Review of the manuscript „Composition, size and cloud condensation nuclei activity of biomass burning aerosol from north Australian savannah fires" by Marc D. Mallet et al., 2016.

This manuscript describes the measurements of biomass burning aerosol (BBA) in terms of size, number concentration and chemical composition, which were obtained in the north of Australia during June 2014. The results show that the manmade and natural fires in this region of Australia are an important source for CCN in this season. Also diurnal trends in the properties of the BBA are highlighted. A case study is used to highlight the importance the contribution of the BBA to the CCN concentration.

The results are interesting, useful and also rare for this geographic region and are therefore within the scope of ACP. However, some paragraphs were unclear to me. Also, many minor typos and false figure references and labels lead to my recommendation, to publish this work with minor revisions.

Major comments

Since the measurement site is quite close to Darwin, can contamination of emissions from the city be excluded from the measurements, e.g. by trajectory calculations? Are there any industrial sites nearby that can influence the results?

Figure 1 connects the CCN concentrations to the number of fires nearby. However, this does not include information about the size of the fire, the type of fuel burned, rate of spread of the fire,… Is this important for your study? Also, how does the wind speed influence the results?

Why do you have different definitions of day and night? P9L20: 07:00-19:00 and 19:00-07:00 versus P19L27 18:00-07:00? Typo?

Figure 5: I do not see the same numbers that are indicated in the text. The first period (afternoon 25th June) shows values up to 19000 cm^{-3}, activation ratios up to 0.8% and κ values up to 0.1. Maybe, as stated in the technical corrections, you could indicate the periods in the figure?

Could you provide more information on how you obtained the data for figure 6? How did you model the CCN concentration?

Technical corrections

- When listing more the one reference, a space is missing, e.g. Kaufman et al., 1998;Warner….
- P3L6 space missing before references
- P3L7 Remove spare space after period
- P4L15 Remove "that can occur"
- P7L3 Missing period after "aerosol"
- P8L12 wrong usage of unit. Replace "Jm^{-2}" with "J m^{-2}" Also occurring several times in Section 3.5
- Use the umlaut (mutated vowel) Ö in κ-Köhler
- The figure quality is bad for all figures
- Figure 1: labelling of fire distance is wrong. The text stated two distances (20 and 50 km), the labelling shows (10 and 20 km).
- P12L21 Figure 4 is mentioned, but I think you mean Figure 3. Continued on Page 13
- P14L11 Same as above, but vice versa
- Figure 5 Please indicate the two periods you mention in the text. This makes it easier to follow your numbers.
- Check References; some papers are mentioned in the text but do not appear in the reference section. (Reutter et al., 2009, Gacita et al., 2016?)