

## Reviewer 1

The manuscript has improved a lot after revision. But I still suggest some comments for minor revisions.

In Figs. 3 and 8, the blue dots are 'Prudhole Bay Boundary layer' (not 'Prudhoe Bay' as shown in the figures) according to the definition in Table2.

*We changed both Figures 3 and 8 captions to be clearer that the figures are showing Prudhoe Bay in the boundary layer.*

P1, L12-14: I think these statements belong to the introduction section.

*We wanted to include some background in the abstract, so we left these statements in the abstract. We touch on these in the introduction already.*

P2, L1-5: please provide citations.

*Done. We included Tsay et al. (1989) for the first sentence and Boucher et al. (2013) to the second sentence. The third sentence is covered by Boucher et al. (2013).*

P5, L4: fossil fuel -> fossil fuel combustion

*Done.*

P6, L26: 'spatial extent of Prudhoe Bay emissions' is confusing. Please revise.

*We changed 'extent' to 'coverage'.*

P8, L29: Summer 2015 season -> Fires in summer 2015

*We changed to 'The 2015 summer fire season'.*

P8, L30: existed -> lasted

*Done.*

P9, L1-2: I suggest add 'during' before every date

*Done.*

P9, L3: 'larger' compared to what?

*We changed 'larger' to 'increased'.*

P9, L10: 'since ...' is confusing. Please revise.

*We changed 'since' to 'due to the fact that'.*

P9, L13-14: 'Combined, ...' is confusing. Please revise.

*This is referring to the HYSPLIT and MCE data. We revised to clarify.*

P10, L18: the citations should be 'Leaitch et al., 2013; 2016'

*We left as is, since this is the format of the Copernicus Endnote Style downloaded directly from the website.*

P10, L10: 'the presence of ... is lower' is wrong. The concentration can be high or low.

*P10, L10 does not contain this information. But we see the reviewer meant P10, L18-19 and revised to say the 'concentrations of pollutants'.*

Section 3.3 used a lot of 'the summer'. If it is general and not referred to as the summer in 2015 discussed in the paper, 'the' should be deleted.

*Done.*

The summary is usually in past tense.

*Most of it already was in past tense, but we changed the second sentence to be past tense.*

## **Reviewer 2**

This revised paper accurately reports novel and interesting observations of summertime aerosol from the North Slope of Alaska and I recommend publication. One (very) minor comment concerning a typo is included below.

Minor comments:

In Figure 6: 'Correlations between CO and c) rBC mass and d) scattering efficiencies at 550nm for are also shown' the caption appears to be missing a word after for? It would also improve clarity if the authors defined MCE.

*Typo, we added 'all data' after 'for'. We also defined MCE.*