Biogeosciences Discuss., 9, C8776–C8790, 2013
www.biogeosciences-discuss.net/9/C8776/2013/
© Author(s) 2013. This work is distributed under
the Creative Commons Attribute 3.0 License.

Biogeosciences Discussions

Interactive comment on "Density and distribution of megafauna at the Håkon Mosby Mud Volcano (the Barents Sea) based on image analysis" *by* E. Rybakova (Goroslavskaya) et al.

E. Rybakova (Goroslavskaya) et al.

gorolen@mail.ru

Received and published: 5 March 2013

Specific comments

Referee 1: "The introduction is a rather lengthy account of the research history at HMMV. In my opinion much of the information is not of direct interest to the results presented in thems".

Authors: The introduction was shortened. Some of the information which is not of direct interest to the results presented was deleted.

Referee 1: "Authors do not define clearly in the methodology which are the group-

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

ings used for the ANOSIM tests – Are these the three habitat types (bacterial mats, pogonophoran fields, light-coloured sediments)? Or are these groupings based on given combinations of % cover of tubeworms and bacterial mats? Figure 3 is not very helpful in clarifying this because the different habitat types cannot be easily recognized"

Authors: ANOSIM and SIMPER analysis were performed for images from areas with different percent cover of bacterial mats and pogonophorans. We think it is important to analyse separately bacterial mats and pogonophorans because there are lots of combinations of areas with bacterial mats and pogonophorans and their analysis becomes very difficult and shows little information. Nevertheless we added ANOSIM and SIMPER analyses for combinations of bacterial mats and pogonophorans to the chapter "3.1.4 Combination of areas with bacterial mats and pogonophorans". We used three variations of seafloor coverage both for bacterial mats and tubeworms: 0%, 0-50%, 50-100%. Each image was ascribed to one (and only one) habitat type. ANOSIM analysis was performed to assess the effect of a habitat type on megafaunal assemblages. SIMPER analysis also was performed. MDS (figure 3) results for separately bacterial mats and pogonophorans were deleted. One combined MDS for combinations was performed (figure 4). Methodological aspects were clarified: "Analysis of similarity (ANOSIM) was used to assess the significance of differences among images from areas with different percent cover of bacterial mats, pogonophorans or images with different combinations of percent cover of bacterial mats and pogonophorans". Chapter 3.1.4 ÂńCombination of areas with bacterial mats and pogonophorans" was added: "Three variations of seafloor coverage were considered both for bacterial mats and tubeworms: 0%, 0-50%, 50-100%. ANOSIM revealed significant differences in megafaunal composition and density of images with all combinations of areas with bacterial mats and pogonophorans except two combinations: (1) bacterial mats 0-50%, pogonophorans 0-50% and bacterial mats 0-50%, pogonophorans 50-100%; (2) bacterial mats 0-50%, pogonophorans 0% and bacterial mats 50-100%, pogonophorans 0% (Global R=0.551, p=0.001). Figure 4 indicates two groups of images: 1) without bacterial mats and 2) with bacterial mats but without pogonophorans. Images with bac-

BGD

9, C8776–C8790, 2013

CC BY

terial mats and pogonophorans fell out of revealed groupings. SIMPER revealed that five species contributed most to the separation of groupings of images with different combination of areas with bacterial mats and pogonophorans: O. gracilis, lysianassid amphipods, N. macronix, M. horrida and L. squamiventer (Fig. 3)". Figure 3 (MDS) was deleted. A new version of MDS was performed (figure 4). Figure 4. Similarity between images with combinations of different coverage by bacterial mats (BM) and pogonophorans (P) (MDS plot, transect I).

Referee 1: "The discussion could be more structured in different sections"

Authors: The discussion was structured in some sections. Technical comments

Referee 1: P 17477 L7: “diaperism” – change to “diapirism”

Authors: "diaperism" was changed to "diapirism".

Referee 1: P 17481 L17: “In total 1604 images were examined using a stereo microscope.” – Why was a stereo microscope used to examine the images?

Authors: Stereo microscope was used because original images were not digital, they were taken with a 36 mm film camera. Analysis of films using a stereo microscope gives best results (based on our long-time experience). When films are digitized, resolution of images decreases. Explanation of the type of images was added: "In total 1,604 film images were examined using a stereo microscope."

Referee 1: P 17481 19-20: “Images with hard substrata (boulders, carbonate rocks and crust) were excluded” – Hard substrata are a source of environmental heterogeneity that usually contributes to enhance biodiversity; A justification for the exclusion of these images should be given.

Authors: The text was changed, the justification was given: "In total 1,604 images were examined using a stereo microscope. Of these, 1,045 images were used for statistical analyses. Among the analysed images, 894 were taken along the three transects across the caldera and 151 images along the transect outside the volcano. Images

BGD

9, C8776–C8790, 2013

of not satisfactory quality (with sediment clouds, too strong or low illumination, large or small distance from the bottom) were excluded from the analysis. All images within the volcano were taken in the soft-sediment environment. The part of images along the transect outside the volcano were taken with hard substrata (boulders, carbonate rocks and crust). Images with hard substrata were also excluded from the analysis because the aim of investigation was to compare the fauna of similar sediment environments".

Referee 1: P 17482 L15: use the term “square root” instead of symbol

Authors: "Square-root transformation" was used instead of symbol "$\sqrt{}$-transformation".

Referee 1: P17482 L17-18: “Analysis of similarity (ANOSIM) was used to determine the degree of separation of images from: : :” – rephrase; ANOSIM is used for hypothesis testing, it assesses the significance of the difference among a series of samples included in predefined groups – “determine the degree of separation” is not the most exact phrasing.

Authors: The sentence was rephrased and added: "Analysis of similarity (ANOSIM) was used to assess the significance of differences among images from areas with different percent cover of bacterial mats, pogonophorans or images with different combinations of percent cover of bacterial mats and pogonophorans."

Referee 1: P17484 L15: “two groups of images similar to groups revealed by ANOSIM” – ANOSIM does not reveal groups, it is a test applied to predefined groups

Authors: The sentence was deleted because we deleted MDS for separately bacterial mat and pogonophorans.

Referee 1: P17490 L22-25: “ANOSIM revealed significant differences in megafaunal composition and density on images taken inside the caldera on light-coloured sediments devoid of bacterial mats and pogonophorans and images outside the caldera (Global R = 0.378, p = 0.001) indicating significant diferences” – significant differences is repeated in the beginning and at the end of the sentence.

BGD

9, C8776–C8790, 2013

Authors: The sentence was corrected: "ANOSIM revealed significant differences in megafaunal composition and density on images taken inside the caldera on light-coloured sediments devoid of bacterial mats and pogonophorans and images outside the caldera (Global R=0.378, 0=0.001)."

Referee 1: P.17492 L3-12: In their inventory of the benthic taxa known for the HMMV the authors include megafaunal as well as infaunal groups/species. In this case it would be important to incorporate also the results published by Decker et al 2012. The table 2 shown in the supplementary material should also be a complete inventory.

Authors: Results published by Decker et al 2012 were incorporated with results by Gebruk et al 2003 and present study. The text was changed: "Based on the combined data of Gebruk et al. (2003), Decker et al. (2012a, 2012b) and our present study, the species inventory of the HMMV comprises at least 80 taxa. In the present study we added at least 20 species/morphospecies to the inventory: Cnidaria (4), Annelida (4), Sipunculida (1), Cephalorhyncha (1), Crustacea (1), Echinodermata (6), Pisces (3) (Table 2 in Supplementary material)". Table 2 in the supplementary material was changed and now presents a complete inventory.

Referee 1: P 17493 L6-9: Rephrase or define the terms “specialist” and “opportunistic”

Authors: The text was rephrased: "Both siboglinid species apparently are highly specialized to reducing habitats and can inhabit their different types: methane seeps and hydrothermal vents, sunken wood and other decomposing organic material (Gebruk et al., 2003)."

Referee 1: Figure 3: Figures 4 and 7: the authors have very nice photographs of the seabed –these should be valorized (presented in a larger format).

Authors: We think that the size of the manuscript is already large do not allowing figures 4 and 7 in larger format.

Referee 1: Figure 5: use log scale on Y axis (instead of broken bars) – it also improves

BGD

9, C8776–C8790, 2013

CC BY

visualization of smaller bars

Authors: We think that the log scale on the Y axis is not good for our purpose. The main idea of this figure is to show sharp changes in species densities in areas devoid of bacterial mats, small bars are not so important. If we use log scale, the visualization will be very difficult.

Referee 1: Figure 8: Why is “Area coverage of bacterial mats: (0) 0 %, (1) <10 %, (2) 10–50%, (3) 50– 80 %, (4) >80 %; Archeolinum contortum: (0) 0 %, (1) <10 %, (2) 10–50 %, (3)>50 %.” included in the caption?

Authors: "Area coverage of bacterial mats: 0 – 0%, 1 – <10%, 2 – 10-50%, 3 – 50-80%, 4 - >80%; Archeolinum contortum: 0 – 0%, 1 - <10%, 2 – 10-50%, 3 - >50%" was included in the caption in order not to overload the figure by text.

Referee 1: Supplement Table 2: the caption should be changed because the taxa listed are not exclusively megafauna.

Authors: The caption was changed to "Inventory of megafauna and macrofauna recorded on OFOS transects (+), in stomachs of fish, sampled by other gears or registered in previous investigations"

Please also note the supplement to this comment:
http://www.biogeosciences-discuss.net/9/C8776/2013/bgd-9-C8776-2013-supplement.zip

---

Interactive comment on Biogeosciences Discuss., 9, 17475, 2012.

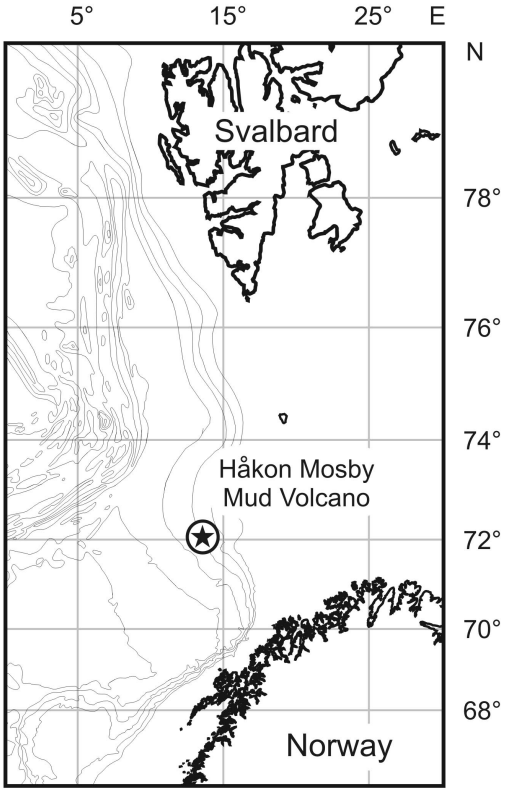

Fig. 1.

BGD
9, C8776–C8790, 2013

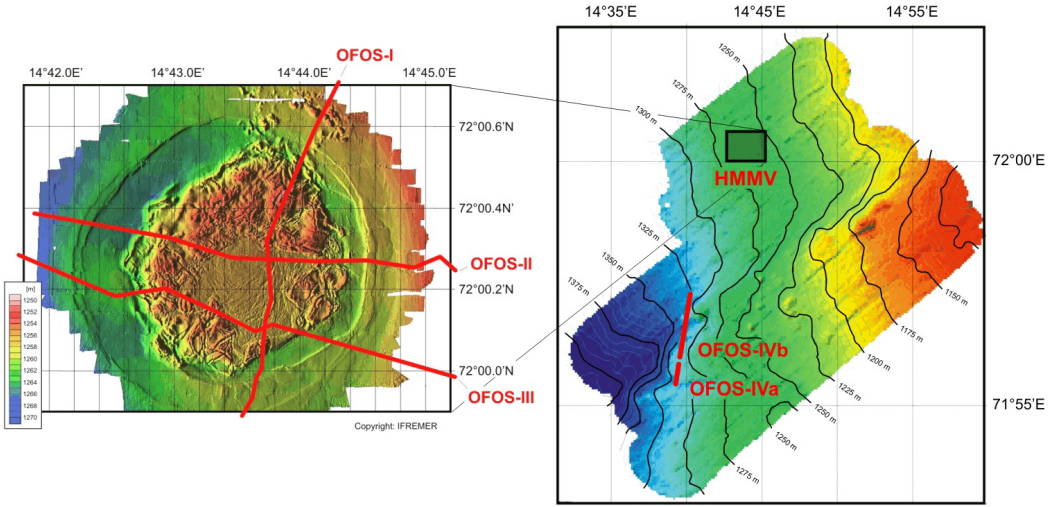

Fig. 2.

BGD
9, C8776–C8790, 2013

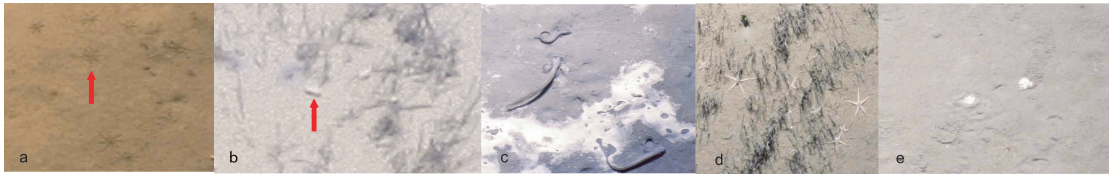

Fig. 3.

BGD
9, C8776–C8790, 2013

CC BY

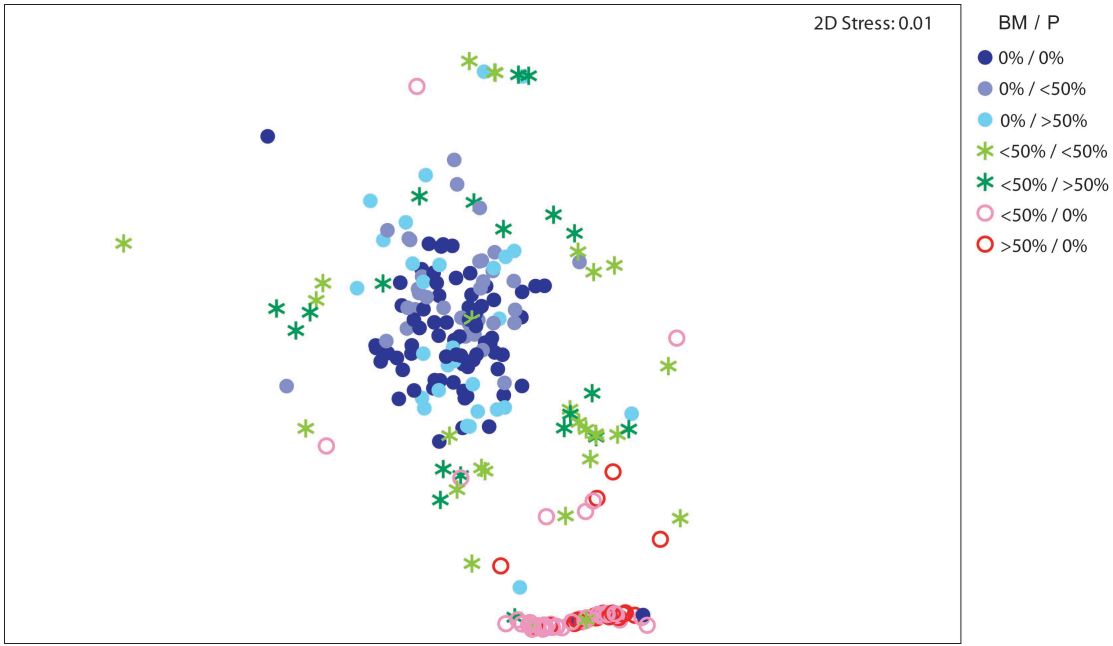

Fig. 4.

BGD
9, C8776–C8790, 2013

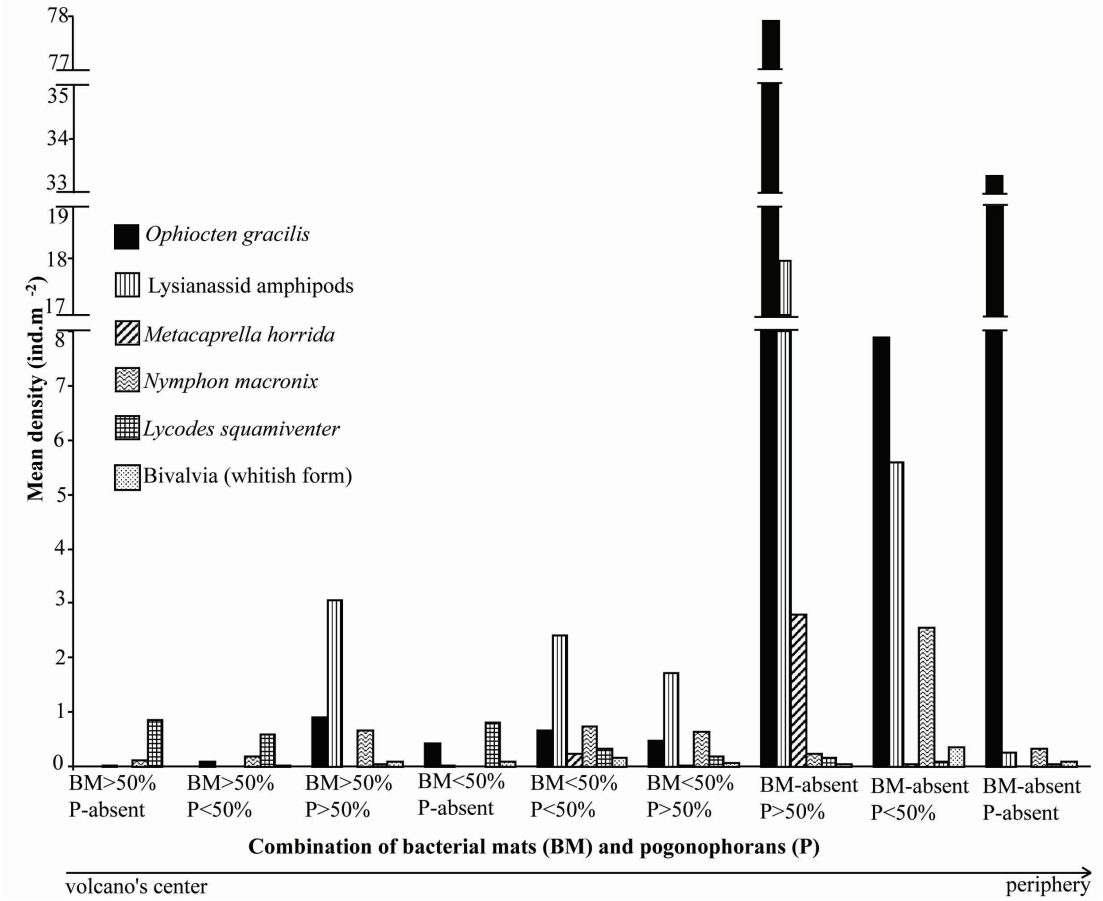

Fig. 5.

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

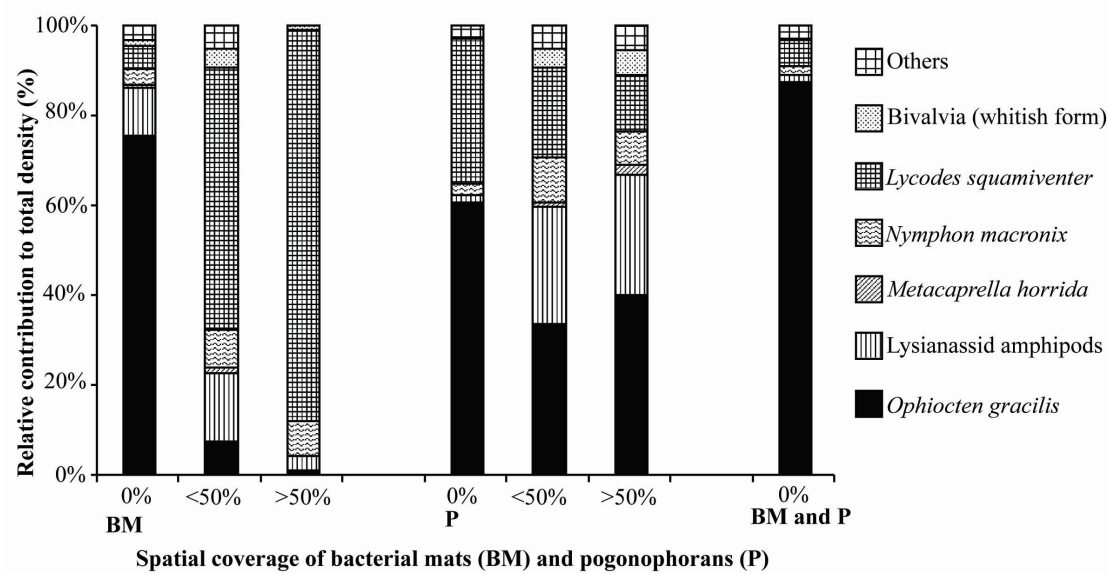

Fig. 6.

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

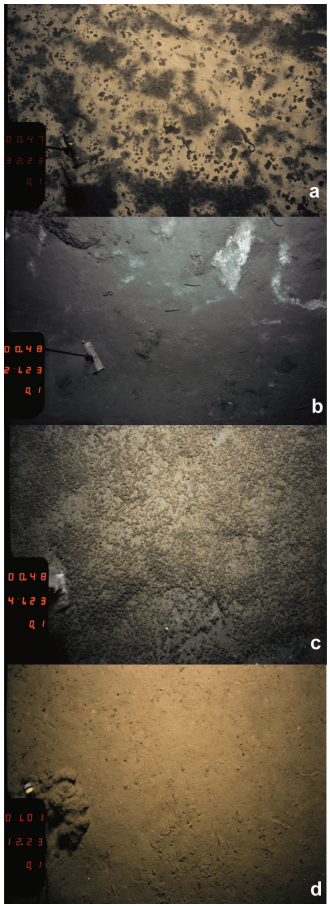

Fig. 7.

BGD
9, C8776–C8790, 2013

BGD
9, C8776–C8790, 2013

Interactive Comment

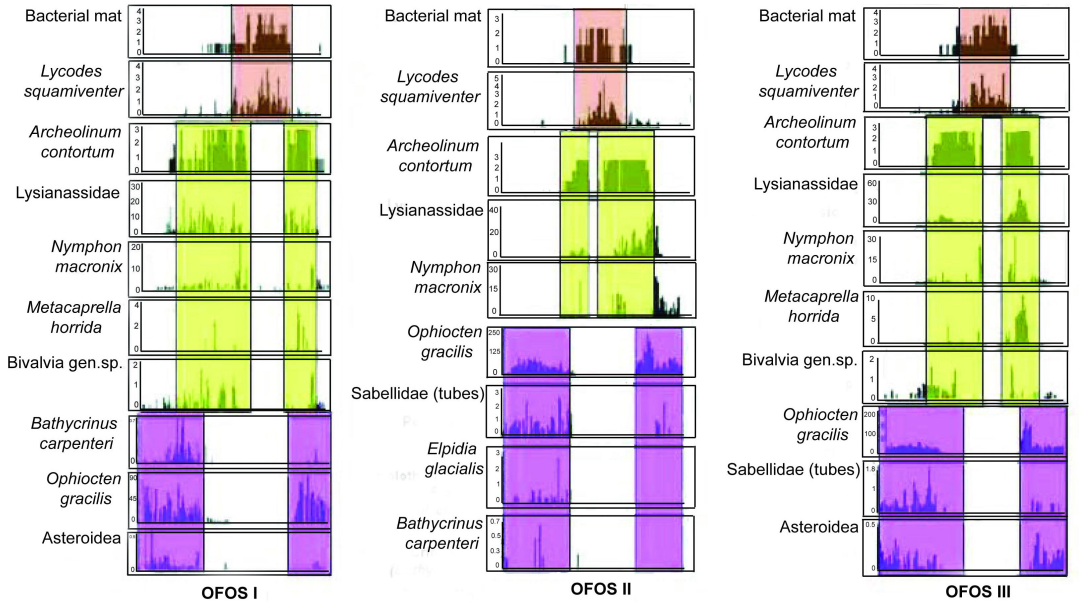

Fig. 8.

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

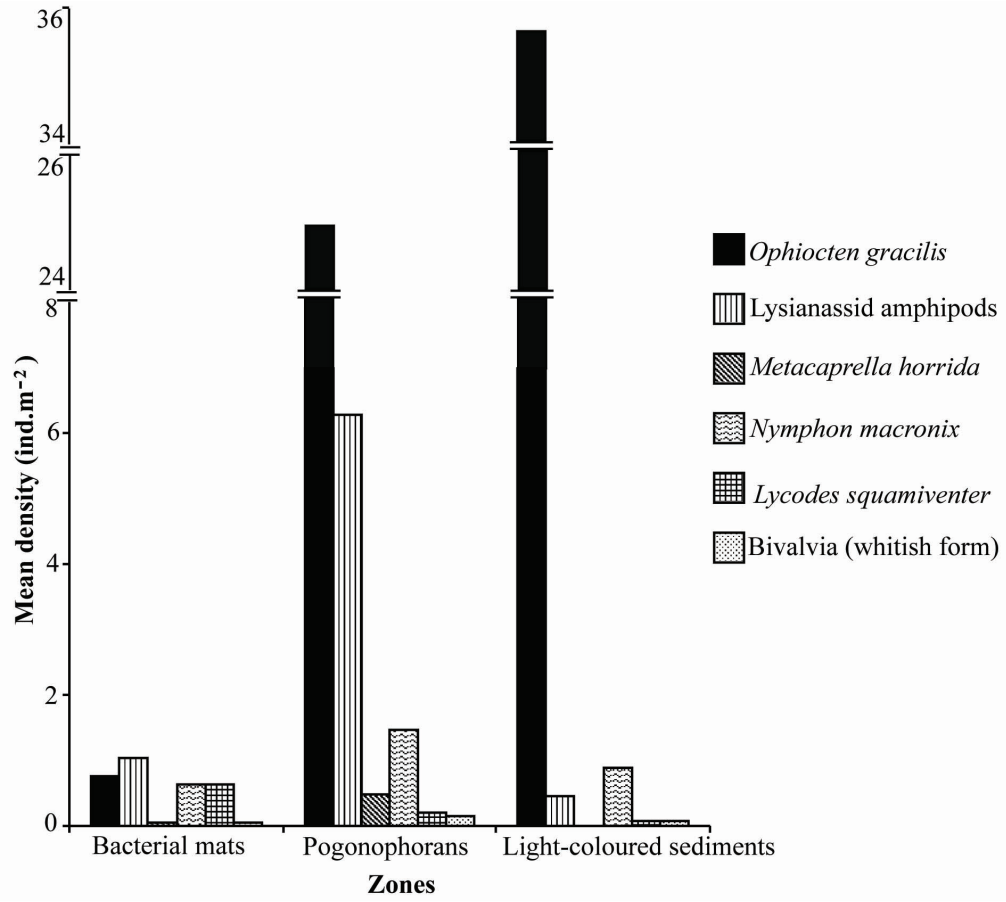

Fig. 9.

BGD
9, C8776–C8790, 2013