

# ***Interactive comment on “Long-term (2001–2012) trends of carbonaceous aerosols from remote island in the western North Pacific: an outflow region of Asian pollutants and dust” by Suresh K. R. Boreddy et al.***

## **Anonymous Referee #1**

Received and published: 13 May 2017

The manuscript titled “Long-term (2001-2012) trends of carbonaceous aerosols from remote island in the western North Pacific: an outflow region of Asian pollutants and dust”, is a well written paper. The methodology is sound and data analysis is convincing. The theme of the manuscript is well in accordance with the scope of the journal. The logic was explicit, and the content was comprehensive and integrated. However, some corrections are still needed before it can be published.

Some grammatical errors as well as the wrong use of articles (a/an/the) are found and must be checked before resubmission.

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Specific comments: Line 24–25: It would be better to write the abbreviations just after to the name e.g. elemental carbon (EC). . . .

Line 30: continental polluted air masses

Line 33: formation of secondary organic aerosols (SOAs)

Line 35: We found significant increase. . . . .

Line 36: biomass-burning-derived

Line 37: anthropogenic sources or anthropogenic aerosols?

Line 38-39: The correlation between OC and MSA- can be shown here to strengthen the sentence.

Line 40: significant increase in OC/TC and WSOC/TC ratios,

Line 40-42: Please rephrase the sentence. Line 42: long-range atmospheric transport? from?

Line 52: There should be a space after “;” in citation bracket throughout the ms e.g. (Zhang and Cao, 2015; Cui et al., 2015).

Line 58: “cooling effect” It’s not necessarily always. It would be better to bring the term “brown carbon” also here and simply describe it.

Line 60-61: This sentence is a complex one. It can be made simple by describing the above comment.

Line 62: estimation of net radiative forcing

Line 65: It would be better to write “radiative balance” in place of “climate”.

Line 79: However, there is still large uncertainties exist in quantification of radiative impacts for carbonaceous aerosols. . . .

Line 88: Expand MEGAN and MOHYCAN

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Line 109: Expand WSOC. It's the first use of this term here.

Line 175: Here the zero in 'H0" can be made subscript "H<sub>0</sub>".

Line 189: Why 850 hPa pressure level has been used? Please brief the specific reason, if any? Why not 1000 hPa, as the study includes surface concentrations? 850 hPa level is roughly at 1.5 km, may be higher than the marine boundary layer over western Pacific irrespective of seasons. Have you also studied the seasonal variations in boundary layer height?

Line 195-197: Some BT analysis can be added here from literatures.

Line 204: The study period is 2001-2012, why authors have used the met data 2001-2013 in figure S1? Also the figure S1 is showing the year 2014. Please make it clear to easy go for readers.

Line 214: All measured species (Fig 3a–c). . . . .and then again an increasing peak in autumn. It is suggested to discuss monthly variations instead of combine winter-spring season.

Line 215: The seasonal pattern is found consistent with the typical. . . .

Line 219: discussed in section 3.1.

Line 220: The highest concentration was clearly seen in March. It is suggested to discuss monthly variations wrt the figure 3 instead of combine winter-spring season.

Line 225: (Figure 2c)

Line 232: were up to seven. . .

Line 233-234: suggested negligible contribution of local anthropogenic emissions as well as long-range influences over. . . .

Line 235: was found maximum in summer and minimum..

Line 236: suggesting negligible. . .No need of insert "a" in between.

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Line 244: delete “over the sampling sites”

Line 248: “observed in midsummer to early autumn”...also write the name of months may in bracket for easy understanding.

Line 248-250: “suggesting an influence of biomass burning emissions from southeast Asian countries via long-range” How it suggests? Is it only an assumption? Otherwise provide some suitable references.

Line 251-253: No. Figure 2c is not clearly showing dominant flow from SEA. Please maximize the axis scale in Figure 2. Moreover, enhanced BB over SEA is evident in February–April not common in June-August (summer) and Sept–Nov (autumn) as mentioned in this study. It may be only occasional. It is suggested to rephrase the sentences. In addition to the continental Asian outflow, western Pacific Ocean also receives biomass burning emissions from Southeast Asia particularly in spring (late February to mid-April) through westerlies. Ex: Tsay et al. (2016) Satellite-Surface Perspectives of Air Quality and Aerosol-Cloud Effects on the Environment: An Overview of 7-SEAS/BASELInE. *Aerosol and Air Quality Research* 16, 2581-2602.

Lin et al. (2013). An Overview of Regional Experiments on Biomass Burning Aerosols and Related Pollutants in Southeast Asia: From BASE-ASIA and the Dongsha Experiment to 7-SEAS. *Atmos. Environ.* 78, 1–19.

Huang et al. (2013), Impact assessment of biomass burning on air quality in Southeast and East Asia during BASE-ASIA, *Atmospheric Environment*, 78, 291 – 302.

Line 259: an unique

Line 283: showed clear.....

Line 287: EC showed a decreasing order,.....continuously increasing....

Line 336: not necessarily OC always scatters the radiation. OC form BB mostly absorbs. Rephrase the sentence.

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Line 338: “extension” changes to “extinction”. It is suggested to use this reference. Pani et al. (2016). Radiative effect of springtime biomass-burning aerosols over Northern Indochina during 7-SEAS/BASELInE 2013 campaign. *Aerosol Air Qual. Res.*16: 2802–2817.

Line: 341: “OC/EC ratios can be used to understand the relative contributions of scattering or absorbing aerosols in the atmosphere (Ram and Sarin, 2015).” It can be but with much uncertainties and limitations. This is may not be true and enough for a marine boundary layer location where long-range transport of distinct air masses is the possible reason of carbons. OCs in this study may be more scatters only due to aging process.

Line 351: nss-sulfate (nss-SO<sub>4</sub><sup>2-</sup>) is a major contributor to the CCN,. . .use reference..

Line 352: also plays an. . .

Line 371: use “regional radiative balance” instead of “Earth’s radiative forcing”.

Please also note the supplement to this comment:

<http://www.atmos-chem-phys-discuss.net/acp-2017-288/acp-2017-288-RC1-supplement.pdf>

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