Biogenic structures in the Arctic: an ecosystem functioning hotspot?

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PeerJ Preprints | https://doi.org/10.7287/peerj.preprints.26738v1 | CC BY 4.0 Open Access | rec: 20 Mar 2018, publ: 20 Mar 2018

Abstract

In deep-sea environments, resources availability and habitat complexity drive the distribution of benthic organisms. Biogenic structures such as cold-water corals and sponges create a three-dimensional habitat that facilitate sediment and resources accumulation and therefore show a high abundance of the associated species compared to bare sediments. However, the functions of these biodiversity hotspots in the ecosystem functioning are still poorly known. In this study, we addressed three main questions: 1) do benthic fluxes vary according to their position within patches and bare sediment? 2) are infaunal communities similar in biogenic structure and bare sediment patches? and finally, 3) which variables explain benthic fluxes in these patches? Infaunal communities and benthic fluxes were examined in Arctic regions presenting two types of biogenic structures: corals (*Keratoisis* sp.) and arborescent sponges. To compare ecosystem functioning between the biogenic structure versus bare sediment patches, sediment cores were collected to quantify benthic fluxes (nitrate, nitrite, ammonium, phosphate and silicate) and the diversity, abundance and composition of infauna. Multivariate analyses suggested that biogenic structure and bare sediment patches exhibited different infaunal assemblage and a spatial pattern for the benthic fluxes even with a distance of 100 m between the type of patches.

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