

## ***Interactive comment on “Remote sensing CO<sub>2</sub>, CH<sub>4</sub> and CO emissions in a polluted urban environment” by Denis M. O’Brien et al.***

### **Anonymous Referee #1**

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#### <General Comments>

Monitoring greenhouse gases and carbon monoxide continuously from geostationary satellites is important theme for next-generation satellite remote-sensing. Selecting Shanghai region as a target is also important. From GOSAT and OCO-2 experiences, aerosol and cloud contamination is the largest error source for the GHG retrieval. The paper is comprehensive and aerosol models are well described. I recommend publication after minor revision. I still do not understand well why tight CO uncertainty is need for convergence. Is XCO error much reduced if the spectral resolution of 2.3 micron band is higher? How was the spectral resolution of 2.3 micron band for geoCARB selected?

#### <Specific Comments>

C1

(1) Page 3 line 9, Page 6 Line 16, “model spin up” and “non-spin-up days”.

More explanation will help reader’s understanding.

(2) Page 6 Line 9, “surface properties”

Brief explanation on typical surface albedo value of 4 bands over selected Shanghai region will be helpful. Is surface albedo low enough to neglect multiple scattering between surface and aerosol? Is it close to Lambertian surface?

(3) Page 7, Line 16

There are several versions in JPL and CSU retrieval algorithm for OCO-2 and GOSAT. Reference or brief explanation is needed.

(4)Page 25, Figure 3

AOD in O2A band is not spatially uniform. Brief description of aerosol spatial distribution over the region is helpful.

#### <Technical Corrections>

(1) Page 1 Line 9,

Orbiting Carbon Observatory (OCO2) > Orbiting Carbon Observatory-2 (OCO-2)

(2) Page 13, Line 15,

“ACOS” appears firstly. Description of “the ACOS team” is needed.

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