Editor's final comments on revised ACPD ms. acp-2014-925 by S. Mailler et al., entitled "On the radiative impact of aerosols on photolysis rates: comparison of simulations and observations in the Lampedusa island during the ChArMEx/ADRIMED campaign"

By François Dulac, November 2015

Thank you for your revision and detailed answers to reviewers. I shall be pleased to accept your ms. for publication in ACP after a few minor revisions and technical corrections as detailed hereafter. In particular, I consider that a number of explanations and details given in your reply letter are worth being presented in the paper.

<u>Minor revisions:</u>

-Abstract, 1st paragraph: line 9-11 should be completed by explanations for the third simulation referenced as O_3+.

-Line 894-896: this explanation does not appear consistent with section 2.1.1 where it is stated that the model produces a good wind module. Please reconsider and include a statement on the left open question of the model overestimation of sea-salts, based on your reply to referee-3's comment on p.7604, l.29.

-Please include in the paper explanations given about refractive indices, considering both your reply to referee-3's comment on page 7893, l.12, and your reply 3 to my comments on the comparison of the model refractive index with AERONET observations; I consider that the associated figures in your reply letter is useful information that should be shown in the paper, possibly as supplementary material. Note that the use of "minimum" in you figure legends is not clear since the bars show ranges of values, not only minima; please rephrase.

-I consider that the figure of the number of MODIS observations given in reply 5 to my comments is useful information and should be shown, possibly as supplementary material.

-I would like to see included in the paper your first sentence about non-sphericity in reply to referee-1's comment on p.7593, l. 15 : "Non-sphericity has not been taken into account […] the possible effect of non-sphericity."

-I would like to see acknowledged in the paper the referee-1's comment on p.7602, l.9 that a significant peak in AOD is missed by the model and that you have no clear interpretation of the reason.

-I recommend including in the manuscript, possibly as supplementary material, the plots on differences in the vertical ozone profile over the Mediterranean and Sahara, as provided in reply to referee-2's comment on section 3.3. Associated comment on the differences in boundary layer height is needed in the paper. Please note a mistake in your figure legend, the right panel being for the Sahara, and not the Mediterranean as stated.

-Please comment in the paper the relatively coarse resolution based on you reply to referee-3's first comment.

-Line 402: please mention the personal communication about the Fast-JX ozone climatology need for update that you report in reply to referee 3.

-Please include in the paper reply to referee-3's comment on p7892, l.3, mentioning the weak influence of boundary conditions on Lampedusa dust content.

Technical corrections:

-line 7: "July 15, 2013" to homogenize the date format.

-line 40: "values […], which range from".

-line 58 : "northeastern coast".

-line 131: for the ChArMEx/ADRIMED campaign you can refer to Mallet et al.: Overview of the Chemistry-Aerosol Mediterranean Experiment/Aerosol Direct Radiative Forcing on the Mediterranean Climate (ChArMEx/ADRIMED) summer 2013 campaign, Atmos. Chem. Phys. Discuss., 15, 19615-19727, doi:10.5194/acpd-15-19615-20, 2015.

-lines 178 and 221: add a space before the unit "km"; km should be squared or repeated.

-line 194: add a space before the unit "km"; "wavelengths of about".

-line 198-199: First figure cited should be Fig. 1; please remove ", which is shown on Fig. 4".

-lines 203-204: rather shift the sign ":" after "Europe".

-lines 204, 205, 226, 227, 231: add a space before unit "K".

-line 223: "expected to be".

-line 226: "on average".

-lines 251 and 256: add spaces before the two unit symbols in "5.3 m s^{-1}".

-line 304: "with a ratio of 2".

-line 333: replace "as provided on" by "from".

-lines 371, 412 and 417: add a space before unit "hPa".

-line 384: add a space before unit "DU".

-line 437: specify "is chosen for the tracer release".

-lines 456 and 960: add a final dot.

-lines 476-477: add a space before unit "km".

-line 490: replace the comma at end of line by a dot.

-line 490, 493 and 495: replace "was" by "were".

-line 545: add a space before unit "nm".

-line 547: "data have been".

-line 559: "low-volume dual-channel".

-line 576: "each ion" (singular) and ". Details" (single space before and upper case first letter).

-lines 652-653: "South-North".

-line 659: "western".

-line 663: remove fist occurrence of "GMT", add a space before the second.

-line 665: specify "is visible over the Mediterranean both".

-line 672-673: capitalize "East", "West" and "South".

-line 685: "consistent".

-line 696: "western Mediterranean.

-line 708: "Saharan" witout an i.

-lines 732 and 746: cite "(Table 3)".

-line 753: You may cite here Ancellet, G., Pelon, J., Totems, J., Chazette, P., Bazureau, A. Sicard, M., Di Iorio, T., Dulac, F., and Mallet M.: Long range transport and mixing of aerosol sources during the 2013 North American biomass burning episode: analysis of multiple lidar observations in the western Mediterranean basin, Atmos. Chem. Phys. Discuss., 15, 32723-32757, doi:10.5194/acpd-15-32323-20, 2015. From this ref., you can specify that this event is due to very-long range transport of forest fire smoke from North America and Saharan dust that came back from the northwestern tropical Atlantic.

-line 787: Based on the above ref. by Ancellet et al., you can specify "missed by the model due to its very long-range origin".

-line 794: "peak value in AOD".

-line 810: replace the coma by ":".

-line 821: specify "aerosol backscatter".

-line 849: replace "45m.a.s.l." by "45 m above sea level".

-lines 851, 852, 935: add a space before unit "m".

-from line 866 on: check in all instances that " μg m^{-3}" has a space before "μg", and also before "m^3".

-line 908: specify "aerosol column load".

-line 936: "North Africa"

-lines 946-947: capitalize "North-West".

-line 954: "(Granier et al., 2004).".

-line 960: add a final dot.

-line 1034: specify "photolytic rates of NO_2".

-line 1039-1040: specify "we selected two non-cloudy days,".

-line 1094: specify "$J(O^1D)$ maxima".

-line 1183: add a space before unit "nm".

-line 1199 and 1514: "superimposed".

-line 1280: "reaching almost"; also dd a space before unit "ppb".

-line 1310: decapitalize "continental".

-lines 1324 and 1344: no italic for "O3+".

-lines 1346-1347: specify "of the ozone column content".

-line 1357: "over".

-line 1361: replace "contrary" by "opposite".

-line 1388: please add " with a spin-up period from June 1,".

-line 1424: remove "locally".

-line 1479: should likely be "60°".

-line 1490: specify " to almost 2 ppb".

-line 1499: specify "the surface ozone".

-lines 1544-1545, 1597-1598, 1640-1641, 1696-1697: remove citation of http web pages.

-lines 1564, 1719, 1741: add doi.

-line 1568 and 1764: check character "âĂŞ"instead of "-" between pages.

-line 1576: remove space in paper number "D02201".

-lines 1629 and 1724: remove double "doi;".

-line 1659: please look for missing pages ("n/a-n/a").

-line 1702: possibly update.

-line 1759: abbreviate "Geosci.".