Response to the comments of Reviewer 2

This work addresses a retrieval method of the optical depth of super-thin oceanic clouds using polarization as a theoretical study. This sort of cloud is quite difficult for detection with conventional passive sensors, but the authors had developed a detection method for the clouds using polarization in the previous study, and further proposed a retrieval method. Overall, this paper is well-written and the reviewer recommends the publication after solving the following points.

Answer: The authors of this manuscript greatly thank this reviewer for the helpful and insightful comments.

Specific points: The reviewer wonders how large the retrieval error would be. Could the authors give any sensitivity study within realistic ranges of calibration for PARASOL data?

Answer: Following this comment, we add in the text of Conclusion: "Our sensitivity study shows that for a polarization intensity measurements with ~10% calibration error such as those from the PARASOL 670 nm channel (Fougnie et al., 2007), this algorithm can have ~0.006 uncertainty in the retrieved super-thin cloud OD."

Could the authors give any validation results using, for example, CALIOP and so on? Is it out of the scope?

Answer: Because "clear sky" between thick clouds over ocean generally are not in very big range in midlatitude and tropical areas, PARASOL's resolution and acquiring rate have problem to obtain clear-sky data without thick clouds contamination and with densely multi-angle measurements for glory patterns. On the other hand, the CALIOP has serious sunlight contamination during daytime, super-thin cloud measurements from daytime CALIOP have very large errors. It is not reliable to use the current data for validation of this method now.

We are proposing a new generation of fast and high-resolution polarimeter and improved lidar technique for solution of this problem.

Typographical points: Line 7, Page 21963: 'term' should be 'terms'? Lines 8 and 9, Page 21969: If two descriptions of Sun et al. (2014) are the same, how about combining them into one 'Sun et al. (2014)'?

Answer: These are corrected following this helpful comment.