

We rally appreciate the efforts made to address the reviewers questions and comments. Nevertheless I believe there are still some minor points that need the author revision, in order to improve accuracy of the discussion on carbonaceous aerosol sources. Here is a list of editor's comments:

Line 90: rephrase as: "Using the emission **estimated by** Model of Emissions of Gases and Aerosols from Nature (MEGAN) **and** combined with the MOdel of HYdrocarbon Emissions from the CANopy (MOHYCAN) ~~model~~,"

Line 233: please rephrase as follows to take into account aqueous phase chemistry: "gas-to-particle conversion **and heterogeneous phase processing** in the atmosphere

Line 239: "The OC/EC ratios > 2.0 have been used to point out the presence of secondary organic aerosols (SOA)". But it can also be due to biomass burning emissions, which are POA.

Line 251: this line seems to contradict line 247, where SOA is recognized as the main source of carbonaceous aerosol "...biomass burning and fossil fuel combustion ~~are important sources for contribute to~~ carbonaceous aerosols over the western North Pacific **in winter to spring**."

Line 253 : Please rephrase as :It is well documented that nss-K<sup>+</sup> and EC ~~are the~~ **can be used as** tracers..."

These are not the unique sources of EC and nss-K<sup>+</sup>.

Line 273 :"~~(Kanakidou et al., 2005; Kondo et al., 2007)~~ and references therein).

Line 272-284: this paragraph is confused. It uses WSOC/OC as an indicator of SOA, but it also says that biomass burning (a POA component) emits WSOC. I would suggest to rephrase the sentence as follows: "Thus, measurements of WSOC have been used to estimate the SOA in ambient aerosols (Weber et al., 2007; Snyder et al., 2009; Sudheer et al., 2015; Decesari et al., 2001; Docherty et al., 2008). Because major fraction of biomass burning products is highly water soluble (Sannigrahi et al., 2006; Saarikoski et al., 2008), **in ambient with limited biomass burning impact** WSOC/OC ratio has been used as ~~an unique~~ tracer to better understand the photochemical activity and/or aging of aerosols and to discuss SOA formation mechanism in the atmosphere during long-range transport (Miyazaki et al., 2007; Ram et al., 2010b; Ram and Sarin, 2011; Kondo et al., 2007; Weber et al., 2007; ~~Gilardoni et al., 2016~~). The WSOC/OC ratios exceeding 0.4 have been used to indicate the significant contribution of SOA (Ram et al., 2010a) and aged aerosols."

Gilardoni et al., 2016 is not an appropriate reference here since it refers to an environment strongly affected by wood burning emissions.

Line 321-326. Please rephrase the sentence. It is not clear as it is written now.

In addition, the WIOM is attributed to marine primary aerosol, although it does not correlate with wind speed and sea salt. This attribution is weak. The link between the WIOC in summer and autumn and marine sources is based on the higher concentration of azelaic acid in these seasons. The increase of azelaic acid in summer and autumn could also be due to the higher contribution of biomass burning, in agreement with higher nss K<sup>+</sup>/EC. In fact, azeliac acid is also found in biomass burning plumes form oxidation of fatty acids released by fires (Graham et al., 2002 JGR) .

Line 345: Since high OC/EC and OC/TC ratio can indicate both higher SOA mass fraction or higher biomass burning mass fraction, I would suggest to rephrase the sentence as follows: "However, the annual trends of OC/EC and OC/TC ratios increased significantly (p<0.05; +0.46%

yr<sup>-1</sup> and +0.06% yr<sup>-1</sup> ) from 2001 to 2012 (Figure 5d and 5e), suggesting that ~~the secondary formation of OA and its contribution to carbonaceous aerosols have continually increased over the western North Pacific. These results further suggest that~~ the contribution of primary fossil fuel combustion to carbonaceous aerosols has declined during the sampling period.

Line 358-371: Since the site is affected by biomass burning emissions from south Asia, and biomass burning emits WSOC species, the use of WSOC or WSOC/OC as an indicator of SOA increase over years is misleading. Do you have any idea about the sudden decrease of WSOC/OC in 2007-2008?