

## ***Interactive comment on “Fast simulators for satellite cloud optical centroid pressure retrievals, 1. evaluation of OMI cloud retrievals” by J. Joiner et al.***

### **Anonymous Referee #1**

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The paper describes a fast simulator for estimating cloud optical centroid pressure given a vertical profile of optical extinction. The fast simulator is used to compare CloudSat/MODIS based cloud OCPs with two different OMI cloud OCP data sets.

The paper is well-written. A few minor points need to be clarified. They are listed below. The paper is acceptable for publication after consideration of these points.

Specific comments:

1. Title: "Fast simulators" is in plural, but "a fast simulator" is described in the abstract and the manuscript.

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2. Pages 6190-6191: May something be said about the uncertainties of the various OCP products?

3. Page 6192, lines 4-9, Section 2.3 Modis cloud top pressure: all other retrieval algorithms used in the paper are described to some extent. Please also include a sentence or two describing the MODIS cloud-top pressure retrieval.

4. Page 6193, lines 22-23. What is the effect of this averaging? Has it been quantified?

5. Page 6195, lines 9-10. "such a simple model . . . . appears to be appropriate for providing relative values". Have you done any calculations to justify this statement or are there any relevant references to be mentioned? What are the criteria to justify the use of a simple model? As the model is used in the fast simulator a quantitative justification for its use should be included. Please expand and justify the use of the delta-Eddington approximation of Jospeh et al (1976).

6. Page 6196, line 8. It is stated that "We tested several other methods. . .". Please describe these "other methods". As it stands this sentence and the following do not provide any useful information for the reader.

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