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Interactive comment on “On the chemical nature of the oxygenated organic aerosol: implication in the formation and aging of α -pinene SOA in a Mediterranean environment, Marseille” by I. El Haddad et al.

Anonymous Referee #1

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The paper describes partial results from an intensive aerosol campaign at an urban background site in Marseille during summer 2008. Corroborative results from this campaign were already published in 2011 focusing on primary sources of OC and SOA formation as deduced from CMB results based on GC-MS in combination with ^{14}C and gas phase analysis. The current publication deepens the study of SOA formation by application of PMF₂ to AMS data, combines this outcome with ^{14}C to determine fossil vs. non-fossil sources of different OOA fractions and compares this result with the previous CMB investigation. In conclusion, OOA was found to be mainly of non-

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fossil origin and LV-OOA and SV-OOA could be attributed to HULIS and α -pinene SOA, respectively.

The manuscript attains significance as independent publication from the combination of AMS-PMF with ^{14}C (A) and from the intercomparison with GC/MS-CMB (B). A) The apportionment of fossil vs. non-fossil sources of OOA as a tracer for SOA is a creative strategy but has seldom applied yet so that this investigation will be very helpful for the general understanding of SOA formation and the interpretation of AMS data. A discussion with the few previous studies of that kind should be included. B) Although the comparison of PMF with CMB doesn't seem to provide new aspects at first view, both techniques should be regarded as independent approaches so that their similarity points towards sound results for both. However, the drawback of both approaches (e.g. the too small variability of sources for PMF for the Marseille campaign and dependence on literature emission factors for CMB) should be kept in mind and presented in a clearer way. The same should be done for the limitations of the independency of both approaches from each other. In general, a discussion of uncertainties of the results needs to be included in the main paper. This was thoroughly done in the supplementary material and deserves a summary chapter in the main part.

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