

## ***Interactive comment on “Cloud\_cci ATSR-2 and AATSR dataset version 3: a 17-year climatology of global cloud and radiation properties” by Caroline A. Poulsen et al.***

### **Anonymous Referee #3**

Received and published: 20 January 2020

This paper describes Version 3 of a dataset from the Cloud-cci project based on ATSR-2/AATSR observations. The article is well structured and clear. Sufficient figures are included to understand the nature of the product and changes since Version 2. Multi-year global cloud data sets such as this are important for a wide variety of studies. Over the time period the observations were made, the capabilities of these two sensors offer several unique strengths. Further, this 17-year data set will be extended by observations from the two SLSTR instruments which began in 2016. Thus, the ATSR/AATSR datasets which are the subject of this paper are unique and important.

The paper includes sufficient references to the instruments and algorithms. Datasets

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such as these require instruments with radiometric calibrations which are consistent and stable. Long term calibration drifts must be monitored and characterized. One paper on solar calibration accuracy is referenced but references on calibration of the infrared radiances are necessary, particularly in light of the statement that the dataset is well suited to investigation of trends.

Specific comments: The sentence in lines 45-47 implies CloudSat detection of GHG-forced trends in cloud height is limited by nadir-only sampling. The larger issue is separating forced cloud changes from natural variability. There has been considerable work which makes clear that long-term calibration stability is a major difficulty in characterizing forced trends from passive sensors observations. See, for example, Shea et al. (JGR, 2017, doi:10.1175/JCLI-D-16-0429.1). I'm not sure what the point of the last half of this paragraph is, which raises complex observational issues which are beyond the scope of this paper.

Line 72: This doesn't look like a complete sentence. Maybe something like "ATSR is designed to provide low noise radiance measurements ..." - ?

Table 3: Define 'hit rate'. How is hit rate different from probability of detection? I'm not familiar with Kuiper Skill Score, please provide a reference.

Line 221: As a general comment: peer reviewed publications should be cited rather than data quality summaries posted on-line, unless the information is only available from on-line summaries. Results reported in refereed papers are archival, have usually received more scrutiny, and tend to be better explained and documented.

Line 222: Are the CERES uncertainties which are mentioned the uncertainties in the monthly global means?

Line 223 and 258-259: global means are within CERES uncertainties only for 60N-60S. All-sky fluxes show differences which are much larger, and there are significant regional biases which seem to be associated with clouds.

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Line 164: “version 4-20” should be “version 4.20”

Line 228: incomplete sentence

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Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2019-217>, 2019.

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