

Interactive comment on “Optimizing observations of drizzle onset with millimeter-wavelength radars” by Claudia Acquistapace et al.

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We thank the reviewer for his/her comments. In the following we respond to all of the reviewer's three sentences:

"The paper is a nicely laid out study conducted to optimize the settings of the European millimeter-wavelength radars to detect the onset of drizzle formation in clouds."

The referee acknowledges a "...nicely laid out study conducted to optimize the settings of European millimeter-wavelength radars..". We interpret this comment as an acknowledgement of substantial scientific work which has flown into this manuscript. Unfortunately, the reviewer has only addressed 3 of the 15 review criteria mentioned in the AMT referee guidelines (http://www.atmospheric-measurement-techniques.net/peer_review/review_criteria.html) whereby the argumentation is difficult

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to follow objectively due to brevity of the comment.

"Unfortunately, the topic is so narrow (a single process in warm clouds), . . ."

It is indeed true that the topic we investigated is strongly focused on drizzle onset. In the paper we are not proposing that a radar has to be only optimized for drizzle onset studies. Rather, this study – unlike previous studies looking at drizzle – tries to present a systematic approach how to determine such optimized radar settings for a specific application; it is self-understanding that this approach should be applied in a similar way also to other topics (such as super-cooled liquid water, ice, snow and rimed particles (Shupe et al, 2004, Verlinde et al, 2013, Kalesse et al, 2015)) as mentioned in the manuscript).

"the work covers roughly the same ground as a series of papers (on the same narrow topic) done by one of the co-authors, . . ."

Since the reviewer is not mentioning explicitly which papers he/she is referring to, it is hard to answer this point in a more specific way. However, we would like to mention that in the past, to the authors' knowledge, only Kollias et al., 2005 investigated the need for a higher temporal resolution of radar products. For this, they compared time series of mean Doppler velocities collected by two different radar systems. No statistical approach was presented and the analysis was limited to the mean Doppler velocity, with only general conclusions drawn for spectral width. Thus, it remains an open question how different integration times influence skewness and other radar Doppler moments in a statistical sense. The scope of our paper is to answer this question.

Drizzle onset has been selected because it is one of the most mature applications of higher Doppler radar moments. Therefore, skewness-based drizzle detection is likely to be included in cloud classification algorithms like Cloudnet in the near future. Because there exists a growing number of MIRA radars across the world, we think that is an extremely important task to find optimal radar settings. This is essential to ensure a high data quality and homogeneity of retrieved products across a future radar network.

Even for the ARM program, guidelines for the optimal radar settings have not yet been officially published. Therefore, the authors are convinced that it is absolutely vital to share our findings with the radar community. We would like to quote the comment of reviewer #2 which expresses exactly our intentions of this study: "This seems a bit technical but this is an original and precious work in the sense that papers describing the optimization of radar data processing in the light of observational needs are very rare. And it is probably for this reason that currently, most of the radars of the type considered in this paper are not using the optimal settings (for drizzle observation at least), an important finding of this work. Overall, this manuscript is well written and is well suited for the readers of the Journal of Atmospheric Measurement Techniques (AMT)."

"...and reaches no conclusions that I could not have predicted after I read the introduction. I do think this paper, while a nice piece of work, falls well below the required level for publication."

Also this comment is very general in our opinion. We are convinced that finding results as expected does not mean that a study is not worth publishing. Moreover, several outcomes of this study were different from what we expected at the beginning e.g. the negligible impact of the spectral resolution on the Doppler moments estimations and the lack of substantial differences between 1 and 2 s integration times. Since the title of the journal is "Atmospheric Measurement Techniques" we think our study fits exactly in the scope of this journal.

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