Atmos. Chem. Phys. Discuss., 8, S7630–S7631, 2008
www.atmos-chem-phys-discuss.net/8/S7630/2008/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Climate forcing and air quality change due to regional emissions reductions by economic sector" *by* D. Shindell et al.

D. Shindell et al.

Received and published: 29 September 2008

We thank the reviewer for their comments. The reviewer raised the question of why two models were used rather than presenting results from just a single model. The answer is that use of multiple models allows us to characterize the uncertainty due to differences in the way models represent chemistry and physics, at least to some extent. While the last line of the abstract, stating that the broad conclusions appear robust to intermodel differences, implies this rationale, we agree that this was never explicitly stated, and so have added a sentence about this in the Introduction (3rd paragraph of section 1).

The other issue raised by the reviewer is how might the effect of reductions in emis-

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

sions from the agricultural sector compare with those explored here. While we have not performed the simulations required to properly answer that question, it is an interesting issue and worthy of further study. In addition to reductions in ammonia emissions, methane emissions would be affected, as might be NOx and N2O via fertilizer application. While RF from nitrate changes was very small in our experiments (Table 4), the response to large reductions in NH3 emissions would be concomitantly larger. However, our recent study (Bauer et al., ACP, 2007) indicates that RF from nitrate changes are likely to be fairly small in the near future (though again in a study that did not emphasize the agricultural sector), but that as sulfate emissions decrease and nitrate emissions increase, the role of nitrate in surface pollutants is likely to become important. Additionally, given that the balance between ammonium sulfate and ammonium nitrate links sulfate and nitrate chemistry, control of NH3 emissions in areas remote from SO2 emissions may have a large influence on PM2.5 (as discussed in Henze et al., ACPD, 2008). Hence changes in agricultural emissions remote from industrial emissions may be especially important. We plan to continue to study this area, and have added a comment on this topic to the second-to-last paragraph of section 6.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 11609, 2008.

ACPD

8, S7630–S7631, 2008

Interactive Comment