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Interactive comment on "Analysis of simultaneous aerosol and ocean glint retrieval using multi-angle observations" *by* Kirk Knobelspiesse et al.

Anonymous Referee #1

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This study presents a theoretical information content analysis to evaluate the capability of multi-angular MISR 865nm measurements to simultaneously determine aerosol and ocean surface sun glint variables, including AOD, fine-mode fraction, relative humidity, and surface wind speed. Such analysis was accomplished by a radiative transfer simulation of seven sets of MISR observation geometries and the Bayesian-based information content (and error) analysis. Authors also performed several comparative information analysis to evaluate the sensitivity of retrieval errors to solar & view geometries, plane-parallel atmosphere assumption in radiative transfer, and wind direction.

This is an important study, as indicated by the authors, which is to lay the groundwork for the design of an algorithm for a simultaneous retrieval of aerosol and ocean surface properties from MISR. The paper is well written and well organized. I have the following

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[Discussion paper]

comments that author may consider:

1. It seems to me that correlation between errors of individual observations and correlation between the prior error of each state elements are not considered in the Bayesian information analysis. However, these error covariances may exist between MISR's multi-angular observations, as well as between some retrieved variables (such as AOD and fine-mode fraction, AOD and RH). It is thus necessary to explicitly declare the assumption of error correlation in this work and discuss its potential impacts to the results.

2. I agree with the reviewer #1 that more analysis should be performed to extend the currently selected geometrical conditions. It will be of interest to see the results for MISR observations in solar principal plane and perpendicular plane (which are currently missing in the selected geometries, as in Figure 1).

3. In the section of results, readers need to compare posterior PDFs for different conditions but tend to get lost to flip back-and-forth between Figures 3 to 7. I would recommend to rearrange the panels in Figure 3-7 by combining same panels for different conditions. Doing so will help the comparative interpretation.

4. The symbol "r" is used to represent both relative humidity and particle radius. Authors may want to use different symbols for them to avoid confusion.