Atmos. Chem. Phys. Discuss., 13, C5808–C5809, 2013
www.atmos-chem-phys-discuss.net/13/C5808/2013/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Water-soluble organic carbon over the Pearl River Delta region during fall–winter: spatial variations and source apportionment" *by* X. Ding et al.

Anonymous Referee #2

Received and published: 12 August 2013

General comments: This manuscript presents a thorough analysis of spatial variation and sources of WSOC in southern China including suburban and rural areas when biomass burning activities are intensive. The authors give a clear picture of sources of carbonaceous aerosol. From the analysis, it shows that during the study period (fall-winter), POC is about 70-80% of OC and WSOC is about 40-60% of OC. Biomass burning, SOC, and unexplained POA aging component contribute about 40-50%, 20-40% and 18-30% to WSOC, respectively. The results are based on applying levoglucosan as a tracer for estimating biomass burning contribution and individual tracers of SOC to estimate each source contribution to SOC. However, there are still a few things

that need to clarify. If the authors can provide more information in the text, it will be helpful and supportive. For example, SOC is also important in summer. Why do the authors pick fall-winter period and exclude summer period? How are we so sure that biomass burning is most active in fall-winter? Are there other evidences to show that biomass burning is active in this region during fall-winter such as satellite data for the fire counts? When they perform WSOC source apportionment, the unexplained simply goes to POA aging which requires more supporting and convincing data/evidence and analysis. Does the rural site show more POA aging component than suburban site? Do the POC and SOC split agree well with the EC/OC method? Overall, this manuscript is well written and data are of high quality. It helps the understanding of sources and characteristics of WSOC in Pearl River Delta, China. I suggest for publication after minor revision.

Specific Comments: 1) Phthalic acid is used as tracer for 2-ring PAH SOA tracer. Is there a good reference? Are there other sources for phthalic acid? 2) Based on correlation between WSOC and EC, the authors suggest that it is primarily due to biomass burning. What about contribution from motor vehicle emissions, which is one of the major sources in China? Is vehicular emission an important source to EC? 3) Page 10, Line 2: (ftracer/WSOC)=0.0806, what is the reference for this ratio? Is there any way to estimate uncertainty associated with this ratio, and the uncertainty with biomass burning estimate? 4) Page 11, Line 12: ftracer/SOC: are five or nine tracers used? And why? 5) Page 12, Lines 17-18: Is there any more supporting evidence for aging POA contribution to unexplained part? Could there be other possibilities?

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 13773, 2013.