

	Comment	by
i	Suggested Additions:	
1a	An added comparison with the OTAG results using UAM-V would also have been useful, but may have been beyond the scope of the SAMI work	Hidy
1b	Extensive model performance evaluation of acid deposition models was conducted under NAPAP. Comparison of URM1ATM model performance obtained here with model performance obtained with RADM and ADOM would be useful (NAPAP, 1990)	Seigneur
2	Diagnostic testing was not reported in the SAMI work.	Hidy
3	It would be helpful if the referral to Appendix A was followed by a brief synopsis of what the figures there show — e.g., are the conclusions in the example applicable to all sites and at all times, or are there systematic differences by location, time, species, etc.?	Tombach
4	There is a need to translate the modelers' language into a communications to decision maker language in this report. It would be helpful for the authors to add a "so-what" section into the summary that clearly states qualitatively the nature of the results in relation to the SAMI goals, and the nature of limitations and uncertainties in the modeling exercise.	Hidy
5a	The second aspect of the modeling mentioned earlier is a "philosophical question" about interpreting the results of the model within the formal framework of the statistical errors established in the comparison between the modeling and observations. The rms error is generally larger than the response of the model to changes in emissions. This poses an unresolved pedantic dilemma among the scientific community about the interpretation of the results in the light of such uncertainty.	Hidy
5b	It appears that many of the predicted changes are within the stated errors. How does this affect the confidence in and reliability of these sensitivities?	Meagher
5c	The reader needs some guidance as to how much credibility to give the various numbers that elude from the model. If the model says that particulate nitrate concentrations increase by, say, 5% between the base case and 2010, is that value $5\pm1\%$ or $5\pm10\%$? I realize that quantifying the uncertainty in all of the model outputs is impossible in practice, but some sort of expert judgment on those uncertainties should be part of the report's conclusions.	Tombach
5d	A paragraph should be added to provide a qualitative discussion of potential uncertainties in the results. For example, one could state that the direction of the response of the model to changes in emissions are less uncertain than the magnitudes of those responses.	Seignuer
ii	Uncertainty due to meteorological inputs:	
1	The authors point out that there are potentially significant uncertainties in the precipitation scavenging and cloud components, and in the estimation of dry deposition. However, these are not discussed extensively other to note that the translation from the meteorological estimates of precipitation to scavenging and chemical deposition involve substantial spatial differences from (sparse) NADP field measurements.	Hidy

2	<p>As examples, implications were analyzed well for the initial and boundary conditions discussion but were lacking when uncertainties in the meteorological model output were presented.</p> <p>I suggest that three additional aspects of meteorological model performance be included in Section 4 – the ability to predict mixing heights, transport winds aloft, and the presence of clouds.</p>	Tombach
iii	Emissions:	
1	Uncertainties associated with input data, including emissions inventories are not dealt with except cursorily in conjunction with ozone estimation.	Hidy
2	three additions I would encourage are (1) discussions of the implications of specific uncertainties on the emissions management conclusions of the study;	Tombach
3	More detail on emission processing	Wheeler
iv	Issues related to model set up:	
1a	The authors do not discuss the uncertainties associated with the boundary conditions aloft. It is assumed that there is a linear decline in concentrations with height to nominal levels in the upper troposphere given by text book estimates. Similarly conditions at the boundaries are provided with a somewhat arbitrary differential between continental conditions to the west and north and marine conditions to the east. The impact of these assumptions is not discussed. The question of the conditions aloft may be of particular concern given current knowledge of diurnal variations of pollutants aloft associated with layering in stable air.	Hidy
1b	The use of linear interpolation for IC/BC from the ground to the top of the free troposphere seems simplistic and, possibly, unrealistic. One would expect ground level concentrations to be representative of the boundary layer and free troposphere values to apply to the whole free troposphere (i.e., above the boundary layer).	Seigneur
2	In connection with the confidence in the use of relative changes, it is perhaps unfortunate that the modeling did not provide for a check on the regional sulfur and nitrogen material balance. This calculation would add confidence to the estimates of change within grid cells, in that all of the sulfur and nitrogen present in the system would be accounted for.	Hidy
3a	In any case, the weakness of nitrate response in precipitation found for reductions in NOx is problematic without examination of the details of the aqueous chemistry in the model.	Hidy
3b	The model response to NO _x emission reduction for nitrate wet deposition was counterintuitive.	Seigneur
4a	The model evidently is estimating much too large of ammonium content in precipitation than observations. This may create a problem in using the model results for ecosystem modeling since the total N deposition is overestimated. The reason for this anomaly is unclear.	Hidy
4b	The gross overprediction of ammonium wet deposition is puzzling. Such a large overprediction is unexpected considering that model performance appears reasonable for particulate ammonium. This issue should be addressed by some	Seigneur

	diagnostic model runs to identify the cause of these ammonium wet deposition overpredictions.	
5	The poor performance of DDM for ammonium and nitrate wet deposition is surprising since particulate ammonium nitrate is expected to contribute little to wet deposition. Testing the DDM implementation for small perturbations is recommended.	Seigneur