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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Photochemical age of air pollutants and oxidation products in transboundary air observed on Fukue Island, Nagasaki, Japan" *by* S. Irei et al.

Anonymous Referee #2

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General Comments: My understanding of the purpose of this paper was to determine the age of air masses based on gas and particle phase oxidation products transported downwind of a highly polluted region. This work is motivated by a desire to understand the strong and evolving influence that point sources of air pollution in China have on the surrounding regions. It is clear in this paper that a lot of experimental work was done. The analyses performed are explained well and are thorough. All of the results are presented well, but I feel conclusions drawn from the results could be improved. For instance, what does it mean to have a similar f44 increase rate at your site as was observed during the New England Air Quality Study? I'm having trouble bridging the conceptual gap with how determining the age of these transported air masses

combined with the chemical oxidation product information gives us useful information about SOA or transported air pollution generally. Having this explicitly and simply laid out would be very useful, but it is not necessary.

Specific and technical comments:

section 3.3 – line 15 or so... I would change "highly correlated" to just "correlated"... that might be even stretching it with an R2 of 0.562 for OA but with ambient measurements "correlated" seems fair

section 3.3 – line 21 or so ... can you site a source for your average OH concentrations? generally to equate OH concentration into an equivalent "OH exposure day" in chamber studies we will use 1.5x10^6 [Mao, et al. 2008].

section 3.3 – "The high correlation (of particulate ammonium) with [delete organics] organics (m/z 44) suggests that (organics are primarily composed of carboxylic acids). [delete beyond here] in major the organics composed of carboxylic acids.

section 3.3 – I didn't really notice before here, but ammonium (NH4+, which is measured by the AMS is referred to as "ammonia" here which is not correct)

section 3.4 – what are the correlation values between your extracted spectra from PMF and the spectral database? What are the correlation values between your December spectra and the spectra described in this study?

General comment – The term "signifigance" is used, generally, in scientific literature to describe a statistical significance. When "the significance of a reaction channel" is being evaluated you could alternitavely say "the relevance". You could also say something like "the reaction of x with y is dominant during the day" as opposed to significant.

Page 21 - grammatical correction "This hypothesis consistently *explains our observations that the f44 oxidation indicator sometimes worked, and sometimes did not."