Dear Editor, Jason,

1. We have expanded the current paragraph on the boundary conditions to the following text:

"In the present model set-up, trends in boundary conditions were not considered. We believe that the impact of using time variant boundary conditions would be most relevant for O_3 levels, which also affect the formation of SIA. Recent studies report increasing European ozone trends for the period up to 1995, with a more level concentration level afterwards (Oltmans et al., 2013; Parish et al., 2012; Wilson et al., 2011; Christoganelli et al., 2015). Hence, it is not sure if significant trends occurred during most of our study period. Introducing an increasing trend in ozone background levels would generally lower atmospheric lifetimes of SO_2 and NO_2 slightly. Consequently, it might cause slightly larger modelled negative trends for these components which would increase the differences with observed trends. Note that there is a practical complications to introduce trends in boundary conditions from a global model system. Hogrefe et al. (2011) showed that the representation of the inter-annual variability of O_3 concentrations was improved when time-variant boundary conditions were used. However, biases in the global simulations significantly affected the O_3 simulations throughout the modelling domain with adverse impact on the simulated O_3 trends. Before global modelling results can be used as boundary conditions these need to be carefully evaluated. Global models still show substantial and consistent quantitative disagreement with measured surface O_3 patterns (Parish et al., 2014)"

We are not in favor to use hind casts that are not well tested. The use of C-IFS as a hind cast has not been evaluated yet. We have performed a one year simulation using the C-IFS boundary conditions and see a very significant degradation of the model performance for that year. Strong biases are introduced in e.g. ozone. Moreover, the response of C-IFS to emission changes has not been evaluated and could be prone to large errors in areas without observations. Hence, using C-IFS could have introduced severe problems. Hence, we rather have no changing boundaries than boundary conditions that are not proven.

We hope this addition satisfies your remark on the boundary conditions. We agree that this is a point that deserves further attention!

2. For the section on Code Availability we have included the following text:

"LOTOS-EUROS is a Dutch consortium model from TNO, KNMI and RIVM. Source code is available upon request and requires permission by the steering group."

3. The figures have been improved following your comments.

Figure 1: Dashed lines of same thickness as emission lines are used.

Figure 2: Axis limits have been changed for T, RH and Precipitation.

Figure 3: Axis limits have been adapted for almost all panels.

Figure 6: Axis limits have been improved. However, we have chosen to use the same axis for all panels of Figure 6 so they can be better compared to each other.

Kind regards, Sabine and Martijn

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