

## ***Interactive comment on “The MACC-II 2007–2008 reanalysis: atmospheric dust evaluation and characterization over Northern Africa and Middle East” by E. Cuevas et al.***

**Anonymous Referee #1**

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There is a general concern whether dust forecasts are sufficiently accurate to be a part of weather prediction operations. By performing a 2-year reanalysis of the MACC model and by its thorough validation against aerosol observations, this study provides very useful detailed insight on the model performances and its effectiveness to predict the atmospheric dust process. The uniqueness of the study is that examines spatial and temporal (seasonal and interannual) variability of dust, specifically over or very close to dust sources. The authors successfully managed to present a complex analysis of large amount of information addressed to the model comparison to different types of dust measurements. The manuscript is well organized, it is also clearly writ-

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ten. Presenting many of the results in Supplement makes easier readers to follow the major text. The following are my comments and suggestions to the authors (page/line comments are referenced to the acpd-14-27797-2014-print.pdf file), to be considered before the article is published: This study covers only two years, although the recent MACC atmospheric composition reanalysis (Inness et al, 2013) covers much longer period. Why 10 year period was not selected? Is this done as an initial work that would be extended later? Or, this is because records of some data (MODIS Dark Target AOD?) were too short? Please, explain in more details and justify. Pg. 27800, line 4. Giannadaki et al 2014 (dust impact on mortality) to be included Pg. 27800, line 11 Include Nickovic et al, 2013 (iron/dust deposition over the ocean) to be included Pg. 27800, line 18. Not only past but current and future climate are/would be affected by direct effects. Also, weather is influenced by dust-radiation feedback (e.g. Peres et al, 2006 to be included, as early evidence) Pg. 27802, line 13. The dust reanalyses made by Barcelona Supercomputer Centre to be mentioned (Perez et al??) Pg. 27804, line 26 Written in the text: “. . .A revision of the dust emission potential. . .” Please explain what kind of revision is made Pg. 27805, line Written in the text: “. . .18 at 06, 09, 12, 15 and 18UTC in the period 2007–2008. . .” Why 0/24UTC is missing? Pg. 27814 line 4. Written in the text: “. . .An important objective of the MACC-II reanalysis evaluation is to examine its ability to reproduce aerosol spatiotemporal variability. . .” The objectives of the study should be also mentioned in the Introduction as well.

Supplement S4, S5: Does it make sense to show a scatter diagrams, in addition to the existing images?

Pg. 27831 line 22. Written in the text: “. . .we only selected those extinction profiles corresponding to  $AE < 0.35$  provided by the Dakar AERONET sunphotometer (located some 80 km from M'Bour). . .” It would be useful to explain somewhere in the beginning of the manuscript why AE thresholds in the study vary from 0.35 to 0.75