Atmos. Chem. Phys. Discuss.,
doi:10.5194/acp-2016-233-RC2, 2016

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Atmospheric CH_4 and CO_2 enhancements and biomass burning emission ratios derived from satellite observations of the 2015 Indonesian fire plumes" *by* Robert J. Parker et al.

Anonymous Referee #2

Received and published: 19 May 2016

<General Comments>

This paper demonstrated temporal and regional CH4 and CO2 measurement from space. This capability showed the detection of large-scale biomass-burning from space for the first time. It also suggested fuel type detection. I recommend publication after minor revision. I understand number of good in-situ data is limited, but discussion on rough estimation of horizontal and vertical distribution of the plume is helpful to understand the usefulness of large footprint (10km), point-based and, column averaged observations of GOSAT. Authors used CO data to identify the fire affected area. Fig-

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ure 6 shows the comparison between XCH4/XCO2, MACC CO, and IASI CO. Further analysis or discussion on correlation between GOSAT-retrieved XCH4/XCO2 and CO will be useful.

<Specific Comments>

(1) Page 8, line 26 Description XCO2 retrieval method

My understanding is that the Proxy XCH4/XCO2 in this paper uses XCO2 from GOSAT instead of model XCO2. For CO2 retrieval do the authors use both 1.6 and 2.0 micron bands or only 1.6 micron band, which is closer to the CH4 band? The brief explanation is helpful.

(2) Page 23 line 16, Description on CAI will help reader's understanding.

CAI has a UV band at 380nm, which is shorter than MODIS blue band. CAI image helps distinguish aerosol absorption from cloud. From CAI image such as Figure 4, the spatial scale fire affected area can be estimated. Is there difference in CH4/CO2 between white and yellow (more absorption in UV)?

(3) Page 10, Line 10 and Page 27 Figure 6.

How do the authors retrieve XCO2 and XCH4 over dark ocean? Do the authors use glint data of TANSO-FTS?

(4) Page 15, Line 5

Authors mentioned high spatial resolution and imaging capability of Sentinel 5. Vertical profile information clarify the difference between in-situ CH4/CO2 and satellite-measured column CH4/CO2. CH4/CO2 discussion using profile information from TANSO-FTS TIR band in the future might help.

<Technical Corrections>

(1) Page 5 line 31, fire radiative power (FRP).

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Fire radiative power (FRP) is described already in Page 4, line 10.

(2) Page 8, line 5

Cryo-cooler restart is not “August 2015” (it stopped in August 2015) but “September 2015”.

(3) Page 9, line 16, GOSAT Cloud and Aerosol Imager (CAI)

It already appeared as the Cloud and Aerosol Imager (TANSO-CAI) in Page 7 Line 29.

(4) Page 16, Equations (A6) and (A7)

Equations (A6) and (A7) are redundant.

(5) Page 25, Table 1

“Blue”, “green” and “red” in Table 1 caption are not defined. Are these ones in Figure 8?

(6) Page 31, Figure 11, Upper left “Aratio = 1.0000. . .1” is confusing. Is it “Aratio=1.0”?

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