 40 values (even if they

ACPD

9, S1190–S1193, 2009

are just a representation of model output they do not make any sense) as it does not implicate any significant information.

I would like to suggest authors to cite following references:

Girgzediene and Bycenkiene, Environ Monit Ass, 2007 Tuovien, Environ Pollution, 2000 Tuovien, Environ Pollution, 2002 Fuhrer et al., Environ Pollution, 1997

References : Girgzediene and Bycenkiene, Environ Monit Ass, 2007 Tuovien, Environ Pollution, 2000 Tuovien, Environ Pollution, 2002 Fuhrer et al., Environ Pollution, 1997

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 4141, 2009.