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Interactive comment on “Impacts of climate and emission changes on nitrogen deposition in Europe: a multi-model study” by D. Simpson et al.

Anonymous Referee #2

Received and published: 7 May 2014

General Comments

The impact of climate change and anthropogenic emission scenarios upon future air quality is an important topic for scientists and policy makers. The issue of how reactive nitrogen deposition may change in the future is a subject containing many uncertainties and variables that clearly requires further analysis. This article describes how an ensemble of four chemistry transport models was used to investigate future nitrogen deposition as a result of decreased NO_y emissions, increased NH₃ emissions, and climate change. The article is well-written and well-organised and presents interesting results while highlighting the areas that require further study. I would like to recommend this article for publication in ACP.

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Specific Comments

In Section 2.1, it is stated that the current legislation (CLE) scenario was used for future emissions, but the representative concentration pathway (RCP) 6.0 was used for ship emissions. For further clarity, please explain how the CLE scenario compares to the RCP scenarios.

On page 6670, line 15, the authors state that the future increase in NH₃ emissions have the potential to offset many of the beneficial effects of European NO_y emission reductions. Please clarify that this is expected to be a partial offset.

Technical Comments

page 6664, line 8: “result” → “results”

page 6664, line 21: “which exceed” → “that exceeds”

page 6665, line 7: “are” → “include”

page 6665, line 11: “in future” → “in the future”

page 6665, line 23: “reflects” → “reflect”

page 6666, line 26: “data-sets” → “data sets”

page 6666, line 29: “considered 20 yr time-windows of simulation” → “20 yr time-windows of simulation were considered”

page 6667, line 1: “is” → “was”

page 6668, line 19: “data-bases” → “databases”

page 6668, line 24: “data-base” → “database”

page 6669, line 6: “data-sets” → “data sets”

page 6669, line 18: “forest-fires” → “forest fires”

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page 6669, line 21: “forest-fires” → “forest fires”

page 6669, line 22: “data-set” → “data set”

page 6670, line 3: “in future” → “in the future”

page 6670, line 9: “Northern” → “northern”

page 6670, line 14: “Northern” → “northern”

page 6671, line 12: “the the” → “the”

page 6672, line 23: “with top” → “with a top”

page 6673, line 21: “which” → “that”

page 6674, line 12: “which” → “that”

page 6674, line 26: “is” → “is made up of”

page 6675, line 3: “use” → “uses”

page 6675, line 6: “reach” → “reaches”

page 6675, line 8: “, barren” → “, and barren”

page 6676, line 5: “formations” → “formation”

page 6676, line 21: “tropopause, the” → “tropopause; the”

page 6679, line 1: “Northern” → “northern”

page 6679, line 4: “This Table” → “This table”

page 6680, line 10: “dramtic” → “dramatic”

page 6680, line 16: “NHx” → “NHx deposition”

page 6681, line 26: “increase” → “increases”

page 6682, line 2: “if” → “is”

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page 6682, line 9: “Conclusions” → “conclusions”

page 6686, line 9: “which” → “that”

page 6686, line 18: “which” → “that”

In Table 3, I would recommend deleting “MOD-” before the names of the models. Please also write out “stations” instead of “stns”.

In Table 5, TDEP, WDEP, and DDEP should be defined somewhere. Also, please remove the extra “the” in the note under the table.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 6663, 2014.

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