

## ***Interactive comment on “Laboratory Spectral Calibration of the TanSat Atmospheric Carbon Dioxide Grating Spectrometer” by Zhongdong Yang et al.***

### **Anonymous Referee #3**

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Revision of the paper entitled "Laboratory Spectral Calibration of the TanSat Atmospheric Carbon Dioxide Grating Spectrometer"

Authors: Zhongdong Yang, Yuquan Zhen, Zenshan Yin, Chao Lin, Yanmeng Bi, Wu Liu, Qian Wang, Long Wang, Songyan Gu, and Longfei Tian.

Journal: Geoscientific Instrumentation, Methods and Data Systems.

#### 1. General Comments

The authors describe the spectral calibration of the Atmospheric Carbon dioxide Grating Spectrometer (ACGS) of the TanSat mission that was performed before its success-

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ful launch in 2016. The reviewer considers that the paper is within the scope of GI. The paper presents data on the spectral response function, dispersion and resolution of the three bands of the ACGS. The paper also presents a device to perform the measurements automatically that was implemented for this calibration. The results shown in the article suggest that the spectrometer meets the spectral requirements of the mission. The overall presentation is well structured, although the reviewer considers that there is margin to improve the use of English.

#### 2. Specific Comments

Page 1, lines 5 and 6: I suggest adding the names of the W and S bands when the wavelengths are specified for the first time.

Page 1, line 23: It is stated that the ACGS has a wide dynamical range and a high spectral resolution. This must be quantified. For the spectral resolution, another possibility would be to refer the reader to the section where those values are specified.

Page 2, line 6: Level 1 products are mentioned here and in the abstract. A brief description of them could be included here.

Page 2, line 11 and page 4, line 25: I suggest writing Lee et al. instead of Lee and etc.

Page 2, line 19: How was the extrapolation performed, and how reliable are those values expected to be?

Page 3, lines 5 and 6: I suggest being completely consistent with the spectral ranges of the bands. For example, for the strong CO<sub>2</sub> band there are three slightly different values: 2041 nm here, 2040.54 nm in line 8 of page 7, and 2042 in Table 1 (although those are the requirements).

Page 4, line 31: The value of 0.2 pm corresponds to one of the wavemeters, according to Table 3.

Figure 1 and Table 3: The NIR wavemeter of Table 3 is referred as VIS wavemeter on

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Figure 1. I suggest changing the name in Figure 1.

Page 6, line 7: When it is mentioned that “By averaging tens of frames”, is there a specific number?

Page 7, line 6: The reason for which those specific channels of that specific footprint are shown could be explained.

Page 7, line 18: To which previous results do you refer? I suggest specifying this and adding references.

Page 7, lines 28 and 29: The WCO<sub>2</sub> band is mentioned twice. One of them should be the SCO<sub>2</sub> band.

Figure 3: I suggest increasing the size of the font in axes and titles.

Figure 4: In the caption, SCO<sub>2</sub> band is mentioned twice (also for the row in the middle).

Figure 5: I suggest rewriting the second sentence of the caption to improve clarity.

### 3. Technical Corrections

Page 1, line 6: I suggest writing: The spectral resolving power values are. . .

Page 1, line 10: I suggest writing: . . .in the three bands.

Page 1, line 11: I suggest writing: The resulting variations. . .

Page 2, line 10: I suggest writing: In detail. . .

Page 2, line 15: I suggest writing: There are also some differences . . .(removing “have”).

Page 3, line 13, and Table 1: km should be written with lowercase k.

Figure 4: I suggest correcting some typographical errors in the title of the figure. Also, “variations” is used in the figure, and “bias” in the text.

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