Answers to the interactive comment on "Characterization of PM10 sources in the central Mediterranean" by Anonymous Referee #2

The manuscript reports the result of a quite long PM sampling campaign in the Lampedusa island. This is a peculiar site in a very good position to extract data representative of the Mediterranean basin. In general the article is well written, the results are sound and the methodologies clearly described.
As for reviewer #1, we thank for the positive evaluation of this work and we appreciate the productive comments and suggestions. These are addressed point-by-point in the following, recalling some answers already given to reviewer #1 when both reviewers pointed to the same issues.

I agree with Referee 1 when he/she notes on the possible impact of the missing information on carbonaceous aerosols and I also recommend a more deep analysis of the uncertainties both in the PMF results and in the chemical apportionment directly derived by raw concentration data (for instance: how reliable are the average correction factors used to obtain by PIXE concentration values for light elements? From sample to sample and according to the size distribution of the aerosol they could vary significantly). On the PMF side whatever is the used approach an evaluation on the uncertainty is missing and must be added.
As concerns the uncertainties on PMF results, please refer to the answer given to reviewer #1.
The correction factor for Na concentration as obtained by PIXE was estimated on the basis of PIGE (Particle Induced γ-ray Emission) measurements carried out for the quantification of Na on a subset of samples. PIGE does not suffer from self-absorption problems as it exploits the more energetic γ-ray radiation. Correction factors for the other light elements (Mg, Al, Si) were estimated accordingly on the basis of a simple attenuation model for single spherical particles (Formenti et al., 2010). As a consequence, the uncertainty on the PIXE quantification of light elements also bears a contribution due to these correction factors. These details were added in section 2.2. It has to be highlighted that, as reported in section 3.2, the redundancy of the data set, containing the determination of several elements by different techniques, allowed performing a quality assurance analysis of data (e.g., Na vs Na^+, see table 1).
As concerns the uncertainties on the chemical apportionment directly derived by raw concentration data, in table 1 are now reported the standard deviations also for sea-salt and mineral dust. In this case, standard deviations mainly reflect the natural variability of the data, and not the analytical uncertainty. Under a strict analytical point of view, roughly a 15% uncertainty may be estimated for the determination of the sea-salt and mineral dust daily contributions, but this does not reflect neither the natural variability of data neither the uncertainty on the main assumption of the method (average composition of seawater and main oxides in the Earth's soil). It is important to note that this latter factor may be the main cause of uncertainty; limits of this method are discussed in te paper, mainly in section 3.4.2.

The comparison between sea salt concentration determined by PMF and by raw data and the discussion on the reason of the quite large discrepancy is questionable. The literature on the PM composition in the open Mediterranean sea is quite limited but for instance in Schembari et al., Atmospheric Environment 98 (2014) 510-518 the PMF results for sea salt are quite different and some discussion/comment on this issue sgould be deserved (also because part of the Authors also signed that paper).

We have added a comment on the reported variability of sea salt factors across coastal sites in the Mediterranean sea in section 3.4.2, including the data cited by the reviewer, referring to the open Mediterranean sea.