Atmospheric
Chemistry
and Physics
Discussions

Open Access

Interactive comment on "Measurements of the aerosol chemical composition and mixing state in the Po Valley using multiple spectroscopic techniques" *by* S. Decesari et al.

Anonymous Referee #2

Received and published: 28 April 2014

The manuscript by Decesari et al. employed various online/offline state-of-the-art spectrometric techniques to characterize the chemical composition and mixing states of aerosol particles at a rural site in the Po Valley, including HR-ToF-AMS and SP-AMS for submicron aerosol composition, ATOFMS for particle mixing state, HR-ToFMS-TAG for speciated organic aerosol composition, H-NMR for water-soluble organic composition, and CIMS for gas-phase species. PMF and factor analysis were further performed on AMS, NMR, and TAG datasets to investigate the sources and variations of organic aerosol factors, and the meteorological effects on aerosol composition and mixing states were also highlighted. The deployments of multiple spectrometric tech-

niques are impressive, yet they also limit the deep analyses of each dataset that was analyzed individually and briefly in this study. Although most results and conclusions are supported each other, some are speculative. Actually, I was expecting more new findings from the multiple techniques in this study, which I was a bit disappointed. Overall, it is a valuable manuscript suitable for publications.

General Comments:

The separation of LV-OOA-MO and LV-OOA-LO is speculative. In particular, the authors didn't present any PMF diagnostic plots in supplementary. The mass spectra of LV-OOA-MO and LV-OOA-LO are very similar, but I am surprised that their diurnal profiles (Fig. 7) are also very similar although their time series (Fig. 9) are quite different. PMF analysis of SP-AMS dataset identified CxHyN+ ions, why HR-ToF-AMS didn't have (Fig. S7)? The nitrogen-containing fragment at m/z 73 that was attributed to amines was suspicious, and also we cannot see nitrogen peak at m/z 58. Amines generally present fragments at m/z 30, 58, 72 and 86. The authors concluded that the fewer PMF factors from SP-AMS was due to the shorter record period, why the authors choose the same period of HR-ToF-AMS data as SP-AMS to do another PMF analysis, and then have a direct comparison between two AMSs. In addition, the authors can simply calculate the elemental ratios (e.g., O/C ratio) of each PMF factor to judge the oxidation degree of each OA factor.

Specific Comments:

Some abbreviations were not used consistently throughout the manuscript, e.g., HR-ToF-AMS (HR-TOF-AMS), LV-OOA-MO (LVOOA-MO), etc.

Some figures (e.g., Fig. 7, Fig. 10) missed labels (a), (b), and (c), which are hard to follow in the text.

There are many places that need careful proofread. For example, page 9299, line 7, should be [C2H3O]+; line 9, should be (LV Low Volatility); line 19, Fig. 10c was not

correctly referred; line 25, r2 = 0.9, two references, which LV-OOA was compared?

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 9275, 2014.

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper