Review of “Is there an aerosol signature of cloud processing?” by Ervens et al. (2018)

The authors have thoroughly revised their manuscript considering mostly all of the comments raised. I have one small remaining concern about the calculated mass ratio. I read through the manuscript, and have the following comment which need to be addressed in the final manuscript.

In the revised manuscript, the authors have used aerosols in a size range up to 850 nm for the calculation of the $R_{tot}$ factor. In the firstly submitted manuscript, aerosols in a size range up to 320 nm were used for the calculation of the $R_{tot}$ factor. The authors mentioned in their revision “The resulting total masses are considerably higher and, thus, the resulting $R$ values are much smaller.” and “Scenarios where this ratio exceeds $R_{tot} \sim 0.5$ are the most likely ones where clouds can significantly change aerosol parameters.”. The value in the firstly submitted version was $R_{tot} \sim 2$.

So, the applied aerosol size range for the calculation affects significantly the $R_{tot}$ values which are used to predict a chemical cloud-processing signature in selected air masses. Therefore, I guess it should be clearly stated in the revised manuscript that for the calculation of $R_{tot}$ values only aerosols in a size range up to 850 nm (PM 0.85) should be used. If aerosols with a different size range are used the resulting $R_{tot}$ values could be smaller or higher. Thus, a comparison with the proposed value of $R_{tot} (\sim 0.5)$, provided in the present study, could be misleading.

Response: We appreciate the reviewer’s comment and agree with this caveat on the use of $R$. We ded the following text to the manuscript:

Abstract: It should be noted that the absolute value of $R_{tot}$ depends on the considered size range of particles.

At the end of Section 3.1.4: In the experiments described by Wagner et al. (2015) and Wonaschuetz et al. (2012) similar particle size ranges (< 50 nm up to 800 nm) were measured. If a narrower range of particle sizes were taken into account (e.g., only SMPS data up to $D = 316$ nm, cf Section 2.1.1), the denominator in Equation-1 will be smaller and consequently the resulting $R$ larger. Thus, by comparing $R$ values from different experiments, it should be made sure that measurements of similar particle size ranges are considered.

In the conclusions: It should be cautioned that only measurements of similar particle size ranges should be compared since this range will determine the initial aerosol mass that is used in the calculation of $R$. 