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Comment

***Interactive comment on “Organic biomarkers in deep-sea regions affected by bottom trawling: pigments, fatty acids, amino acids and carbohydrates in surface sediments from the La Fonera (Palamós) Canyon, NW Mediterranean Sea” by E. Sañé et al.***

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Interactive comment on “Organic biomarkers in deep-sea regions affected by bottom trawling: pigments, fatty acids, amino acids and carbohydrates in surface sediments from the La Fonera (Palamós) Canyon, NW Mediterranean Sea” by E. Sañé et al.  
Anonymous Referee #1 Received and published: 28 January 2013

This study examines the impact of bottom trawling on organic biomarkers in the deep

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sea. I found the description of the work hard to follow, especially the sections on sampling and statistical analysis.

1. It is unclear from Fig. 1 which are the trawled and reference areas. The legend of the figure does not say what the red and blue symbols are.

REPLY: The referee is correct stating that the red and blue symbols were not explained in the legend. However, the legend stated that trawling grounds were marked with grey lines, hence the position of sampling stations, within or outside these bold grey lines indicate whether they are trawled or untrawled (control) sites. We also used two different colors (red for trawled and blue for control) for the stations to further clarify that point but, as noticed by the referee, probably we have achieved the opposite result, i.e. confusing the reader. Therefore, we have completely modified this figure, adding the information from the Vessel Monitoring System (VMS) positions from Palamós harbour trawlers (see Puig et al., 2012 for details) to identify the exact extension of the fishing grounds and using the color code for sampling stations collected in Spring (red) and Autumn (blue). The information in the first paragraph of the methods section has been updated accordingly: “Coring stations were chosen based on the distribution of fishing grounds in the La Fonera Canyon, which is well known thanks to the satellite-based navigation tracks of bottom trawlers (i.e., Vessel Monitoring System (VMS) data) (Fig. 1).”

2. A potential problem of spatial segregation between trawled and reference stations arises if the stations with different colors reflect different levels of disturbance. In this case the authors should discuss the potential implications of this spatial segregation for the interpretation of their results - i.e. to what extent the observed differences in organic biomarkers between trawled and reference areas might have occurred because of spatially varying processes other than anthropogenic disturbance.

REPLY: In previous works, no substantial differences between the northern and southern canyon flanks were observed in terms of the composition of downward particulate

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matter fluxes (Martín et al., 2006). Furthermore, it has already been demonstrated that there are notable differences in the degree of perturbation between trawled and untrawled areas, to the point that large-scale alterations of the underwater morphology of the margin are produced in the trawled region, and absent from the untrawled areas (Puig et al., 2012). Hence we assume that the presence or absence of the trawling fishery is a preponderant factor over any other in determining the disturbance of surface sediments. The present paper aims to address the differences in terms of nutritional quality of topmost sediments between trawled and untrawled sites, but we take as a fact the existence of contrasting trawled/untrawled areas along the flanks of this canyon, as shown in Puig et al. (2012). We have updated the manuscript with this paragraph to include the information: “In previous works, no substantial differences between the northern and southern canyon flanks were observed in terms of the composition of downward particulate matter fluxes (Martín et al., 2006), hence for the purpose of this study we assume that there are no major differences in the sampling stations within the trawled and untrawled pool of samples.”

3. There is also a problem with the analysis of the data. Season and level of disturbance are crossed factors and should be examined together in factorial ANOVAs.

REPLY: The one-way ANOVA was used hypothesizing no interaction between the effects of trawling and seasonality. Following the suggestions of both referees, we replaced the two one-way ANOVAs with the two-way ANOVA design. The two-way ANOVA confirmed the absence of interaction between the effects of trawling and seasonality. The results are shown in Table 2c and presented in the first and the third paragraphs of the results section (see revised manuscript). However, in the case of carbohydrates the one-way ANOVA was maintained (Table 2d) because there is only one factor (samples were collected only during autumn).

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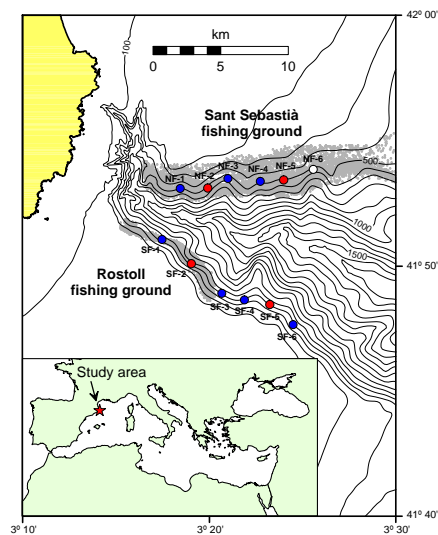
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**Fig. 1.**