

### **Anonymous Referee #3**

*The manuscript of Guo et al. focuses on quantification of primary and secondary organic tracers in total suspended particles over the Yellow and Bohai seas (YBS) and the South China Sea (SCS) collected both in 2014, and the northwest Pacific Ocean (NWPO) collected in 2017. The authors focused on the long-range transport impact to the marine atmosphere in spring during East Asian monsoon season. Thus, the influence of continental BB aerosols in marine atmosphere was studied and the contributions of different precursors to the observed SOA were quantified using specific tracers. Also, SOA formation pathways in marine atmosphere have been discussed and related to the literature data. It is high quality work focusing on organic aerosols from remote marine areas which are rare compared with continental ones.*

**Response:** We thank the reviewer's comments and revise our manuscript accordingly.

*Major comment: Major comment is related to the fact that this study presents a snapshot situation at particular marine areas and it is hard to distinguish how representative they are for general conclusions. With that in mind, the discussion and conclusions related to the SOA change in recent decades are questionable. This is especially addressed to the continent-derived BB aerosols affected by accidental intensive open-fire events and or specific meteorological conditions. Long-term study is needed to enable conclusions on increase/decrease in contribution of continental-derived BB aerosols to remote marine areas (L17-19; L152-154; L434-443). Despite the authors did great effort to support their discussion with the relevant literature, conclusions arising from there should be done more carefully since the authors compare a snapshot situation. Authors should comment on that and/or all general conclusions related to above should be avoided.*

**Response:** We agree with the comments and soften the arguments accordingly. In revision, they have been revised as “The comparison of levoglucosan observed in this study with values from the literature showed that the concentrations of biomass burning aerosols over the NWPO increased largely in 2014. More observations

together with the snapshot measurement, however, need to confirm whether the large increase occurred continuously through the last decades.”

“Using these previous observations as a reference (Table 1), our observations suggested that the BB aerosols from the long-range transport over the NWPO in 2014 largely increased. Thus, an important question is raised, i.e., does the increase occur continuously and largely over the last decades in marine atmospheres over the NWPO?”

“This further implied a large increase in continent-derived BB aerosols in marine atmospheres over the NWPO recently, compared to previous studies. An important question is thereby raised, i.e., does a large increase in continent-derived BB aerosols in marine atmospheres over the NWPO occur continuously and largely in recent decades?”

*Minor comments*

*Line 153 Add . . .as a reference (Table 1),*

*L161-L163 Remove –samples- from the sentence or rewrite*

*L181 Change –surprised- with to surprise or surprising*

**Response:** Done. Thanks.

*L205 I suggest to rewrite the first sentence in figure caption, it is unclearly written*

**Response:**

The caption was rewritten into “Spatial distribution of LEVO in TSP over the NWPO in spring of 2014 and 72-hrs back trajectory associated with each TSP sample. The red lines represent that air masses can be derived from the continent (a, Category 1); the blue lines represent that air masses may be derived mainly from the oceans (b, Category 2). The red dots represent the locations of fires from Fire Information for Resource Management System (FIRMS, <https://firms.modaps.eosdis.nasa.gov/>). And the base map was from Resource and Environment Data Cloud 210 Platform, DOI: 10.12078/2018110201.”.

*L212 Replace NWPO with SCS.*

**Response:** Done. Thanks.