

## ***Interactive comment on “MBL drizzle properties and their impact on cloud property retrievals” by P. Wu et al.***

**Anonymous Referee #1**

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This paper provides a concise description about the drizzle and cloud properties derived with simple methods and discusses the importance of drizzles to the retrieval of cloud properties using empirical regression equations. This short paper is well-written and delivers the information of both drizzle and cloud properties over Azores site.

General comments: 1. The conclusion that the impact of drizzle on cloud property retrievals is insignificant at the ARM Azores site is conditional. It is right for the cloud retrieval method used here based on empirical regression equations which are dependent on both solar transmission and liquid water path. However, for other types of retrieval algorithms, such as those based on radar reflectivity, this conclusion might be not applicable. I would recommend the authors to be more cautious for this claim.

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2. Since the cloud retrieval method examined here is an empirical regression algorithm. This study in principle examined the role of LWP contribution from the drizzles. To examine the accuracy of cloud retrievals that are used here for Azores site, an intercomparison with in-situ aircraft observations might be optimal. Of course, it does not affect the major part this study is trying to understand without the use of aircraft observations.

3. For the examination of roles of drizzles to cloud retrievals, this paper has examined the uncertainties in cloud retrievals with the method developed by Dong et al. (1998). The main error is from the relative LWP contribution by drizzles. However, various cloud retrievals exist, particularly those based on radar reflectivity or spectral radiation. If possible, it will be great if the authors can also examine the role of drizzles to other types of cloud retrievals.

4. For page 4311 that describes the cloud retrieval algorithm, I would suggest briefly indicating or discussing the cloud retrieval uncertainties for each variables. As we know, uncertainties in LWP and sigma (logarithmic width), solar transmission and other variables could introduce errors to the cloud retrievals. The authors indicate an uncertainty of  $\sim 10\%$  in page 4316, but that is too simple to know details. Knowing the cloud retrieval uncertainties is very importance since this information could help us know the uncertainty contribution from the drizzle is significant or not compared to other influential factors.

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