

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

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Dr. C. López-Rodríguez et al use the geochemical method to characteristic the lipid biomarker compositions and maturity properties of organic matter from Mud breccias samples in three studied mud volcanoes from the northern West Alboran Basin. The n-alkane-distributions indicate that all studied mud breccia have a similar biomarker composition consisting of mainly thermally immature organic matter with an admixture of petroleum-derived compounds. The past or present anaerobic oxidation of methane activity was established using lipid biomarkers specific for anaerobic methanotropic archaea (irregular isoprenoids and GDGs) and the depleted carbon isotope composition of crocetane/phytane. The presence of these lipid biomarkers, together with the low amounts of detected GDGTs, is consistent with the dominance of anaerobic methan-

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otrophs of the ANME-2 over ANME-1, at least in mud breccia from Perejil mud volcanoes. In contrast, the scarce presence or lack of these Anaerobic Oxidation of Methane-related lipid biomarkers in sediments from Kalinin and Schneider’s Heart mud volcanoes, suggest no recent active methane seepage has occurred at these sites. Moreover, the observed methane concentrations support the current activity of Perejil mud volcano, and the very low methane seepage activity in Kalinin and Schneider’s Heart mud volcanoes.

The manuscript provides data that will be of interest to organic geochemists in that it provides the first results on the composition and origin of organic matter, Anaerobic Oxidation of Methane processes and general characteristics on MV dynamics. The manuscript is based on established methods and the conclusions are drawn on well established correlations between particular compounds, carbon isotopic signatures, and their sources. The manuscript is reasonably clearly written and explains the analytical procedures in sufficient detail. The discussion is relevant and is supported by the data.

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