

Responses to the comments of Anonymous Referee #2

Comment 1 - In this article authors represent extensive and very impressive dataset, that is definitely worth of publishing. Article is easy to read and understand. Topic, SOA concentrations in East Asia is very important and requires attention. I will recommend accepting this paper with a few minor comments.

Response 1 - Thank you so much. Please see below point-by-point responses to the comments.

Comment 2 - Chapter 2. - Include number of samples /year to give reader an idea on how many samples conclusions are based on - CO, O₃ data are used in results. Please add information about these instruments also.

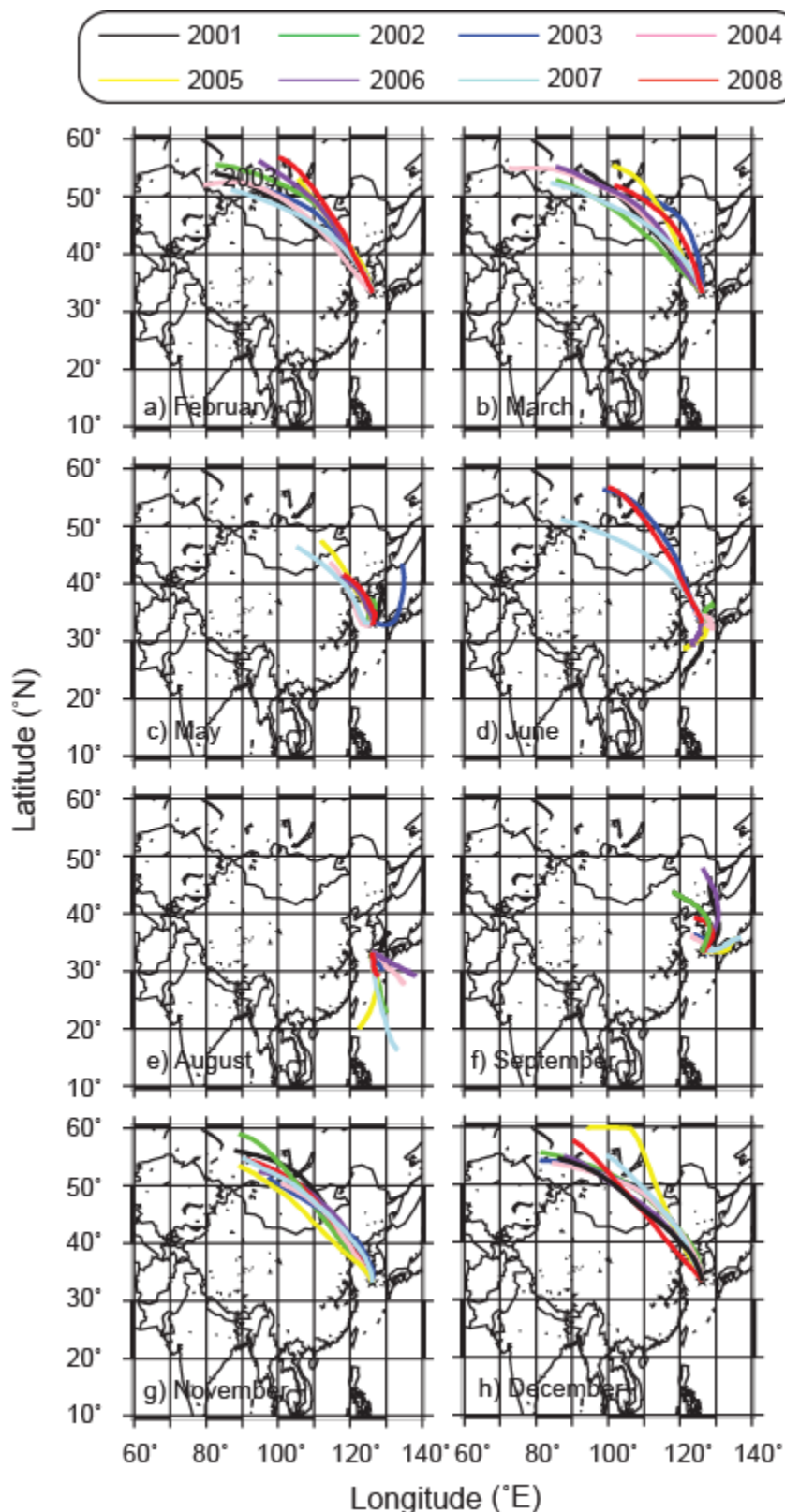
Response 2 - The samples collected per year have written in the revised manuscript as “The total numbers of samples collected were 71 in 2001, 25 in 2002, 48 in 2003, 98 in 2004, 123 in 2005, 116 in 2006, 142 in 2007, and 91 in 2008.” Please see lines 100-102 in the revised manuscript. The information related to the O₃ and CO monitor has been provided as “The concentrations of O₃ and CO were measured by the Korean Meteorological Administration (KMA) using Thermo Environmental Instrument 49C and 48C, respectively (Thermo Inc., USA). Please see lines 154-157 in the revised manuscript.

Comment 3 - Chapter 3.1. -Please define molecular distribution

Response 3 - We have described the term molecular distributions in the revised manuscript as “Molecular distributions, related to the presence/absence and abundance of organic compounds in atmospheric aerosols, provide important information about their sources, formation, chemical evolution and physical properties.” Please see lines 162-164 in the revised manuscript.

Comment 4 - Chapter 3.2 -Authors state that “Typical air mass transport patterns at Gosan have been shown with reference to the mid-month of each season over the time period of 2001–2008 (Fig. 3)”. Have authors checked that these mid-month values represent the whole dataset by calculating daily trajectories? I think so-called trajectory density plot (describing by color how often a trajectory intercepts a given locationbox) would describe situation better, but might be time-consuming to make.

Response 4 - According to this comment, we have added the air mass history for the other months as Fig. S1 in the supplementary materials. We have also described the results of Fig. S1 in the text. Please see lines 180-183 and 196-198 in the revised manuscript.



Comment 5 - Authors state that: “In spring, major saturated diacids did not correlate or loosely correlated with 2-methyltetrols (isoprene-SOA tracers, $r^2=0.001-0.05$) (Fig. 5a-e), pinic acid (an-pinene- SOA tracer, 0.10–0.39) (Fig. 6a–e) and levoglucosan (a biomass burning tracer, 0.001– 0.07) (Fig. 7a–e) (e.g., Fu et al., 2014). “. However, 2-Methyltetrol concentration were only measured for 2003-2004. Please add this to text.

Response 5 - We have provided that information as “In 2003-2004 spring, major saturated diacids did not correlate or loosely correlated with 2-methyltetrols (isoprene-SOA tracers, $r^2 = 0.001-0.05$) (Fig. 5a-e), pinic acid (α -pinene-SOA tracer, 0.10-0.39) (Fig. 6a-e) and levoglucosan (biomass burning tracer, 0.001-0.07) (Fig. 7a-e)”. Please see lines 215-219 in the revised manuscript.

Comment 6 - Chapter 4-Authors state “The increases of diacids derived from anthropogenic VOCs are more prominent than those of diacids generated from biogenic VOCs in East Asia. If the current rate of increases continued, the SOA budget would increase significantly in the future atmosphere in East Asia.”. I am not sure if you can conclude that increase in diacids, directly means increase in SOA. Maybe reformulate this and also same statement/conclusion in other chapters.

Response 6 - Unfortunately, we do not have the estimation of the SOA mass. We agree that the increase of diacid fractions may not enhance the SOA mass. Hence, we are not going to extrapolate the diacids increases to the increases of total SOA budget in the abstract, conclusions and other parts of the manuscript. In the revised manuscript, we have deleted the related sentences.

Comment 7 - Figures - Figure 5, 6, 7 have a very low information value. If there is no correlation, just note that in text. Please consider improving these pictures. Maybe show only those plots that are necessary. Others can be shown in the supplement.

Response 7 - We have improved the color of this picture in the revised manuscript. For example, see the revised Fig. 5 as below. We have decided to keep those figures in the manuscript because diacid concentrations are well-correlated with tracers in other seasons, although the concentrations of diacids are not well-correlated with tracers in spring.

