Responses to referee #2:

We would like to thank the referee #2 for his/her constructive comments, which significantly contribute to the improvement of the quality of this manuscript. Our replies (in normal text, italic text in red corresponds to new or modified version, italic blue corresponds to the old version) to the comments from referee #2 (**in bold**) are addressed as below:

The article of Baldassarre et al. (2015) presents a case study of emission calculation and smoke modeling for a fire that occurred in Turkey, in the province of Antalya.
Emissions are computed using FRP from a geostationary satellite obtained by two methods, and are compared to the more standard emissions obtained with FRP from MODIS. Then, multiple simulations are performed with the different emissions and results are compared to satellite observations of aerosol (AOT), CO and NH3. The main findings include rather large variations within geostationary FRP retrievals which propagate to significant changes in smoke concentrations both in magnitude and in location. Also, there is evidence that one of the FRP geostationary retrievals outperforms the other and that the optimal one can improve model skill when compared to MODIS FRP based emissions. These results are novel and relevant to the ACP community, thus I recommend publication after the author address my comments.

Main comments
1) Why there such large differences between WF_ABBA and LSA SAF FRP for this fire given that they are obtained from the same satellite sensor? This is a major point of the article and the authors need to make a better job explaining the reasons of the differences. Right now they only describe the methods how the FRPs can be obtained and state that one product uses one method, and the other a combination of both methods, and later this is blamed as the reason of the differences very briefly. However, I think a longer and more in depth explanation on how the different methods create such a big change in FRP for this specific case is needed. Try including also reasons for the differences in temporal variability (Fig. 4a). It seems the LSA SAF performs much better than WF_ABBA when comparing to MODIS FRP, so it would be and advancement if the authors could report what went wrong with the WF_ABBA retrieval so this algorithm could be corrected in the future and also have it as a reference for other algorithms.

We agree that this is a very interesting point that needs further investigation. The reason of this difference observed in this analysis cannot be clearly addressed by this study. Investigating the reasons behind different performances of different fire products is a very challenging task. In fact, both SEVIRI based fire products are generated by very complex algorithms that are effectively unknown to the end users. The algorithms differ in their handling of atmospheric attenuation, calculation of background temperature, adjustments for the point spread function of the sensor, cloud screening, and the oversampling that occurs with SEVIRI pixels. Determining the precise cause of the difference would require an exhaustive comparison of the two algorithms that is beyond the scope of this study. The agreement between MODIS and LSA SAF suggests that the WF_ABBA is performing poorly, particularly considering that the WF_ABBA FRPs consistently appears much to be lower than LSA SAF's. However, LSA SAF's larger number of fire detections outside of the fire perimeter may be lending to the appearance of superior performance. The WF_ABBA detections matched the fire perimeter more closely, indicating it handles the diffraction due to the point spread function more effectively. The apparently low FRP values from the WF_ABBA may reflect and issue with the algorithm, including missed fire pixels that may have been screened out by overly aggressive cloud screening for example, over counting by LSA SAF, or a combination of both. Both algorithms are described in Algorithm Theoretical Basis Documents that are quite long and complex, and determining the reasons for the performance differences is a task for the algorithm teams. This study serves to highlight them.

In page 16 line 21 we assumed, as one of the possible reasons of this difference, the different way the algorithms treat SEVIRI pixel oversampling in case of large biomass burnings where several adjacent pixels can be affected by the same episode.

The following paragraph will be added at the end of section 3.1:

The agreement between MODIS and LSA SAF suggests that the WF_ABBA is performing poorly, particularly considering that the WF_ABBA FRP consistently appears much to be lower than LSA SAF's. However, the WF_ABBA detections matched the fire perimeter more closely, indicating it handles the diffraction due to the point spread function more effectively. The apparently low FRP values from the WF_ABBA may reflect and issue with the algorithm, including missed fire pixels that may have been screened out by overly aggressive cloud screening for example, over-counting by LSA SAF, or a combination of both.

2) An important point of this article is the use of multiple observational datasets. I think there is still some missing observational evidence related to the vertical extent of the plumes. Please check CALIPSO overpasses to see if aerosol plumes were detected in the region for the period of the fire, and if they were, make a comparison along the satellite track.

The only days CALIPSO passes over the area affected by Antalya fire plume are the 3rd and the 4th of August 2008 (Figures 1 and 2), the last two days of the fire activity and also the less intense. Also, during the most intense, in terms of fire activities, of this two days, CALIPSO only passes over a peripheral part of the simulated plume (Fig1a). However, it is still possible to notice high values of Caliop level1 attenuated backscattering 532 nm between 2000 – 3000 meters over the region of the Antalya fire plume observed (Fig1c).

A cross section of the modeled fire plume along the CALIPSO track and coincident with its pass (Fig1b), shows that the highest concentrations of PM2.5 only related to biomass burning emissions (CMAQ FIRE – CMAQ BASE) are located in the model grid cells between 1000 – 2000 meters. The agreement in the vertical extent of the plume between the simulations and the CALIPSO measurements is quite good, especially for the 3th of August. But, unfortunately as the only days CALIPSO passes over the area is at the end of the fire period and over a peripheral part of the plume, we think that there is not much more to say about it. Therefore we will not add this small analysis to the paper.

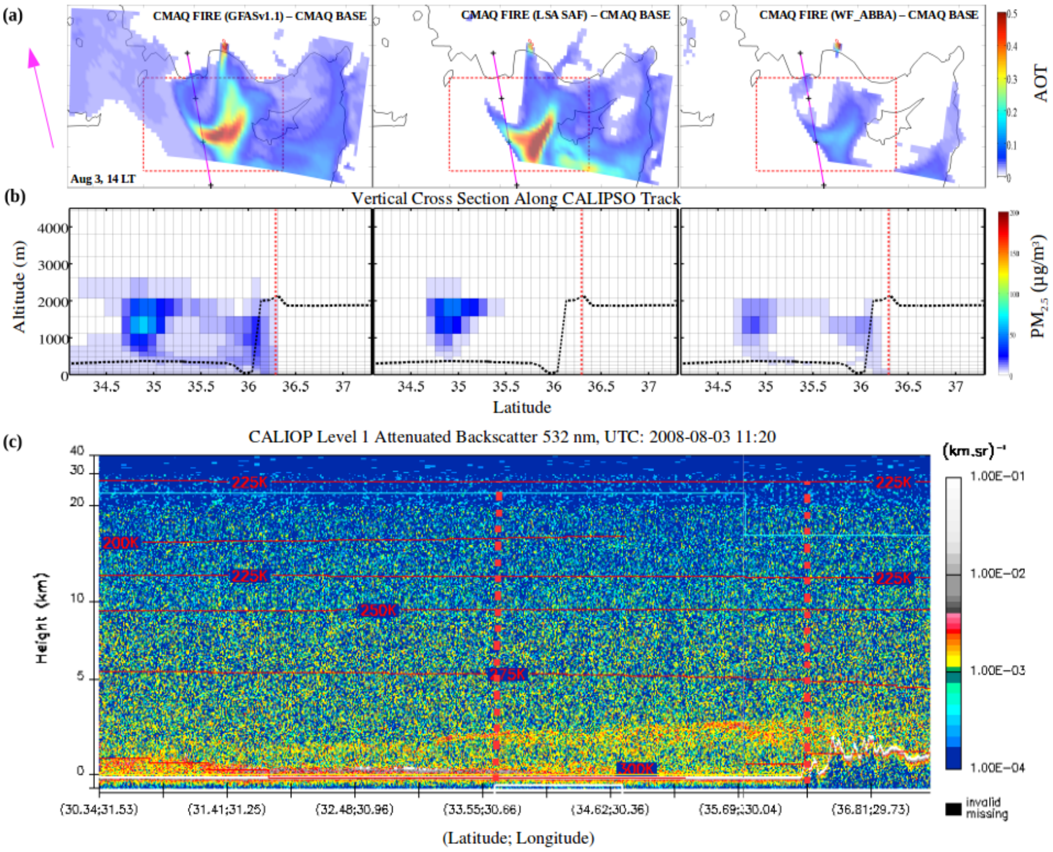

Figure1. 3 August 2008, 14 LT. CMAQ simulated changes in AOT (a) and the vertical distribution of PM2.5 concentration along the CALIPSO track (b), due to fires made by using GFAS1.1, LSA SAF and WF_ABBA based fire emission inventories. The changes in the AOT are calculated by subtracting the background emissions. Black dashed line, in the vertical cross sections, defines the PBL. (c) Coincident CALIOP level 1 Attenuated Backscattering 532 nm.

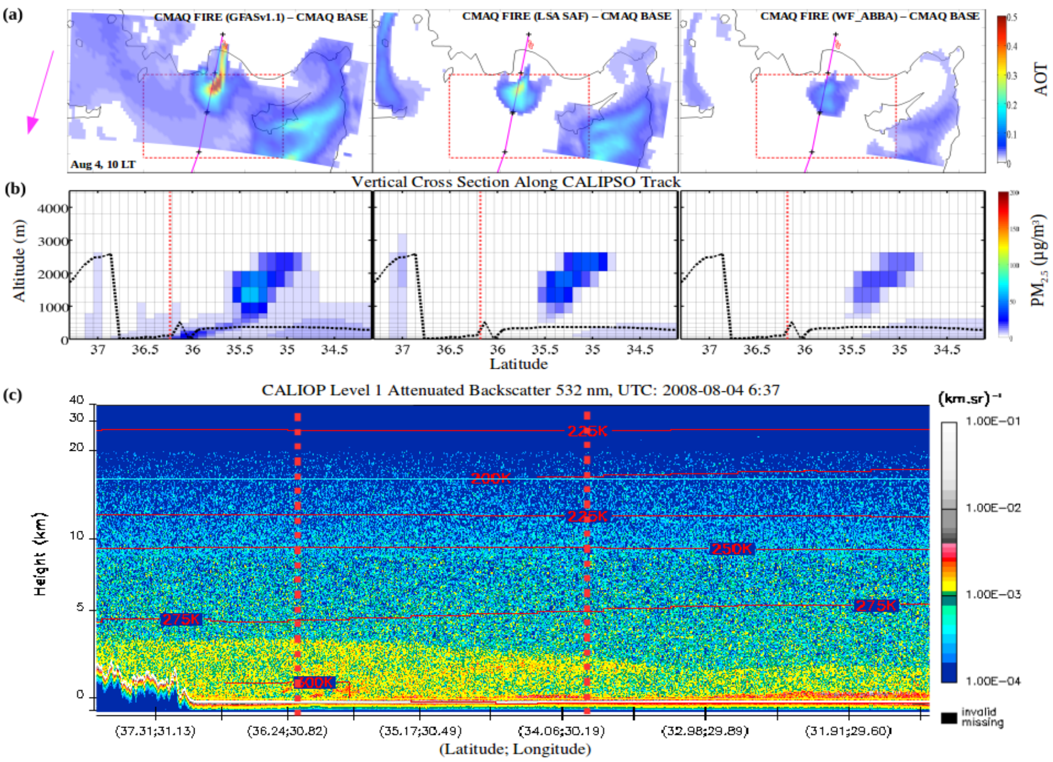

Figure2. 4 August 2008 10 LT. CMAQ simulated changes in AOT (a) and the vertical distribution of PM2.5 concentration along the CALIPSO track (b), due to fires made by using GFAS1.1, LSA SAF and WF_ABBA based fire emission inventories. The changes in the AOT are calculated by subtracting the background emissions. Black dashed line, in the vertical cross sections, defines the PBL. (c) Coincident CALIOP level 1 Attenuated Backscattering 532 nm.

3) The authors should include a more quantitative analysis comparing model and observed AOT in a similar fashion as it was performed for CO and NH3, even if the model completely underestimate AOT. Computing correlations for the whole area and point by point as done for CO could be informative too.

The main reason why there is a big underestimation of the modeled AOT compared to the MODIS products is because we did not boosted the emissions of particulate matters of a factor of 3.4 like announced in section 2.1.2 and like we did in figures 3,4 and 5 and in the tables.
Hence we repeated the CMAQ simulations to be coherent with this requirement. In the next version of the paper we will include a new section 4.2 "Top-down information on AOT" that will contain a quantitative analysis of the simulated and observed AOT, including new Figures, shown also in this document.

The section 4.2 reads as follow (the figure numbers refer to the new version of the manuscript):
Previous studies have found that the bottom-up estimate of aerosols tends to be underestimated due to uncertainties in input parameters for the emissions algorithm by a factor of 3 (Reid et al., 2009, Yang, 2011). In this study we decided to boost the fire aerosol emissions we estimated (WF_ABBA and LSA SAF FRP based one) and we used (GFAS1.0 and GFAS1.1) of a factor of 3.4 as suggested by Kaiser et al., 2012.

For the comparison with MODIS AOD, we selected the MODIS retrieved and simulated AOD data pairs at the same time and at the same location inside a selected area that includes the fire plume originated from Antalya (red dashed box in Fig. 9).
From Fig. 9 we can observe that point by point correlation is generally higher when fire plume is not present in the selected area (the 30th of July and 6th of August, 2008). In fact, if the magnitude or the spatiotemporal distribution of aerosol fire emission is poorly estimated, or, if the transport and dispersion of fire plumes are not well represented in CMAQ, the predicted fire plume at a certain location and time may not agree exactly with the one observed by MODIS. For example, the 1st of August at 15 LT, the largest AOD values associated to the fire plume, according to MODIS-AQUA retrievals, are located in the middle-left bottom part of the selected box, while, the LSA SAF simulation from CMAQ shows larger AOD values in the middle-right upper part of the red box.
If we average MODIS – CMAQ data pairs over the selected red-dashed box, we can have an estimate of the performances of different fire emission inventories in predicting the magnitude of the emitted smoke aerosols. In Fig. 10 we present the temporal series of the average AOT over the Antalya fire plume box, predicted by CMAQ and observed by MODIS from 30th of July to 6th of August 2008, and the corresponding correlations. In Figures 9 and 10 we excluded MODIS observations with large areas of missing values inside the box surrounding the fire plume (the complete temporal series of the MODIS AOT from 30th of July to 6th of August 2008 is described the Figure S3 the supplementary material).
Interestingly the GFAS1.0 simulation shows the largest correlation coefficient (0.72) even if the intensity and shape of the plume is not well represented, while the LSA_SAF simulation shows the closest values in terms of AOT and plume shape, but only a correlation of 0.46. This is mainly due to the observed MODIS AOD on the 4th of August showing large AOT values on the East of Cyprus, which are captured one day in advance by the model simulations, which may indicate a problem in the model to reproduce the plume transport in the last days of the fire. Removing the 4th of August from the temporal series, we observe that the GFAS 1.0 and LSA SAF simulations are the more

highly correlated with the observed MODIS one (Pearson's R coefficient 0.79 and 0.77 respectively). And a better correlation is observed also with the GFAS1.1 and WF_ABBA FRP based emission inventory (Pearson's R coefficient 0.69 and 0.6 respectively).

New Figures for new Sections 4.2 with captions:

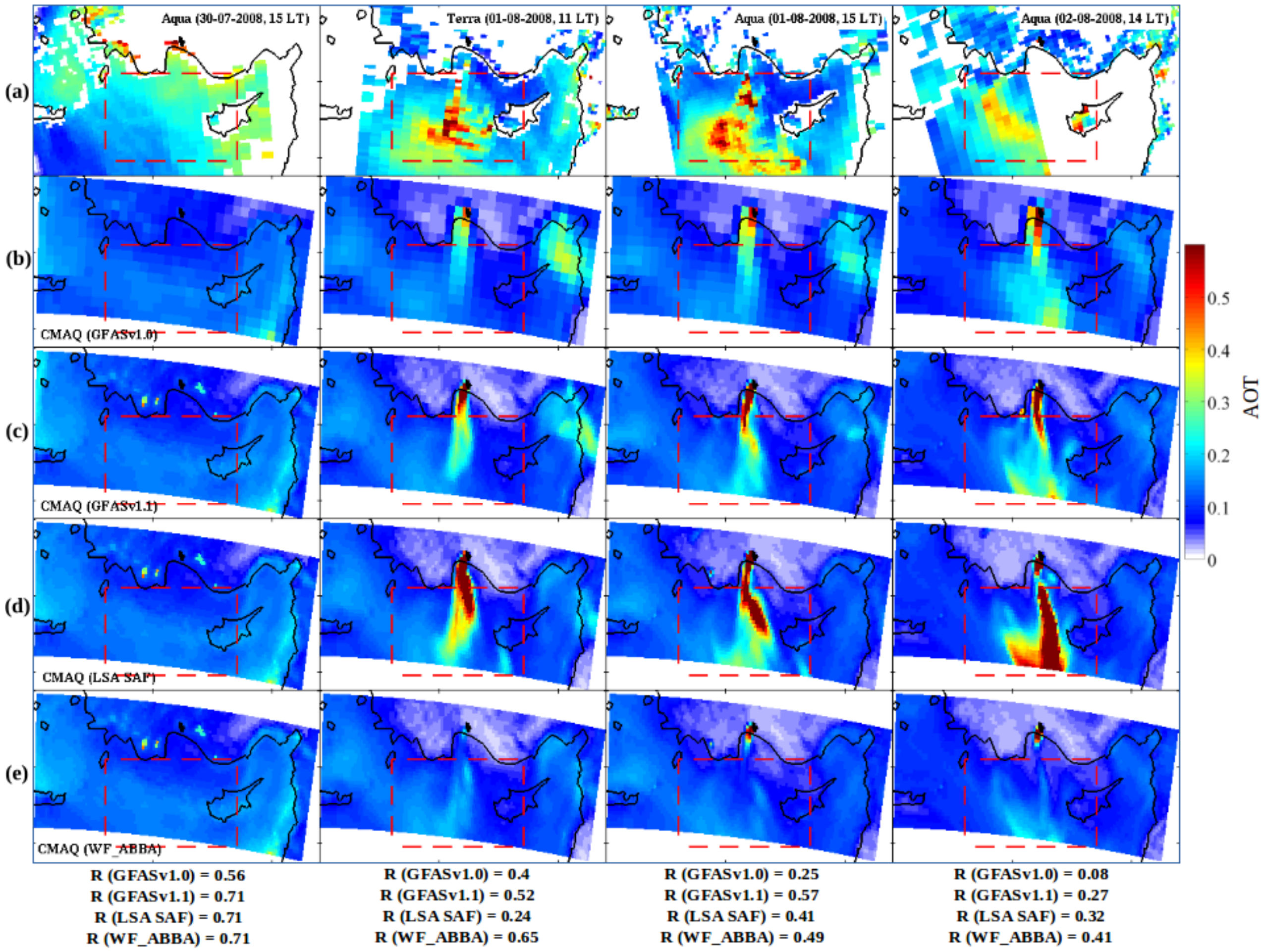

Figure 9. (a) Instantaneous MODIS AOT retrievals over the Eastern Mediterranean basin from 30 July to 6 August 2008. Concurred CMAQ simulated AOT made by using GFAS1.0 (b), GFAS1.1 (c), LSA SAF (d) and WF_ABBA (e) based fire emission inventories. Pearson's R coefficients between MODIS observed and CMAQ simulated AOT are given below.

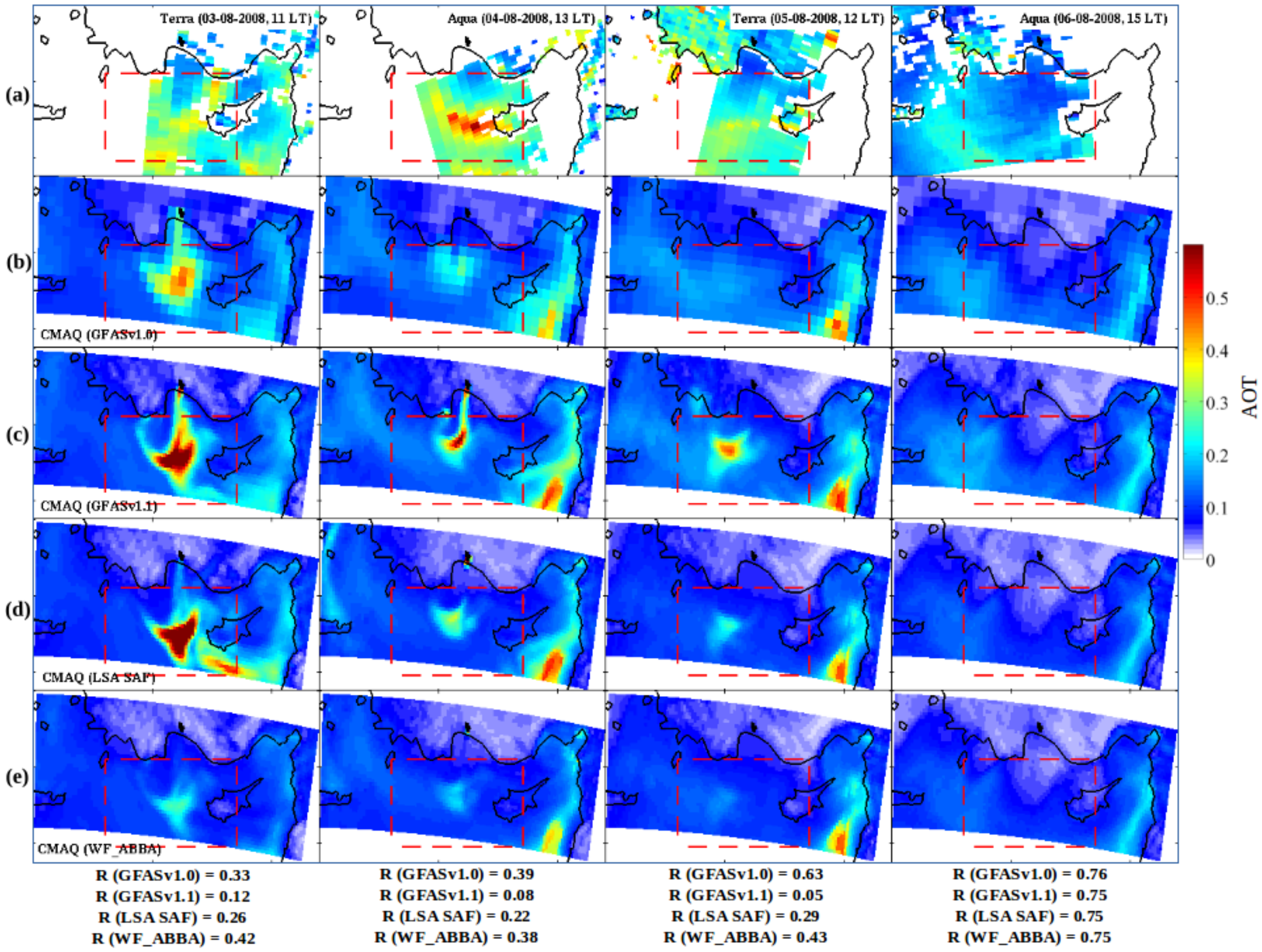

Figure 9. Continued.

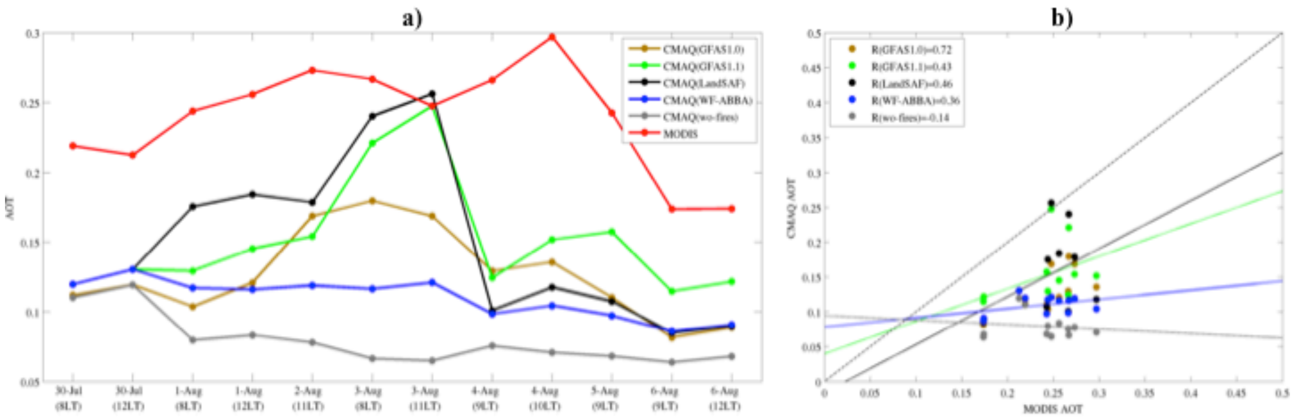

Figure 10. (a) Temporal variations of modeled and observed AOT from 30 July to 6 August 2008 averaged over the area of study and (b) linear regression and associated Pearson's R coefficients between modeled and observed AOT averaged over the same period and area. Five different simulations have been performed using various emission scenarios: CMAQ (GFAS1.0), CMAQ (GFAS1.1), CMAQ (LSA SAF), CMAQ (WF_ABBA) and CMAQ (wo-fires) (without fires).

In these lines, it would also be informative to perform one more test case where emissions are computed with LSA SAF FRP but with Ichoku and Kaufman conversion factors. These factors are based on matching AOD, so it's expected that agreement to MODIS AOD would improve.

Regarding the second part of question 3 a further simulation has been done using the Ichoku and Kaufman TPM emission factors to derive smoke aerosol estimation from LSA SAF FRP, as suggested by the referee. We applied the aerosol speciation from Andreae and Merlet (2001) and Morcrette et al. (2008):

PMcoarse=0.26 * TPM
PM2.5= 0.74 * TPM
BC = 0.043 *PM2.5
OC = 0.704 *PM2.5
Other fine= 0.253 * PM2.5

For comparison a similar simulation has been done with the same TPM speciation but the emission factors described in Kaiser et al 2012. The results are shown in Fig. 3d and Fig. 3c of this document respectively, together with the coincident MODIS instantaneous retrieval of the same parameter (Fig. 3a). Figure 3b correspond to the LSA_SAF simulation using only BC/OC to describe fire aerosol emissions, which is already described in the main text.
The temporal series of the average instantaneous AOT over the Antalya fire plume observed by MODIS and predicted by CMAQ using LSA SAF FRP and the three different approximations of smoke emission aerosols described above are shown in Fig. 4 together with the correspondent correlation (Fig. 4b).
Smoke aerosol approximation using TPM leads to slightly higher AOT values related to the Antalya fire plume than the one based on using only BC and OC (Morcrette et al. 2008).

On the other hand, using Ichoku and Kaufman coefficient of smoke aerosols, leads to an increment in the AOT values of a factor of three compared to the one approximated with conversion factors and emission coefficients described in Kaiser et al., (2012) (referring to Andreae and Merlet, 2001)."

The simulations using TPM estimates from Ichoku and Kaufman largely overestimate AOT values also when compared to MODIS observations.

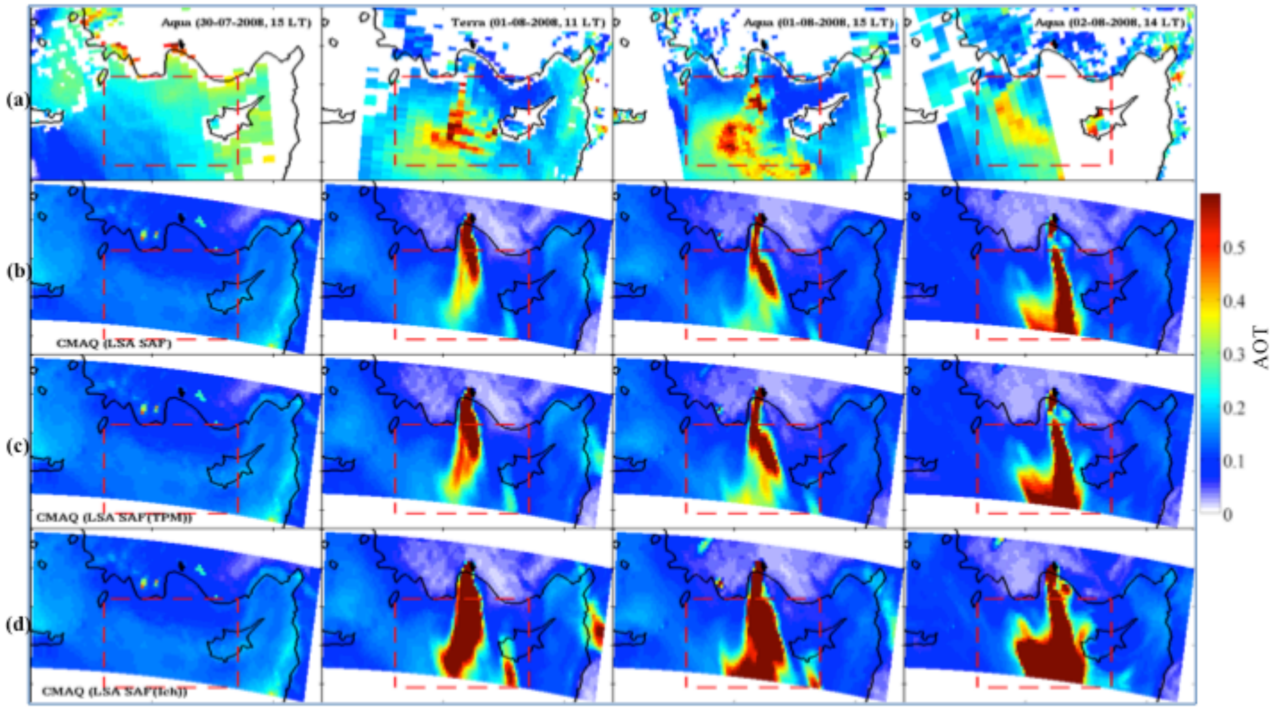

Figure 3. (a) Instantaneous MODIS AOT retrievals over the Eastern Mediterranean basin from 30 July to 6 August 2008. Simulated AOT using fire emission inventory generated with LSA SAF FRP and conversion factors and emission coefficients described in Kaiser et al., 2012 (referring to Andreae and Merlet, 2001) (b) considering only BC and OM (OM=1.5*OC), (c) TPM and (d) TPM from Ichoku and Kaufman (2005) smoke emission coefficients.

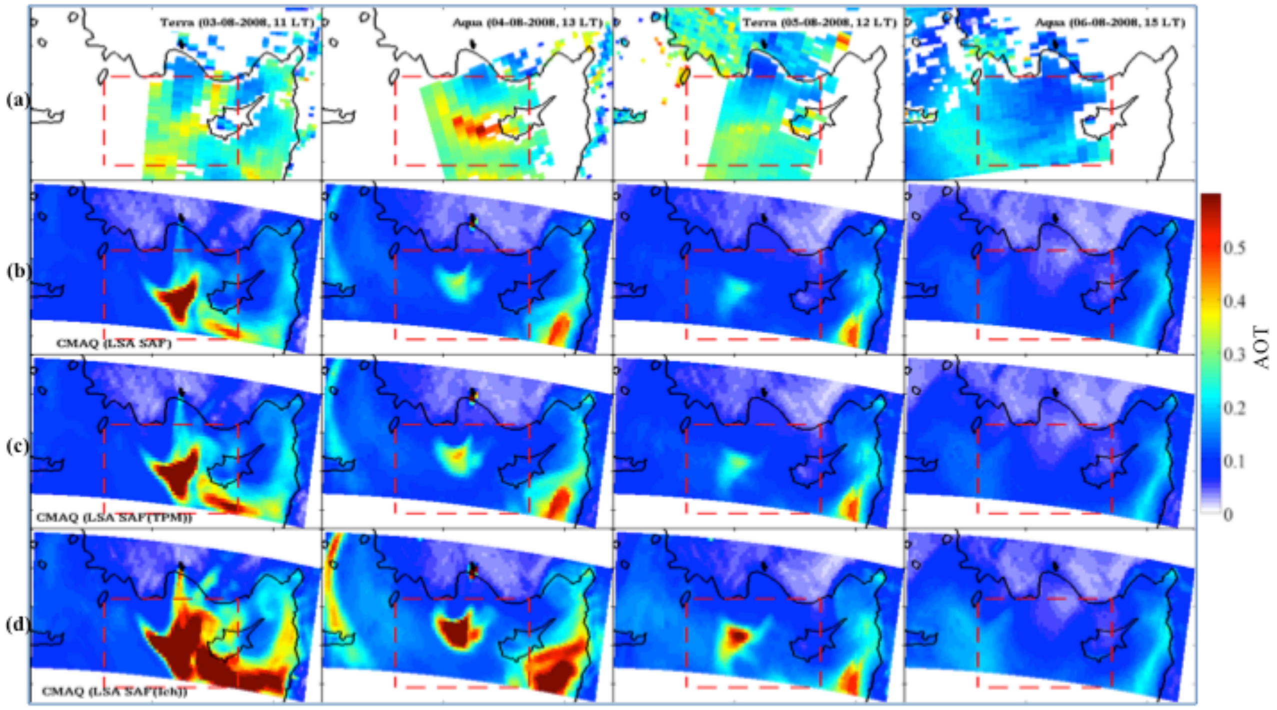

Figure 3. Continued

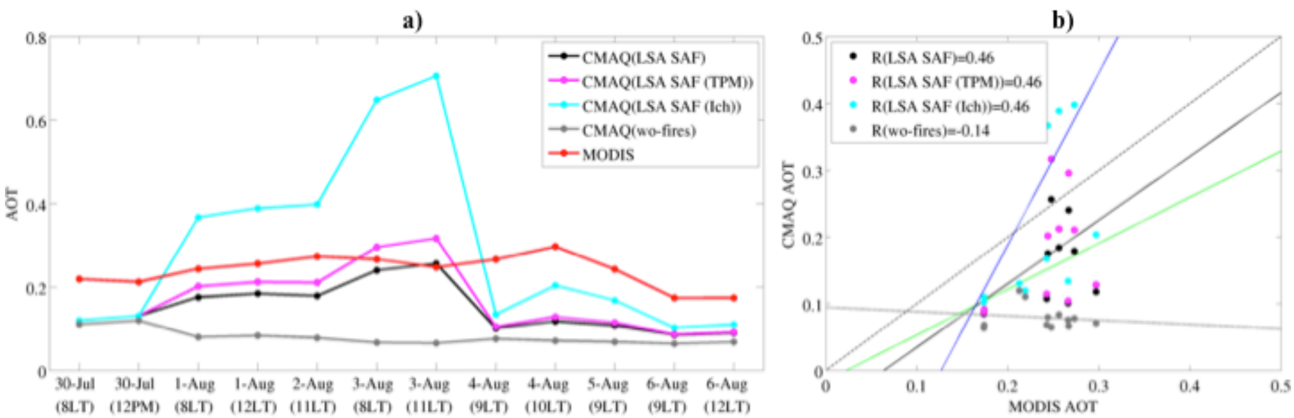

Figure 4. (a) Temporal variations of modeled and observed AOT from 30 July to 6 August 2008 averaged over the area of study and (b) linear regression and associated Pearson's R coefficients between modeled and observed AOT averaged over the same period and area. CMAQ simulated AOT made by using fire emission inventory generated with LSA SAF FRP and conversion factors and emission coefficients described in (Kaiser et al., 2012) (referring to Andreae and Merlet, 2001) smoke aerosols derived using BC and OM (LSA SAF), smoke aerosols derived using TPM (LSA SAF (TPM)), and smoke aerosols derived using TPM and Ichoku and Kaufman smoke emission coefficients (LSA SAF (Ich)).

4) Methods are very extensive but results and discussion and very concise. The authors should expand the results and discussion section a bit to describe the results found in more depth.

We have included new results according to the reviewer suggestions. A new session with quantitative analysis of the simulated AOD, Section 4.2 in the new verison of the manuscript. New paraghraphes with new figure in the have been added in sections 3.2 and 4.1 New figures integrate the analysis of the results in the supplementary material.

Minor comments

1) Tables are not cited in order (e.g., the first table cited in the text is Table 2). Change the numbering of the table or the way they are cited.

The number of the tables has been changed

2) Page 3, Lines 5-6. "Furthermore, the impact . . .." *accepted*

3) Page3, Line 7, delete "indicate" *accepted*

4) Page 3, lines 9-11, Are you talking about improvements recently included into CMAQ? Or saying that CMAQ is an improvement by itself? It is not clear what you mean by this, please rephrase.

we changed from:

The recent improvements of air quality models, such as the Community Multiscale Air Quality (CMAQ) model,

to:

Continuous improvements of air quality models, such as the Community Multiscale Air Quality (CMAQ) model,

Page 3, Lines 11-12. "Therefore, emission inventories must also be provided . . ." *accepted*

5) Page 3, Lines 13-14. "According to Garcia-Menendez et al. (2014), in addition. . .". It seems every time you want to cite a paper in the way "Author (year)", it is cited as "(Author, year)". Please correct this throughout the text. *accepted*

6) Page 5, Line 2. ", had the highest . . ."

the present tense in this case means a permanent condition of high fire risk on the west coast of Turkey (not just during summer 2008). In fact, the next sentence is: "In other words, approximately 60 % (12 million ha) of Turkey's forest area is located in fire sensitive areas (JRC, 2009)".

7) Page 5, Line 5. "A large forest fire occurred on 31 July 2008 in Antalya, Turkey's most touristic province" *accepted*

8) Page 5, Line 7. ", a typical fire adapted. . ."?

we changed from:

It burned for 5 consecutive days and affected 15 795 ha of forestland mainly dominated by Turkish Red Pine (Pinus brutia Ten.), typical fire adapted ecosystems of Eastern Mediterranean basin (Kavgacıet al., 2010)

to:

It burned for 5 consecutive days and affected 15 795 ha of forestland mainly dominated by Turkish Red Pine (Pinus brutia Ten.), a typical fire adapted species of Eastern Mediterranean basin ecosystems (Kavgacıet al., 2010).

9) Page 5, Line 9 "buildings" *accepted*

10) Page 5, Line 13. The "Internal fire hazard report" is not in the references, include a link or some other way to track the source.

Reference not found. Citation deleted.

11) Page 6, Line 4-5, Wooster ref is in () *accepted*

12) Page 6, Line 12. Erase "While" or use a comma instead of a period to separate both sentences. *Accepted*

13) Page 9, Line 7. Govaerts reference is in (). *accepted*

14) Page 10, Line 2, Kaiser ref in (). Ichoku and Kaiser refs also in () in the same section *accepted*

15) Page 10, Lines 15-22. Specify if the emissions computed with the Kaiser approach when comparing to Ichoku have the factor 3.4 included or not. *accepted*

we changed from:
Table 2 shows a significant difference between smoke aerosol emissions evaluated with this approach and with the one described in (Kaiser et al., 2012), that are the ones we finally used in this work to simulate the atmospheric composition of Antalya fire with the CMAQ air quality model.

to:
Table 1 shows a significant difference between smoke aerosol emissions evaluated with this approach and with the one described in (Kaiser et al., 2012) already boosted by the mentioned aerosol enhancement factor. The last ones we finally used in this work to simulate the atmospheric composition of Antalya fire with the CMAQ air quality model.

Do the same for Table 1.

we changed from:
Total Particulate Matter estimates [tons] in the study area and for Antalya fire from WF_ABBA and LSA SAF FRP-Pixel products during Antalya fire lifetime (31 July and 5 August 2008) using conversion factors and emission coefficients described in (Kaiser et al., 2012) (referring to Andreae and Merlet, 2001) and (Ichoku and Kaufman, 2005) smoke emission coefficients. The estimates based on (Ichoku and Kaufman, 2005) are set in italics below the ones referring to (Andreae and Merlet, 2001).

to:
Total Particulate Matter estimates [tons] in the study area and for Antalya fire from WF_ABBA and LSA SAF FRP-Pixel products during Antalya fire lifetime (31 July and 5 August 2008) using conversion factors and emission coefficients described in (Kaiser et al., 2012) (referring to Andreae and Merlet, 2001) boosted by 3.4 and (Ichoku and Kaufman, 2005) smoke emission coefficients. The estimates based on (Ichoku and Kaufman, 2005) are set in italics below the ones referring to (Andreae and Merlet, 2001).

16) Page 11, Sofiev in () *accepted*

17) Page 11, Lines 12-13. Correct the parenthesis , seems to be either missing or extra ones

accepted

18) Page 11, Lines 14-15. "and its ability to reproduce the meteorological conditions including the region of interest . . ." *accepted*

19) Page 11, lines 16-20. Also state that ECMWF is used and initial and boundary met conditions

we added this at the end of the sentence(Page 11 line 20):
" ... used to constrain the WRF meteorological simulation through nudging, initial and boundary conditions."

20) Page 12, first paragraph. You say here emissions are uniformly distributed up to a certain height, which is not what's reflected in Fig. 4b. Please clarify.

The emissions are distributed uniformly but considering the ratio of the layer thickness to the plume height. The thickness of the layers increase from surface to the top and therefore upper layers include proportionally more emissions than the lower layers, until the plume height calculated using Sofiev et al. (2012).

we changed from:
The emissions calculated for each hour were distributed uniformly from the ground up to the height determined by using a semi-empirical formula suggested by (Sofiev et al., 2012).

to:
The emissions calculated for each hour were vertically distributed within the all layers proportionally to their thickness compared to the plume height, determined by using a semi-empirical formula suggested by (Sofiev et al., 2012).

21) Page 12, Line 8. Fig 13 is in the main text, not in the supplement. If you keep it that way, change the figure numbering so they are referred to in order in the text.
Moved to supplement

22) Page 12, Line 10. What does "ca." stands for? Or is it a typo?

We replaced "ca." (abbreviation for circa) with "about".

23) Page 13, Line 14-15. You already make this statement earlier on the same page in line 5, right? *Accepted. We deleted the mentioned sentence*

24) Page 13, Lines 18-21. This sentence is way too long, please split.

we changed from:
As a source of information on the aerosol content in the atmosphere over the area affected by the Antalya fire at the beginning of August 2008 we used the MODIS Aerosol Product that monitors the ambient aerosol optical thickness (AOT) over the oceans globally and over a portion of the continents (Remer et al., 2005; Levy et al., 2007).

to:
As a source of information on the aerosol content in the atmosphere over the area affected by the Antalya fire at the beginning of August 2008 we used the MODIS Aerosol Product. This satellite product reproduces the ambient aerosol optical thickness (AOT) over the oceans globally and over

a portion of the continents (Remer et al., 2005; Levy et al., 2007).

25) Page 14, Line 18. Rodgers ref is in (). Same for Van Damme (twice) and Walker later in the same section *accepted*

26) Make Fig 2 cover the whole width of the page, now its too small *accepted*

27) Page 15, line 18. "even if" its not a good connector here, rephrase *replaced with "however"*

28) Fig. 3. Does the labels representing dates show 00 local time? The steps when going from one daily emission value to the other seems to be shifted like 2 hours from the position of day label. Please correct.

This is because the GFAS emission inventory and the fire products refers to UTC. For example, 3:00 LT means 00:00 UTC, this is when the GFAS daily emission starts and this is the reason of the shift.

29) Page 16 line 21- Page 17 Line 2. This paragraph should go in section 3.1, as the differences are due to FRP, not to how the emissions are computed. In section 3.2 just say that emissions differences are due to FRP differences explained in the previous section. *Accepted*

30) Page 17, line 4. Garcia ref is in () *accepted*

31) Page 17, Lines 22-28. In Fig 4 you are only showing that the vertical allocations are different, not that one if better than the other, as you seem to be stating ("can lead to a more accurate vertical allocation").

we changed from:
We can infer that the refinement in the emission inventory, achieved by using SEVIRI FRP data, in terms of a more detailed temporal allocation of the fire emissions, can lead to a more accurate vertical allocation.

to:
Refinement in the emission inventory, achieved by using SEVIRI FRP data, in terms of a more detailed temporal allocation of the fire emissions, leads to a different vertical allocation.

32) Fig. 4. Is TPM the same as PM2.5? It seems that way from Fig 4a axis label and caption *accepted. We corrected the caption (TPM instead of PM2.5)*

33) Fig 4a. Time label starts at 4, not at 0? If starts at 4 then add this label, otherwise is confusing. *Accepted*

34) Fig 5. I understand why GFAS has the same emissions for Aug 1 at different times (column 1 and 2), but they should be different for Aug 2 (column 3) as shown in Fig. 3. Right now all three panels are the same. Please clarify

This is due to the fact that we use local time to describe the output while the GFAS dataset is in UTC so 3:00 LT of Aug 2 means 24:00 of Aug 1 as we said in the capture. We changed the figure label to make it more clear. For example:
From: Aug 2 (3:00)
to: Aug 2 (3 LT)

35) Page 18, line 20. Garcia ref is in () *accepted*

36) Fig 14 is not in the supplement, is in the main text. Change figure numbering and order if necessary

Figure 14 is now part of the Figure 2 presented in this document. This figure is discussed in the new section describing the AOT simulations. See answer to comment 3).

37) Page 19, Lines 10-11. MODIS AOD retrieval is performed by aggregating info from 1km pixels (see Levy et al., 2007). Since the smoke plume is so concentrated it labels those pixels as clouds, and performs the AOD retrieval in the rest of the pixels, which are clean. This is why it gives the impression is putting low AOD where the plume is. You should explain this as a retrieval limitation, and not just leave it as a wrong attribution.

we changed from:
We can also notice a wrong attribution of low values of AOT to pixels strongly affected by the fire plume as evident from the concurrent visible wavelength imagery.

to:
In fact, these retrievals are obtained by aggregating info from 1km pixels (see Levy et al., 2007). Probably, in this case, the AOD algorithm labels the pixels with the strongest smoke aerosol concentration (right below the bay of Antalya) as clouds and performs the AOD retrieval in the rest of the pixels, which are clean, resulting in a missing description of the first part of the Antalya fire plum.

38) Fig 6. Caption should be "by subtracting concentrations from simulations without fires" *accepted*

39) Page 19, line 25. I would delete the "Very" at the beginning. In my opinion, very high PM2.5 concentrations would be something like over 100 ug/m3

True for the old simulations but coherent with the new ones (~200 ug/m3). We updated the text and the figures.

40) Page 20, line 9. "From these figures . . ." *accepted*
41) Page 20, line 9-13. English is not proper in these sentences, rephrase or correct

we changed this paragraph as explained in the answer at the comment for of the referee # 1

42) Page 20. Fig 11 is referenced before Fig 10
we inverted the order of the figures.

43) Page 20. Line 23. Intead of explaning the cause of lower FRP, just say that it was because lower FRP, and usesection 3.1 to explain why FRP was lower in this retrieval

we changed from:
No correlation is observed between WF_ABBA simulation and the observations (Pearson's R coefficient −0.08) which could be explained by the more conservative approach used in WF_ABBA for the calculation Antalya fire emitted radiant energy, which results in lower emission estimations.

to:
No correlation is observed between WF_ABBA simulation and the observations (Pearson's R

coefficient −0.08) which could be explained by the lower estimation that this algorithm produces of the energy emitted by the Antalya fire, as discussed in section 3.1, which results in lower emission estimations.

44) Fig 10. It is not clear what you are plotting in c. Are these emissions (y axis legend reads tons)? How would you obtain emissions from IASI? The caption is very confusing, please rephrase.

In this case we first averaged the IASI retrievals of CO over the area containing the fire plume (red dashed box in figure11), then we subtracted the minimum value of the time series. Then we converted this values from total columns (molecule/cm2) to tons.

For the old Fig 10, now Fig 11.

We changed the caption from:
(c) Temporal variations of modeled and observed CO emitted by Antalya fire.

to:
(c) Tons of CO emitted by the Antalya fire over the study area, as observed by IASI and simulated by CMAQ.

45) Page 21, Lines 13 – end of section. This belongs to the methods section. *accepted*

46) Page 22, lines 4. "However, WF_ABBA and LSA SAF tend to be quite lower. . .." *accepted*
47) Page 23, Line 3 what do you mean by "low intense fire activity"? Sounds like a contradiction.

In this case we mainly refer to agricultural burnings that especially at the end of the summer in eastern Europe and in the Mediterranean regions represent an important source of fire emissions. (See also answer to comment 1 of referee #1).

we changed from:
low intense fire activity

to:
low energetic fire activity.

References
Discussion Paper
Levy, R. C., Remer, L. A., Mattoo, S., Vermote, E. F., and Kaufman, Y. J.: Second-generation operational algorithm: Retrieval of aerosol properties over land from inversion of Moderate Resolution Imaging Spectroradiometer spectral reflectance, Journal of Geophysical Research, 112, D13211, 2007.