Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2020-139-AC2, 2020

Atmospheric Measurement Techniques Discussions

Interactive comment on "Global Cloud Property Models for Real Time Triage Onboard Visible-Shortwave Infrared Spectrometers" *by* Macey W. Sandford et al.

Macey W. Sandford et al.

macey_sandford@outlook.com

Received and published: 8 August 2020

Response to RC2:

We appreciate the feedback from this reviewer and have found the comments to be helpful in clarifying our work in this article.

1. Section 2.1 (page 4): what is the pixel size of the Hyperion instrument? How do you C1 AMTD Interactive comment Printer-friendly version Discussion paper consider the instrumental differences between Hyperion and EMIT instrument (such as pixel size, wavelength, etc.)?

Printer-friendly version

Discussion paper

The pixel size of the Hyperion instrument is 30 m per pixel and 7.5 km by 100 km land area per image. EMIT has a spectral resolution from 380-2510 nm and a spatial resolution of 30 m per pixel, both very similar to Hyperion.

2. Section 2.2 (page 4): it is unclear to me how to manually label the 102 Hyperion images (7.7km x 42km)? Could you please provide more details?

We manually labeled the pixels in each scene using an image editing software called GIMP. In this software we manually labeled pixels by human classification, visually. Depending on the classification, the pixel was given a color (in value); red, green, blue, cyan, or black. Black pixels bordered each other classification type to mitigate misclassifications or ambiguous areas. It took a long time, but having a ground truth classification of surface type will be helpful to studies past our own.

3. Figure 2 (and also Figure 4): Could you please explain the meaning of colors and give a color bar on the side?

The red color is clouds and the white color is non-clouds. Yes, this should be included in both figures.

4. One of my major concern is that since this work could be potentially used in the EMIT mission, the authors should also consider the impact of dust aerosols. With the three channels selected in this study, it is possible that heavy dust cases were detected as clouds. I strongly suggest the authors use a case study to demonstrate the defined thresholds are also good for aerosols, in particular dust plumes.

This is an astute point and warrants some additional discussion of the topic in the conclusion. Fortunately EMIT is somewhat immune to this problem because EMIT will not actually measure mineral dust in the atmosphere. It is a geologic mapping mission to map the mineralogy of mineral dust source areas. In fact, the mission intends to filter any AOD550 higher than 0.4. From this perspective, it is fine if the dust plume is screened, because that data would not have been used anyway. Also, it is not nec-

essary that the cloud screening method detect such plumes, because the mission has other methods for estimating AOD550 in the Level 2 stage. By filtering obviously obscured scenes, cloud screening will reduce transmitted data volumes by approximately 50%, enabling EMIT to achieve its geologic mapping objectives in the first 6 months of operation.

5. Please consider cite a recent publication, which developed surface-type based machine learning models for cloud masking and cloud phase classification.

Wang, C., Platnick, S., Meyer, K., Zhang, Z., and Zhou, Y.: A machine-learning-based cloud detection and thermodynamic-phase classification algorithm using passive spectral observations, Atmos. Meas. Tech., 13, 2257–2277, https://doi.org/10.5194/amt-13-2257-2020, 2020.

Great addition! Thank you.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2020-139, 2020.

Printer-friendly version

Discussion paper