

## ***Interactive comment on “Origin of lipid biomarkers in mud volcanoes from the Alboran Sea, western Mediterranean” by C. López-Rodríguez et al.***

**Anonymous Referee #2**

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López-Rodríguez et al. have investigated samples of sediment cores obtained from mud volcanoes of the the Alboran Sea, western Mediterranean. Using lipid biomarkers as the main tool they report on the composition and origin of organic matter contained in MV-expelled mud and the neighbouring hemipelagic sediments. Within the MV-derived samples, they observed foot prints of diagenetically altered organic matter brought up from deeper horizons having already entered the oil window (n-alkane-distributions and epimerization degree of hopanes), thermally immature organic matter as typical for hemipelagic sediments, and biomarkers indicative of Anaerobic Oxidation of Methane (AOM) by their structure in carbon stable isotope composition. Based on the obtained data, they conclude on the activity of the three sampled MVs (Perejil, Kalinin and Schneider's Heart). A very similar work by two of the co-authors (AS, JSSD) exists on MVs in the Gulf of Cadiz. However, it is the first this kind of with re-

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gard to Alboran Sea MVs. In this sense, the scientific significance is good. Generally the work is of good scientific quality; the analytical data are elaborate and support the interpretations and conclusions. The scientific results and conclusions are presented in a concise and well-structured way with the number and quality of figures and tables being appropriate. As exemplified below, a thorough proofreading could improve the paper to excellent/good quality. 18857; line 3: Later has undergone; line 26: Iberian 18858; Line 2: shale diapir structures (not diapirs); Line 6: contain (not contains); Line 12: Lopez-Rodriguez et al., 2013 not in references; Line 23: “The 900 kg box-corer had a round box of 30 cm internal diameter.” Please add the hight of the box and some details on subsampling (as is done for the gravity core samples). 18859; Line 21: What detector? (surely GC-FID as mentioned for methane analyses): Line 22: not a 525m column! (insert blank) 18864; Line 8: delete “by” P 18865; Line 7: lower than that; line 19 (and general) : M defines molar concentration (molarity) , i.e. moles per volume. Thus the dimension  $\mu\text{ML}^{-1}$  seems not correct ( $\mu\text{mol L}^{-1}$  or  $\mu\text{M}$ ). 18866; Line 14: delete plants, following sentence not understandable 18867; Line 6:lead (not lend); Line 11: than at the visually; Line 13: be at 230; Line 25 ff. This is not uncommon (as said twice), but rather an often encountered phenomenon indicating oil impregnations. 18868; Line 16: in other studies (not another); Line 20: typical of 18869; Line 14/15: to be appeared?; Line 20: showed ? 18870; Line 10: methanotrophic archaea; Line 11-13: crude sentence, rework 18871; Line 6: intervals; Line 11: biomarkers; Line 13: reflect; Line 23: indicated 18872; Line 8 is (not are); Line 13 ff.: rework paragraph 18873; Line 1: biomarker; Line 8 variation of; Line 16/17: The co-occurrence od ANME 1 and 2 is no requisite to indicate AOM; there are AOM sites with exclusively ANME 2 or ANME 1.

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Interactive comment on Biogeosciences Discuss., 10, 18853, 2013.