

Interactive comment on “A regional air quality forecasting system over Europe: the MACC-II daily ensemble production” by V. Marécal et al.

Anonymous Referee #1

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General Comments

The MACC-II daily ensemble forecasts are an important product, continually making advances in air quality forecasting for Europe. However, it is unclear to me that this paper provides any additional information or insights beyond what can be found in the 6-monthly reports produced for the MACC project. The purpose of this paper (in comparison to the reports) should be made clearer.

Given that this is labeled a “model experiment” paper, I would like to see a clear presentation and a more in-depth analysis of some scientific questions. This paper presents ensemble output statistics without going into much analysis of the underlying reasons for observed patterns. A deeper analysis would lend weight to the paper.

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I see that this paper is for a special issue, so perhaps the above concerns are less relevant. However, even if the paper is intended to be taken in context with other papers in this issue, a clear statement of purpose of this particular paper is needed.

Specific Comments

Introduction. As mentioned above, make it clear why this paper is needed, given that there are already a series of 6-monthly reports being published.

In the introduction, it would also be nice to add information on how interested users can access the forecasts (I assume they are publicly available).

Section 2.2-2.8. This section takes up a lot of space re-describing individual models that are described elsewhere. It would be far more interesting to read a critical analysis of the differences between the various models based on the experience with the forecasting ensemble to date. For instance, what are the strengths and weaknesses of the different models? Which differences between the models are most decisive in leading to differing model forecasts?

Figures 2 and 3. Can the model forecasts shown in Figure 3 be superimposed on the observations shown in Figure 2, so that the reader can more easily compare models and measurements?

Diurnal patterns in statistical indicators. It is striking in Figures 3, 5, 6, 7 and 8 that there are diurnal patterns associated with the forecast bias and correlation. This is an interesting feature that is not really explored. Why are these diurnal patterns seen? Is it an issue with daytime vs. nighttime boundary layer height? Or something else? I realize the authors might not have a complete answer for this, but it deserves more investigation than it is given here.

Section 3.4. Here there is a discussion of whether indicators for O₃ and PM have gotten better from 2013 to 2014. It would be interesting to see what the trend looks like if you start with an earlier year.

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Figures 7 and 8. Why not have the same y-axis scale for both columns, so the reader can easily compare values year to year?

Figure 9. To complement Figure 9, it would be interesting to see time series of predicted (ENSEMBLE AND AEMET) and observed ozone for a selection of stations. I think such a visualization would provide a better feeling for the differences between model predictions and observations.

Technical Corrections

Line 27, p. 2767. Using ellipses (...) is very informal, I would remove them here.

Line 22, p. 2772. Same comment re ellipses as above.

Line 25, p.2773. The word "comfort" is strange in this context, perhaps the word "improve" would be better.

Figure 10. In the legend, the AEMET model is abbreviated as "MACCH3" and in the caption it is abbreviated as "MACC3." Make it consistent.

Interactive comment on Geosci. Model Dev. Discuss., 8, 2739, 2015.