

Interactive comment on “Organic carbon at a remote site of the western Mediterranean Basin: composition, sources and chemistry during the ChArMEx SOP2 field experiment” by Vincent Michoud et al.

Anonymous Referee #2

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This paper deals with the interpretation of a comprehensive set of data on the organics (aerosol and gaseous phases) recorded during an intensive sampling period in the Cap Corsica remote background site. The article is well written. Results presented are of interest for the scientific community. Sources of organic carbon aerosols are investigated by simultaneously applying factor analysis to the gas and aerosol species determined during a very short period (20 days in summer 2013) at a monitoring site in Corsica. A similar methodology was applied in previous works such as those by Crippa et al 2013a, and / or Slowik 2010. In the present paper the source apportionment results are combined with meteorological analysis for identifying possible source

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areas. As mentioned in the text, ¹⁴C was also analyzed during the field campaign. Definitely, the results on ¹⁴C can provide very valuable information for the objective of the present paper. These analyzes are complementary to the techniques used in the present study and will allow a better understanding of the sources and chemistry of the organics. Thus, authors are referring to the results obtained by the ¹⁴C analysis in the results section (page 32, 24-29) and highlight them in the conclusions section (page 35; 8-11). Would the authors consider including the ¹⁴C data in the present paper? This can greatly increase the quality of the paper. However, if the authors consider that the results of ¹⁴C should be presented and discussed in another article, then the sentences relating to this unpublished material should be removed from the conclusions section.

The title should be modified. The use of composition and chemistry is redundant. "

Minor corrections

Abstract: I recommend authors to rewrite and reorder the abstract. I suggest deleting "First" (L7) and "second" L15). Line 9: Therefore? L12-13: last sentence of the first paragraph . Please, indicate the average concentration of the non-refractory sub-micron fraction. Do you have data on PM1? L27: ACSM should be mentioned earlier (L12-13) when contribution of OM to the non-refractory mass is described L28: Do you mean that 96% of the OVOCs are associated to SOA? INTRODUCTION

Page 4 L21: Use the acronym (HOA), already defined, instead of Hydrocarbon Organic Aerosol L21-L22: Please, indicate the acronyms for cooking aerosols and Biomass burning aerosols Page 5: L30 Why do you distinguish among "composition" and chemistry?

Methodology is described in two different sections (sections 2 and 3). In total is a very long part with a quite detailed description of the number of techniques and methods applied. The first methodological section, Section 2, is entitled "The ChArMEx experiment" . I think this title is not appropriated given that description is circumscribed to



the methods used in the present paper. The ChArMEx experiment is a large scale experiment covering different research fields in the Mediterranean. The present study is focused in the SOP2 experiment, and I guess this SOP2 covers not only the Corsica measurements but also other measurements in different Mediterranean areas". Section 2 describes the instrumental technique used but also the back trajectory analysis and the estimation of the photochemical age of the air masses. Section 3 describes the source receptor models applied used (PMF, ME-2, CF) . Does it mean that back trajectory analysis form part of the ChArMEx experiment but the PMF does not? I think these two sections should be unified in a Methodology section or organised following a different structure: measurements (gaseous –online, offline., aerosols), data treatment, models. OC EC online: which thermos optical protocol was used? Were measurements compared with off line determinations? Were measurements of PM1 available? Could you compare the NR PM1 levels obtained by ACSM with optical or gravimetric measurements of PM1? Measurement of BC by means of a AE-31 were available. However, these measurements were not used in the paper. Data on BC, could be added to the ACSM data and compared to the PM levels (if available. BC data should be comrade with the EC measurements.

RESULTS

In general, average concentrations of measured compounds/species should be compared with results obtained in other comparable areas P21, L32. Please, could you indicate what is the percentage of the NR-PM1 with respect to the total PM1? P26 L4: Solar radiation may also influence biogenic VOCs P26 L23-26. As shown in Figure 6 there is not a clear anti-correlation between Factor 6 and wind speed. Even, during specific days and increase in wind speed is related with an increase in Factor 6. Please, rewrite P30 L19-L20: Can the diurnal cycles with maxima at midday related to specific transport scenarios (breeze)?

P31 L25-34. Authors distinguish two periods with impact of processed anthropogenic / continental air masses: 19 - 27 of July and 30/07-03/08. However, as shown in Figure



12 there are marked differences between this two periods. However, the time evolution of both aerosol components and VOC factors are very similar for the period 17 - 27 of July, including the calm period. The time evolution of ACSM compounds during this period 17 - 27 of July, could be related to the summer recirculation of air masses as shown in previous papers on ACSM data in the area (Minguillon et al *Atmos. Chem. Phys.*, 15, 6379–6391, 2015, Ripoll et al, *Atmos. Chem. Phys.*, 15, 2935–2951, 2015) and described in Pey et al, *Atmos. Res.*, 94, 422–435, 2009, among others. These scenarios characterized by the recirculation of air masses could explain the mix of long, medium and short lived VOCs

Table1: Increase width of first column

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