Atmos. Chem. Phys. Discuss., 15, C6963–C6964, 2015
www.atmos-chem-phys-discuss.net/15/C6963/2015/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "A sub-decadal trend of diacids in atmospheric aerosols in East Asia" *by* S. Kundu et al.

Anonymous Referee #1

Received and published: 18 September 2015

This study presents multi-year data of diacids and other aerosol tracer compounds collected in Gosan site in East Asia. The authors investigated the seasonal and inter-annual variations in these compounds as well as their correlations. They concluded that the dominant sources of the diacides vary with season and the intensity of the pollution sources have increased over years. This study is based on a very comprehensive data set that worth documentation. The data analysis is carefully performed and the manuscript well written with few grammar mistakes and language misuse. For these reasons, I recommend publication of this work on ACP after the authors address my following comments.

Specific comments:

Page 22190 Line 11-12: The authors concluded here that the sources of the organic acids remain the same from 2001-2008 based on the similarity of the molecular distribution of the observed diacids. However, the back trajectories in Figure 3 clearly show that at least for July the origin of the averaged air masses sampled at Gosan is distinctly different from other months, which suggests different aerosol sources.

Page 22191 Line 17-23: What about the correlation between saturated diacids and CO in spring, which could provide evidence for diacides being from anthropogenic sources?

Page 22195 Line 18-19: This statement is confusing and should be re-worded. As the authors discussed in previous sections, the pollution sources of diacids are not identical but vary with season, i.e. anthropogenic in spring, biogenic in summer and biomass burning in winter, and differ for different types of diacids (saturated vs. unsaturated). Also, I don't think that the authors have evidence to show that the diacids is "a major surrogate" of SOA in this study. I suggest changing "a major surrogate" to "an important fraction".

Page 22195 Line 25-26 (and abstract): Do the authors have any measurement of SOA mass? If not, I don't think that it is appropriate to extrapolate the results with diacids to the total SOA budget in East Asia. It is completely plausible that although the absolute concentration of diacids were increasing over years, their fractions in total SOA and hence the total SOA mass were not.

Figure 3. Is the back trajectory of July representative of all the summer months (i.e. June- August)?

Figure 4. I suggest making monthly average plots (same as those for 2-methyltetrols and levoglucosan) for O3 and CO as well for better comparison with other diacids and tracer compounds

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 22183, 2015.