

# ***Interactive comment on “In Vitro Exposure to Isoprene-Derived Secondary Organic Aerosol by Direct Deposition and its Effects on COX-2 and IL-8 Gene Expression” by Maiko Arashiro et al.***

**Anonymous Referee #1**

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The health effects of ambient particulate matter, including SOA components from natural source, is an important scientific concern. Focusing on this issue, this study examined the toxicity of isoprene-derived SOA (generated in an outdoor chamber) on the expression of two inflammation associated genes with an in vitro model of human lung cell line. A novel direct deposition exposure method was applied, and the result was verified with a classical method of resuspended particle exposure. In general, this study was well designed (mainly for the chamber experiment) and has certain scientific significance, therefore it could be considered by the journal of ACP.

A major suggestion is on the discussion section. Obviously, the discussion section was neither in-depth nor penetrating enough, especially for the subsection of “biolog-

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ical implications". In this subsection, it provided only some comparison between this study and others. There is no further discussion on the mechanism between PM exposure and the expression of two inflammation genes, nor any discussion between specific SOA components and gene expression. In addition, why chose mRNA instead of inflammatory factors as the indicator of effects? Increase of gene expression (i.e., mRNA) doesn't always suggest the enhancement of corresponding functional proteins.

The following are some specific comments: Line 82: This abbreviation should be "VOCs". Lines 99-102: The reason for the selection of these two genes was too simple. Suggest the authors to provide some molecular mechanisms between these two genes and oxidative stress and inflammation. Furthermore, this information could also be discussed in the section of results and discussion. Lines 121 and 129: Many factor could influence the photochemical reactions, for example, temperature. What's the temperature (or range) of these sunny days? Lines 134 and 135: Could NO<sub>3</sub> radical trigger the formation of SOA at nighttime? Moreover, this statement sounds too assertive, and how about the temperature of the chamber? There must be some difference between nighttime and daytime. Line 151: There is the symbol of "-" between number and unit. Please unify this expression in lines 174 and 201. Line 169: Why choose nine hours as exposure time? Was there any temporal variation during the nine hours? Lin 171: Was there any preliminary experiment to show this storage did not change the extracted mRNA? Line 176: Typo of "resuspension". Lines 197 236: There are two subsection numbers of "2.6". Line 247: Why not measure the inflammatory factors release in the cell culture medium to verify the changes of mRNA? Line 258: Please define the abbreviation of SEM here. Lines 290 to 292: Were there any particular data to support this statement?

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