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Atmospheric Chemistry and Physics Discussions

Interactive comment on "New eastern China agricultural burning fire emission inventory and trends analysis from combined geostationary (Himawari-8) and polar-orbiting (VIIRS-IM) fire radiative power products" *by* Tianran Zhang et al.

Anonymous Referee #1

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General Comments

This manuscript describes the application of geostationary and polar orbiting active fire datasets to characterise agricultural burning in eastern China and to estimate the fuel consumption\trace gas emissions using fire radiative power retrievals. This study integrates VIIRS FRP retrievals with diurnal fire cycle information from the geostationary Himawari sensor to develop a fire emissions inventory optimised for agricultural burning. The improved detection of small and low intensity agricultural fires from VIIRS results in emissions estimates that are greater than those from other Earth Observation

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Discussion paper

(EO)-based emissions inventories.

The manuscript is well written and covers a topic which is suited to publication in this journal. Below are some specific and technical comments.

Specific comments

#203 – it would be useful to outline the impact of the correction of gridcell FRP for cloud cover (i.e. the percentage FRP adjustment).

#225 and Figure 4 – the model fits the observed Himawari FRP well for most of the diurnal cycle although there is a reasonably strong secondary peak in fire activity around 20:00 which is not modelled. What is the impact of omitting the FRP contribution of this secondary peak to the daily FRE? (i.e. the difference between the 'modelled' Himawari FRP and the observed Himawari FRP). Figure 4 shows the 'summer' diurnal cycle. Are the observed Himawari diurnal cycles similar in shape in different seasons?

#302-310 – is the winter burning season (shown in Figure 5) detected in other emissions inventories (e.g. GFED and GFAS)? It would be useful to highlight the winter burning season in Figure 7. In relation to Figure 5, is there any difference in the proportion of day/night fire detections during the winter months?

#∼321 –What might be the cause in the reduction of amount of wheat residue burnt? The wheat yield in 2015 is marginally higher than it is in previous years (Table S1)?

#354-359 – how do the agricultural emissions derived using this approach compare with those from Li et al., 2015

#459 – what are the combustion completeness values used in EO-derived emissions inventories such as GFED for residue burning?

#482 – Are the DMB estimates for all crop types and were these calculated using the GlobalLand30 agricultural area estimates? How do these estimates compare to those from other studies?

Technical corrections

#56 – ‘this leads’

#63 – define MODIS

#65 – ‘most BA’

#66- define GFED

#75 - define VIIRS

#210 – replace ‘observed’ with averaged

#223 – replace ‘height’ with magnitude

#237 – replace ‘see below’ with Equation 9

#248 and 252 – replace ‘calculated’ with estimated

#466 – replace ‘most later researchers’ with ‘more recent research’

Figures

Figure 3 : Perhaps plot all of the data on the same graph and plot the data from the same day as that used in Figure 2.

Figure 4 : Is the FRP diurnal cycle from all fires in Eastern China or just agricultural fires in the region?

Figure 6 (and others): The density of map gridlines make it difficult to interpret the maps.

Figure 8 – y-axis PM2.5 subscript

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