

Review of 'Long-term real-time chemical characterization of submicron aerosols at Montsec'

The paper describes almost 1 year of aerosol chemical composition measurements in the Western Mediterranean Basin. Seasonal and diel trends were presented for specific aerosol components as well as statistical source apportionment analysis was performed. The latter allows evaluating and acknowledging the significant contribution from secondary aerosol formation. It is a very nice and well written study, enhancing the knowledge on aerosol composition and different sources. The topic and presentation is suitable for ACP and I would recommend publishing it after some minor improvements listed below.

Specific comments:

Abstract: PM₁ is not defined;

Page 10, Line 2: SMPS is not measuring PM₁, define an upper mobility and aerodynamic diameters for SMPS and discuss the differences from PM₁, maybe, the disagreement won't be as large then;

Fig. 3: Chloride is not visible in the pie chart;

Page 13, Lines 28-30: Midday increase is up to 10 $\mu\text{g}/\text{m}^3$, can it really be biogenic? Could you provide reference for such high biogenic secondary concentrations?

Page 15, Lines 13-15: biogenic emissions in winter need more detailed discussion, sources, efficiency?

Paragraph 3.3: Could you provide some more arguments or considerations for 2 factor solution, as for now, m/z 60 and 73 are visible in LV-OOA, why it cannot be separated as a factor, did splitting start earlier? Please provide more details and arguments?

Page 18, Line 10: are you really so certain that it is an overestimation by the ACSM and not negative filter artefacts? Provide some more discussion, why one reason has been chosen over another?