

Interactive comment on “Multi-model mean nitrogen and sulfur deposition from the Atmospheric Chemistry and Climate Model Intercomparison Project (ACCMIP): evaluation historical and projected changes” by J.-F. Lamarque et al.

Anonymous Referee #2

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This manuscript provides an update on atmospheric deposition estimates of nitrogen and sulfur based on a recent model intercomparison exercise. Compared to earlier studies it is based on a relatively limited number of models but uses recently developed emission inventories that provide an historical perspective with time slices for the past and a number of projections for future based on the RCP scenarios. This provides added value compared to earlier estimates of atmospheric deposition of N and S.

C1706

Unfortunately as the authors mention there is an issue with the NH₃ emissions over China (page 6257, line 7 and page 6259, lines 3-4). That would be very useful to provide a clear message on how this problem in the re-gridding of NH₃ emissions over China affects the accuracy of the deposition fields. In this respect in page 6257, line 23, a number is needed for clarity.

While Tables are very informative and figures of good quality, the text of the manuscript is descriptive and rather vague. At several places it is lacking of concrete statements on the accuracy of the simulations. Words like similar performance (line 19 page 6257), minor change (page 6258, line 10), relative increase (line 12), small observed decrease (line 17), ..., not as large as observed (page 6259, line 20), rather well (page 6260, line 4) and several similar statements at other places in the manuscript, would be more informative if quantified.

Specific comments: Units are not uniform. For instance Fig 3 is using ha while in figure 4 m² are used.

Figures 2 explain what are the dotted lines. Correlation statistics could be also provided in the figure.

Figures 5 would be more informative by providing the absolute deposition only for a reference time-slice (for instance 2000) and the other as absolute or percent change from this reference.

Page 6249, line 18 define RCP

line 25: explain why 'novel' : Mention here that it provides past and future simulations in time-slices

page 6250, line 16: in addition to reduced compounds like amines, oxidized compounds like organic nitrates can be part of organic nitrogen.

page 6251, lines 16-18: To increase readability please provide brief information on the range of horizontal and vertical resolution of the models.

C1707

page 6253, line 22: If there is no information available it is not reasonable to assume that S budget in the models is correct !

page 6254, line 2: fields found

page 6256, line 12: set of models

page 6256, line 16: remove 'NO3'

page 6258, line 6: must

line 9: provide range of computed reductions

page 6259, line 23: may be better

page 6261, lines 23-24: were calculated for RCP... These lines requires link to the projected emissions. The authors could discuss deposition/emission ratios for instance.

page 6264, line7: overestimation

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 6247, 2013.