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Atmospheric Chemistry and Physics Discussions

Interactive comment on "New fire diurnal cycle characterizations to improve fire radiative energy assessments made from low-Earth orbit satellites sampling" *by* N. Andela et al.

Anonymous Referee #2

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The manuscript by Andela et al. (2015) investigates different methods for characterising the diurnal fire cycle using FRP measurements from the SEVIRI geostationary instrument but using the temporal sampling opportunities available to low Earth orbit satellite instruments such as MODIS. Characterising the diurnal fire cycle is necessary for deriving FRE estimates and for parameterising emissions in atmospheric transport models in near real time. Three different methods for characterising diurnal fire activity are assessed at high spatial and temporal resolution. The work builds on previous studies in this area and proposes a new approach for modelling the diurnal fire cycle using polar orbiter data which facilitates the development of emissions inventories

using FRP datasets.

This manuscript is suitable for publication in ACP. Detailed below are some minor comments.

Comments (# line number)

#179 : it would be useful to include the range of the number of SEVIRI pixels that fall within a 0.1 degree grid cells over the study region as later sections discuss issues related to fire size\spread etc. within a grid cell.

#218 : the mean fire size is derived using MODIS burned area data between 2001-2013 whilst the SEVIRI FRP data cover a three year period (2010-2013). What was basis for using datasets covering different length time periods and does it impact the results shown in figure 3c (i.e. is the average fire size and its spatial distribution similar when 2010-2012 MODIS burned area data are used)?

#408 : The overall (2010-2012) FRP correlations are discussed but a brief comment on how these vary spatially and temporally would be useful. For example, is the uncertainty greatest during periods or in regions of low fire activity and least during periods of peak fire activity? Figure 6 indicates the approach generally works well in estimating FRE during the peak fire season when emissions are greatest.

#497-499: The discussion of the fraction of FRE omitted at MODIS sampling intervals is interesting. How do regions of the greatest FRE percentage omissions relate to the total annual FRE (fig 3a) and how significant are these omissions with respect to the continental FRE estimate?

Technical Comments (# : line number)

#19: replace 'like' with 'such as'

#27 : 'comprised of'

#34 : replace 'done' with 'implemented'

#65 : delete ‘becoming’

#83-85 : replace ‘earth’ with ‘Earth’

#100 : replace ‘measurement’ with ‘estimation’

#122 : replace ‘using’ with ‘used’

#180, #198 : it is not clear what ‘(fsg3)’ etc. refer to

#191 : replace ‘Because’ with ‘As’

#318 : include parenthesis ‘ (i.e. persistence)’

#366 : ‘the ratio’

#394 : include ‘FRE’ – e.g. ‘regional aggregated FRE time series’ ?

#396 : replace ‘Because’ with ‘Since’

#426 : delete ‘or all of these lower FRP’ ?

#446 : replace ‘was’ with ‘is’

Figures :

Figure 1d : x-axis - replace ‘sum’ with ‘local time (hours)’.

Figure 5: The colour scaling on this figure highlights the improvements made using the climatological approach but makes it more difficult to discern the grid cell values of the other two methods. Inclusion of histograms of the %FRE difference in the lower left corner of each map would help illustrate the distribution of grid cell values.

Figure 6c : c) ‘Democratic Republic of Congo’

Tables :

Table 1: It would be useful to include the standard deviation for each parameter and land cover type as some parameters appear comparatively stable per land cover type

whilst others more variable (figure 2).

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 9661, 2015.