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Atmospheric Chemistry and Physics Discussions

Interactive comment on "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" *by* G. Ancellet et al.

G. Ancellet et al.

gerard.ancellet@latmos.ipsl.fr

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Answer to Anonymous Referee #1 Received and published: 10 December 2015

The paper is well written. It needs only minor technical corrections. p2. L25-35: Refer to more papers on BB in Europe, adding more geographical areas and more recent papers.

Three other papers: Sciare et al. (2008), Bougiatioti et al. (2013), Edler et al. (2011) are now referenced in the new version to extend the biomass burning (BB) charac-

terization to the Eastern Mediterranean basin and to emphasize the use of chemical characterization of the aerosol to identify BB épisode.

p2. L37, p. 5. L132, etc.: In all manuscript (text, fig, tables) refer ONLY to the well-established lidar ratio [(LR)=alpha(aer)/beta(aer)], and not to BER, as defined in French manuscripts.

We agree. This has been corrected.

p3. In section 2.2, the authors should mention the uncertainties of the parameters retrieved by each instrument (lidar, MODIS etc) and cite the corresponding papers. In addition, how the depolarization ratio is calibrated and retrieved.

We thank the reviewer for this useful comment. We fully agree that references to the uncertainties were sometimes missing, especially for the depolarization ratio. Three sentences have been added in section 2.2 and 3.1 to describe how the depolarization calibration is performed and the related error calculated for airborne and ground based lidar (p. 4 L 105 to 111) and CALIOP (p. 6 L 151-153.). The error bar is given for CALIOP data presented in section 3 and 4 by using the error of the backscatter signal from the CALIOP data products. The error on the airborne and ground based lidar depolarization ratio is also estimated assuming a 20% uncertainty on the calibration by the molecular signal. Therefore the error values on the depolarization ratios are now provided in section 3 and 4 (for example see Table 3 for the ground based lidar, p7 L 184 to 187 for CALIOP and p.19 L 323 for the airborne lidar). A reference for the error on the MODIS AOD daily product is also added on p.5 L 125.

p6. L165: change from "June 17 to June 25" to the correct "17 to 25 June 2013" Also, in all manuscript put the dates in European format "dd mm yyyy" (e.g see p.16, Fig. 9, legend)

done

p.7, legend Fig. 2.: Again, do not duplicate the month when you refer to the same

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month period. The correct wording should be "17 to 25 June 2013"

done

p.9, Fig.4. legend: again, in all legends add the year as well. p.10-Fig.5, p12-Fig. 6, p13-Fig.7., p14-Fig.8. p21-Fig11, p22-Fig.12, : legend: again, in all legends add the year as well

Year is now always mentioned in the figure captions.

p17., L293, replace "J.Pelon and co-workers "by Pelon et al. (to be submitted)".

We kept the initial wording to avoid listing a non-published paper in the reference list. The name of the co-worker may also change.

p24., L383, replace "12% while" by "12%, while".

done

Also, in the References add full information about the forthcoming paper, as follows:"Pelon J., ..., title, Journal (to be submitted)

See answer to the p17., L293 comment.

List of author's changes in the manuscript

See attached pdf to identify in red the modifications of the text.

Although it was not requested by the reviewers, a new table (Table 4) is added in section 4.3 to summarize the aerosol optical properties of the 4 different aerosol types described in the paper.

Fig. 1, 2, 3 and 7 have been updated. Error bars are given for depolarization ratios in Table 3.

Please also note the supplement to this comment:
http://www.atmos-chem-phys-discuss.net/15/C11843/2016/acpd-15-C11843-2016-C11845

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supplement.pdf

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 32323, 2015.

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