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Interactive comment on "Estimations of Global Shortwave Direct Aerosol Radiative Effects Above Opaque Water Clouds Using a Combination of A-Train Satellite Sensors" *by* Meloë S. Kacenelenbogen et al.

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I will keep the review short and to the point. If not the lengthiest, it is one of the lengthiest manuscripts I have reviewed so far. So it took me some time to go through it few times and come to the grips of how the DARE_OWCs are actually computed. But once I stated reading it carefully, it was easier to follow and understand. I appreciate the hidden efforts behind the work needed to bring onboard information from the suit of

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Discussion paper

sensors. I also appreciate the way authors contrast and compare their results with the previous studies. Table 5 is a good idea and could be useful for evaluating models. As far as the methodology and results are concerned, I do not see anything that should raise a red flag. I do however have one key concern as mentioned below.

CALIOP offers two distinct advantages over passive sensors, namely its superiority in detecting aerosol layers and their precise altitudes. While the authors go to such a great length and detail to be as realistic and up-to-date in taking into account aerosol and cloud layers (and their properties) as possible, if I am not mistaken, the altitude of these layers is assumed to be constant globally. And I can't help but wonder how this is going to affect their estimates, given the diversity in the verticality of aerosol and clouds in the AAC scenarios and its impact on DARE_OWCs. It is not even clear to me if only tropospheric aerosols were selected (maybe I missed reading it somewhere). I understand that the authors comment on this in Section 4.5, but I would really appreciate if the authors do a quick sensitivity study (e.g. maybe over one of the hot-spots) by incorporating realistic vertical distribution of aerosol and cloud layers, to be able to get an idea of the uncertainty.

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