Comments on "The influence of local oil exploration, regional wildfires, and long range transport on summer 2015 aerosol over the North Slope of Alaska" by Creamean et al.

This study analysed the airborne observations during ACME-V campaign along the North Slope of Alaska in the summer of 2015 and found that summertime Alaskan Arctic was not pristine as suggested by previous evidence, but was with higher aerosol loading and trace gas concentrations than measurements even in Arctic haze. Local oil extraction activities, central Alaskan wildfires, and to a lesser extent, long-range transport enhanced the aerosol and trace gas concentrations in Alaskan Arctic during summertime.
Quantifying aerosol loading and sources in the Arctic is challenging. The aircraft observations presented in this study is therefore an important contribution to the field, but the analysis and writing quality of this manuscript is really poor. I recommend publication in ACP after major revisions and substantial improvements.

Major comments:

1. The analysis of the data was a little superficial and I suggest the authors dig deeper. For example, in Figs. 3, 7 and 9, the data were color coded by flight numbers, which does not provide any valuable information. They already classified the flights into several air mass types as shown in Table 2 and Fig. 10. I think analysis based on different air mass types would provide more information than the current flight numbers used in the manuscript. In addition, Figs. 2, 3 and 4 discussing the impacts of oil extraction was based on data during the whole campaign. I suggest select the period during which these sources dominate would be better to illustrate their contributions.

2. The manuscript was poorly organized, making it really hard to follow. For example, in Sect. 3.1, figures were discussed back and forth. Fig. 2 c and d were discussed after Fig. 4. In the same section, the idea that 'high concentration of small particles are restricted within 50 km of Deadhorse' has been discussed several times (P6, L21–26, P7, L14–16, and P7, L24–25). In Sect. 3.2, discussions of different species were also jumped back and forth. For instance, aerosols were discussed in P8, L15–19, P8, L25–29 and P9, L21–25. Background concentrations of CO and enhanced CO were discussed back and forth in P9, L1–14. In Sect. 3.3, the second paragraph discussing air mass types along the flights does not belong to this section, which is supposed to discuss the contribution from long range transport. Long range transport deserves more analysis.

3. Another problem of the paper is the sloppy style of writing and the use of the English language. For instance, the tense was wrong in numerous places. To name a few, P1, L 22–44, P3, L16, and P3, L30. The references were not always written in the correct format. '… and colleagues (year)' should be '… et al. (year)'. The acronyms were not properly used (e.g. 'rBC' and 'black carbon', 'CO' and 'carbon monoxide'

were used back and forth; AMSL and MSL were not spelled out when they were used for the first time; ARM and AOD were spelled out twice). A lot of 'and/or' were used. Please double check and delete 'and' or 'or'. I also list a few other problems in the 'Minor comments' section, but all these I've pointed out are only a few of the language problems in the manuscript. I suggest a much more careful checking of the manuscript and a substantial improvement of the language.

4. In section 3.2, please compare the fire activity in summer 2015 with climatology to illustrate how representative the summer is.

5. Axis labels of Fig. 7b are wrong.

Minor comments:

1. P2, L22: 'to discover' is inappropriate here. Revise please.
2. P2, L25: 'during their Aug–Sep 2015 study' -> 'during Aug–Sep, 2015'
3. P2, L29: 'exists' -> 'locates'
4. P2, L31: revise 'provides the ability to …'
5. P2, L33: 'long-range transported aerosol from lower latitudes' -> 'long-range transport from lower latitudes'
6. P3, L1: 'insight' -> 'insights'
7. P3, L2–3: please provide proper references
8. P4, L23: CO_2 were also discussed.
9. P5, L6: particles -> particle
10. P5, L23: 'landing the Deadhourse' -> 'landing in the Deadhourse''
11. P5, L30–33: please show these locations in related figures.
12. P6, L17–18: please clarify which data were used.
13. P6, L19: '&'-> 'and'
14. P6, 31: those vapours does not nucleate, the secondary products are. Please clarify.
15. P8, L31: Please provide concentration values in standard summertime and springtime.
16. P9, L4–5: please clarify whether it is active flaming or smoldering.
17. P10, L9: what are the tracers?
18. P19: Figure 2. [mass m^{-3}] is not a unit
19. P22: Figure 5. Move the colour bar to the bottom of the figure.