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Interactive comment on "Composition and sources of sedimentary organic matter in the deep Eastern Mediterranean Sea" *by* R. Pedrosa-Pàmies et al.

Anonymous Referee #3

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The manuscript by Pedrosa-Pàmies and corworkers describes grain-size distributions, elemental and selected lipid biomarker compositions of a series of surface sediments from the Eastern Mediterranean Sea. The goal is to use this multiparameter data set to address sedimentary organic matter (OM) sources and the physical processes, in particular the balance between settling and hydrodynamic sorting, that determine its distribution in the sediments. The manuscript addresses important factors related to the OM composition of the studied sediments, and in particular the inclusion of the grain-size analyses complements the geochemical measurements in providing novel insight into the potential effect of particle sorting during and shortly after sedimentation.

Overall the manuscript is well written (but seen some suggestions of English syntax

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below), the abstract and methods (again see below) are adequate, and by-and-large the references are appropriate (again see below). A few points should be addressed be the authors as listed below.

General: At several places in the manuscript (e.g., line 7, p 9956), the authors tell us that the OM in the studied sediments is a mix of terrigenous and marine material ... "thus indicating that the composition of the OM...can be explained as a mixture of terrigenous (low TN/OC and δ13C) and marine (high TN/OC and δ13C) derived materials." It would be very useful to be given some sense of the relative proportions of terrigenous vs marine OM. On p 9940 we see what the primary production rates are, and that $\sim$0.3% o this is exported below 2000m. Most of the terrigenous input comes from Aeolian transport, mainly of Sahara dust, that riverine inputs to these locations is low, the sedimentation rate is given. The discussion then goes on to talks about marine biogenic CaCO3 vs dust/terrigenous clays. But what is missing is some feeling of the relative amounts that each contributes to the overall sediment OM content.

Specific comments: p 9938 line 16 - "complex topography with tenths of depressions" probably should be "complex topography with ten's of depressions" . . ..

p 9941 line 23 – "freeze-dried and grounded sediments" probably should be "freeze-dried and ground sediments" . . ..

p 9943 line 24 – how was the UCM measured? Response factors same as for the alkanes? How was the UCM integrated? This is important since the UCM seems to be about 10x more concentrated than the long-chain alkanes (extrapolated from Fig. 4).

p 9944 line 16 – Usually concentrations of alkanols are higher than alkanes, but here the reverse is the case. Presumably some of this reflects the presence of petroleum alkanes as indicated by the UCM. Since ΣTerNA and ΣTerN-OH are used as composite concentrations of the terrestrial lipids, were the long-chain even-carbon numbered alkanes used in ΣTerNA corrected somehow for the contributions of the petroleum HC, as would be estimated by the abundances of even-carbon numbered alkanes?

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p 9945 line 15 – here mass-normalized concentrations are used for PCA; elsewhere OC-normalized and "not normalized to OC" (e.g., p. 9952 line 24) are used. This is confusing!

p 9951 line25 – "PCA results mirror the composition of surface sediments"... Isn't this statement a given (obvious) since the PCA is based on the composition of the sediments?

p 9953 line 22 – is the statement "This strongly suggests that the Sahara desert is the main source of lithogenics to the deep EMS" not a bit contradictory to the sentence on the next page (p 9954 line 9)"The high lithogenic contents found in most Ionian Sea stations points to fluvial inputs reaching this area from in the Adriatic Sea"? Perhaps this is a geographic distinction between regions, but it is unclear.

p 9957 line 4 – the Rampen et al reference does not seem to be the correct one for diols and keto-ols. Do you mean Rampen et al. (2012) Long chain 1,13- and 1,15-diols as a potential proxy for palaeotemperature reconstruction. Geochim. Cosmochim. Acta 84, 204–216, or one of the Rampen papers cited therein?

p 9957 line 18 – PCA "provides"....; line 26 – should "inorganic IN" just be inorganic N"?

p 9958 line 24 – is 19% correct- it looks more like 0.19% in the figure.

P 9961 – the Wakeham et al. reference does not provide information about grain size, but rather particle density.

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