Atmospheric
Measurement
Techniques
Open Access

EGU

Discussions

AMTD

Interactive
comment

Interactive comment on "A kernel-driven BRDF model to inform satellite-derived visible anvil cloud detection" *by* Benjamin Scarino et al.

Anonymous Referee #1

General comments

In general, quantitative uses of the visible bands on the GOES are under-utilized. This work will greatly help with that issue, to better automatically detector and characterize anvil clouds.

Specific comments

Page 1. Line 28. Consider these missing references: Brunner, J. C., S. A. Ackerman, A. S. Bachmeier, and R. M. Rabin, 2007: A quantitative analysis of the enhanced-V feature in relation to severe weather. Wea. Forecasting, 22, 853–872. McCann, D. W., 1983: The enhanced-V: A satellite observable severe storm signature. Mon. Wea. Rev., 111, 887–894.

Please reference Ted Fujita's "jumping (stratospheric) cirrus": Fujita, T. T., 1974: Over-shooting thunderheads observed from ATS and Learjet. Satellite and Mesometeorology Research Project Rep. 117, Texas Tech University, Lubbock, TX, 29 pp.

Menzel, W. P., and J. F. W.Purdom, 1994: Introducing GOES-I: The first of a new-generation of Geostationary Operational Environmental Satellites. Bull. Amer. Meteor. Soc., 75, 757–781.

Page 2. Line 5. It should be noted that the legacy GOES (eg, GOES-13/15) were calibrated pre-launch, but not on orbit. Unless, you have applied a X. Wu (NOAA STAR) visible calibration correction (to account for degradation over time). If this is the case, it should be stated. Details of the correction: https://www.star.nesdis.noaa.gov/smcd/spb/fwu/homepage/GOES_Imager_Vis_OpCal.php Is this what the authors are referring to, when they refer to "spectral band normaliza-tion"?

Page 2. Line 29. Note also that the brightness temperature of a water va-por band varies with view angle. For example, a cooling of over 5K for the legacy GOES imager water vapor band at 55 Local (Viewing) Zenith Angle: http://cimss.ssec.wisc.edu/goes/calibration/GOES12_IMGR_LZAvsTEMP.jpg

Page 4. Line 26. "The VIS retrievals are subsampled to the IR data resolution". Was an averaging approach considered? Or ran on one day to understand if there are any differences between sampling or averaging?

Page 5. Line 3. It's stated that Meteosat aren't used due to a lack of 1km vis data over full disk, but the 1km is sampled to 4km in your analysis anyway. So, would using 3km vs 4km be that different? Especially considering that the 3km is at the subpoint? Isn't a larger difference with Meteosat is the timing, given those data are scanned south to north, while the GOES scan north to south?

Page 5. Line 10. Please clarify how this relates to the paragraph: "Note that for some

analyses, satellite data are supplemented by modeled atmospheric profiles provided by the Global Modeling and Assimilation Office (GMAO) Modern-Era Retrospective analysis for Research and Applications, Version 2 (MERRA-2) product."

Page 6. Line 5. How was the 5x5 determined? Given that a projected field-of-view size grows away from nadir, this mean that less area is considered near the sub-point compared to near the limb. How might this affect your results?

Page 8. Line 6. This is every other 4km line and 4km element, correct? If so, this should be stated here, for clarity.

Page 8. Line 11. Do you screen out the sun glint times/location?

Page 9. Line 19. When it is stated "adapted to GOES-16 imagery", does this still mean using 4km spatial resolutions for both the vis and IR inputs? If so, consider running a case (for comparison) at 2km, to use more of both the vis and IR information. Add a GOES-16 reference: http://nwafiles.nwas.org/jom/articles/2018/2018-JOM4/2018-JOM4.pdf

Page 9. Line 25. Consider adding a GOES-16 COD reference.

Page 11. Line 17. Even more importantly, water vapor BT varies strongly with few angle, much more than an IR longwave window.

Page 13. Line 6. This might be a good spot to reference: Line, W. E., T. J. Schmit, D. T. Lindsey, and S. J. Goodman, 2016: Use of Geostationary Super Rapid Scan Satellite Imagery by the Storm Prediction Center. Wea. Forecasting, 31, 483–494, https://doi.org/10.1175/WAF-D-15-0135.1.

Page 14. Line 8. Again, is the every other line/element based on 4km pixels? If so, this should be stated for clarity.

Figure 1. Define what calibration means. Pre-launch? Adjusted for degradation over time? State that the images have been re-mapped to a common projection.

Figure 2. Severe storms based on NOAA storm reports of hail? Wind?

Technical corrections

Page 5. Line 22. Typo: founFu, D.rthermore

###

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2020-206, 2020.