

## ***Interactive comment on “The On-Orbit Performance of the Orbiting Carbon Observatory-2 (OCO-2) Instrument and its Radiometrically Calibrated Products” by David Crisp et al.***

### **Anonymous Referee #4**

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<General Comments> It was very challenging to monitor carbon dioxide from space using imaging grating spectrometer technology. Accurate and precise XCO<sub>2</sub> retrieval need radiometric, spectroscopic, geometric, and polarimetric calibrations and characterizations. The history to investigate, mitigate, correct and refine anomalies after launch is very important. Some additional information below will improve readers' understanding. The satellite operation might not be a topic of the paper but brief explanation on target observation selection, priority, and frequency will help readers' understanding. An idea to minimize the focal plane assembly rotation by design or operation, discussion on necessity of onboard calibration using a solar diffuser for future missions such as OCO-3 will benefit satellite GHG remote sensing community. Onboard so-

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lar differs on spaceborne optical instruments often have larger degradation than the telescope and spectrometers. I recommend publication after minor revision.

<Specific Comments> (1) Page 2, Lines 29-30, “The optical bench and focal planes . . . . operating temperatures (near -152.4 C and -6.4 °C, respectively” Is it near and -6.4 °C and -152.4 C, respectively?

(2) Page 11, Lines 17-18, “the relative radiometric performance (zero level offset, gain, and gain linearity) of spectral samples within a given channel must be known to within 0.1%” What is the definition of zero level offset, gain, and gain linearity of 0.1%?

(3) Page 19, Line 18, “a thick layer of ice would significantly alter the ABO2 instrument line shape (ILS) function,” Is the reason why thick layer affects ILS the mechanism described in page 10, lines 13 – 20?

(4) Page 30, Figure 5. (a) Definition of “maximum measurable signal” will be helpful for readers. Is it dynamic range of the AD converter? Do the data used in Figure 5 (a) include cloud contaminated scene? How do authors calculate SNR from observed data?

(5) Page 35, Figure 10. Which period of data is used? For 18 months?

(8) Page 43, Figure 18 “with a backup lamp (Lamp 2)” Why back up lamp data is used in calibration? How to use and compare primary and back up (monthly) lamps on orbit? How about the third one?

<Technical Corrections> (1) Page 13 Table 3 What does “BPM” stand for? Is it “bad pixel map”?

(2) Page 15, Line 10, The 7 > The V7?

(3) Figures 10, 12 and 14, Captions O2A, O2, CO2, O2A: “2”s are subscript.

(4) Page 42, Figure 17, Caption, Green points Are they “green triangles?”

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