

## ***Interactive comment on “Sources and mixing state of summertime background aerosol in the northwestern Mediterranean basin” by Jovanna Arndt et al.***

**Anonymous Referee #2**

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An aerosol time-of-flight mass spectrometer (ATOFMS) was employed to provide real-time single particle mixing state and thereby source information for aerosols impacting the western Mediterranean basin during the ChArMEx-ADRIMED and SAF-MED campaigns in summer 2013. The ATOFMS measurements were made at a ground-based remote site on the northern tip of Corsica Island. ATOFMS particle classes were identified and grouped into 8 general categories: EC, K-rich, Na-rich, Amines, OC-rich, V-rich, Fe-rich and Ca-rich. ATOFMS reconstructed PM<sub>2.5</sub> mass was regionally transported fossil fuel (EC-rich) and biomass burning (K-rich) particles. As the authors mentioned in their conclusion chapter, I fully agree that the identification of these sources and apportioning aerosol mass to them is a key component of future work to mitigate

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their effects on the Mediterranean climate, however the authors often the term “suggesting that...” which sounds as some of their findings are based on hypothesis rather than robust evidences. My overall judging is that this study is of good quality and deserves publication in ACP, after treating carefully the major comments raised and simplifying the text so as to be clearer to the potential reader. Major comments: 1) As mentioned above, the authors ought to present stronger arguments to some of the interpretations of their results rather than suggesting certain possible reasons for the results obtained (see, for example in p.9 l.31; p.10 l.37-39; p.11 l.11; p.14 l. 26; p.15 l.3; p.17 l. 9 and l.27). 2) P.3 l.18: Please explain why only O<sub>3</sub> and PM<sub>2.5</sub> are formed in arid conditions and strong insolation. 3) P.5 l.12-14: Please explain what are the scientific consequences of the degradation in the power of the sizing lasers observed during ADRIMED and SAF-MED experiments. 4) P.6 l.30-31: Please explain along which criteria the densities were estimated for each class. 5) P.7 l.18: Please give some arguments on the selection of 500 m as release height of the back trajectories generated. Other comments: 6) P.3 l.14: The sentence beginning with the words: “The geography and regional processes...” is expressed in a too general manner, please elaborate. 7) P.3 l.9-10: In the context of the Asian monsoon outflow transporting pollution in the upper troposphere, across northern Africa and the Mediterranean, please refer also to Ricaud et al. (2014).

Ref: Ricaud, P. et al (2014): Impact of the Asian monsoon anticyclone on the variability of mid-to-upper tropospheric methane above the Mediterranean Basin, ATMOSPHERIC CHEMISTRY AND PHYSICS, 14, 20, 11427-11446, DOI: 10.5194/acp-14-11427-2014.

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