Dear Editor,

Please find in this letter our answers to the reviewers for the article:
Ozone and aerosols tropospheric concentrations variability analyzed using the ADRIMED measurements and the WRF-CHIMERE models, by L. Menut, S. Mailler, G. Siour, B. Bessagnet, S. Turquety, G. Rea, R. Briant, M. Mallet, J. Sciare, and P. Formenti

The reviewer #3 asked for minor corrections. We made these minor corrections and answered all questions. Our answers are in blue in the text and after each reviewers remark.

1 Anonymous Referee #3

This manuscript presents an analysis of the ozone and aerosol variability over the Mediterranean during summer 2013. The authors have used both modeling tools and observations of a field campaign to carry out this detailed regional analysis. This work could be published in ACP after the following minor corrections:

- It is clearly stated in the abstract and in the conclusion that summer 2013 was not "a highly polluted period compared to typical levels for summer in this area". However, this affirmation is not very well justified in the paper itself, as there is no comparison to climatological averages for ozone or AOD over the Mediterranean basin. The authors should add this kind of information in the paper.
  We asked for a time extension of the submission deadline to properly answer this good question. To quantify the level of pollution observed during 2013 and to compare it to previous years, we used the MACC II project results. This project is extensively described in (Marecal et al., 2015, GMDD) and this reference was added in the manuscript. In this project, the CHIMERE model is used to provide analyzed maps of surface pollutants: for ozone and particulate matter: Optimal interpolation is performed to calculate surface concentrations by hybridation between model and measurements. This enables to have the most realistic as possible surface concentrations maps over Europe. A new section 3, with a Table, is added and shows the counting of surface PM_{10} and O_3 exceedances for urbanized areas in Europe.
- Section 2: I think that the introduction paragraph of this section (lines 115-130) should be shorter, as all these details are given in the following paragraphs.
  Previous reviewers asked for more details, then less details etc. Here we think this is not a problem to have a little synthesis, even if details are given after.
- Section 4.1: the authors are very optimistic about the performance of the model in terms of temperature and precipitation. They should justify it by giving explicit values as they have done in Section 4.2, or adding maps of differences between observations and WRF.
  The goal of the Figure 7 is mainly to show that the main patterns are well reproduced. We think that these maps are sufficiently clear to see that values are close between WRF and E-OBS: the goal is here to show that the most important spatial structures are well reproduced. For the values, they are provided and discussed in section 4.2.
- Section 5.2 and Figures 10-11: The idea developed between line 465 and 478 seems to be a good explanation but I find that it should be better explained. Indeed, the authors should choose a day when for example the ozone concentration is overestimated in Ajaccio and underestimated in Bastia, and show this day in Figure 11 with the same units as in Figure 10. This would be much easier for the reader to understand the problem.
  The explanation is already given line 469: the regional model, with this resolution, is not able to correctly reproduce very thin plumes.
- Section 6.1: Another region where AOD in CHIMERE differs from AOD in MODIS is the east of Sahara (Egypt and northern Sudan). This should be mentioned in the text, and explained (perhaps due to missing emissions as in the eastern side of the Caspian Sea ?).
  Yes, this is a typical problem of this area-limited regional model: There was probably huge emissions out of the domain, advected in our model domain and thus not taken into account. In this case, the monthly boundary conditions are not adaptated to catch such event.

Technical corrections:

- Line 26: aerosolS
  OK done

- Lines 83/84: Brackets should concern only the year.
  OK corrected for the bibliography.
- Line 90: there are uncertainties
  OK changed
- Line 100: the models' performance
  OK corrected
- Line 103: additional information
  OK corrected
- Figure 5: I cannot see the vectors mentioned in the caption.
  Yes, the caption was erroneous and is now corrected.
- Line 325: "and" should be removed.
  OK corrected.
- Line 358: temperature
  OK corrected.
- Figure 8: The vertical scale for temperature could be changed in order to better see the variations in temperature.
  This may be a solution but we prefer to keep the same scale because: (i) we think the data are clearly readable as it, (ii) this enables to see the temperature evolution between the several sites.
- Line 435: Table 6 is based on hourly data.
  Yes, corrected.
- Line 484: A reference should be added.
  In place of a reference (not found in our last bibliography), we propose a new paragraph to answer this question.
- Figure 12 (caption): represents
  Yes, corrected.
- Line 726: sulphate
  Yes, corrected.
- Line 858: from 1st June to 15th July (same correction to do line 873)
  Yes, corrected.