

## ***Interactive comment on “Effect of biomass burning over the western North Pacific Rim: wintertime maxima of anhydrosugars in ambient aerosols from Okinawa” by C. Zhu and K. Kawamura***

### **Anonymous Referee #4**

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This manuscript presents ambient measurement results of anhydrosugars in aerosol particles collected at a remote background site (northern tip of Okinawa island) in Japan over a period of more than two years. Seasonal patterns and various diagnostic ratios, along with air mass history and fire count data, are used to explain qualitatively as well as semi-quantitatively the source influence from different types of biomass burning in various upwind regions of the Asian continent.

The paper is well structured, coherent, and concise, while more detailed discussions

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could enhance the presented findings in some cases, such as regarding the stability of the measured biomass burning tracers. Overall, this study is valuable to the atmospheric chemistry community, as the number of such measurements at background sites is limited, especially in East Asia and in the western North Pacific Rim. Therefore, I recommend publication of this manuscript in ACP upon consideration of the specific and technical comments given below.

#### Specific comments

1. The authors correctly point out (page 25591, lines 7-10) that agricultural residue burning on farm fields may not be detected by Satellite imaging due to the small scale of such fires. However, then they should be careful with the statement on page 25591, lines 1-2, saying that the observed hot spots are associate with open field burning.
2. For the discussion of the 27 October–3 November 2009 episode (page 25595, lines 1-8) the study by Zhang et al. (2007) could be cited here again, as it included maize straw (besides two other common types of biomass burned in south China: rice and wheat straw), and the average L/M ratio was very high (55), which indicates maize straw smoke to have a rather high L/M ratio as well, since it has been shown in other studies (e.g., Engling et al., 2009, Fu et al., 2008) that the respective ratios for rice and wheat straw can be in excess of 40.
3. The statement that the measured Lev/OC fractions indicate degradation of Lev (page 25596, lines 2-3) is rather presumptive and not really supported by the data presented here. The authors further explain that in the following statement, but they may want to tone down the statement in this sentence.

#### Technical comments

1. Please, use consistent acronyms, i.e., either "Lev" or "L" for levoglucosan, and don't say "L/M" one time and then "Lev/Man" in other places.
2. The proper use of articles (direct vs. indirect) and singular vs. plural forms needs

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to be checked throughout the entire manuscript. For example, on page 25582, line 10 the indirect article "a" is not necessary, on page 25583, line 9, say "smoke" instead of "smokes", or on page 25583, line 13 write "burning" rather than "burnings".

3. What are "smack and planting practices" (page 25583, line 12)?

4. What do the authors mean with "open field cooking for entertainment" (page 25595, line 13)?

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