

Comparison of benthic meiofaunal assemblages between two coastal areas of different environmental condition of submarine groundwater discharge

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Submarine groundwater discharge (SGD) has been shown to be an important pathway between land and sea for the transport of terrestrial materials SGD results in various biogeochemical changes in the coastal environments, such as acceleration of coastal primary production, eutrophication, and ecosystem structure .SGD also impacts on surrounding environments by changing salinity, temperature and sediments characteristics. These changes in environmental condition due to freshwater flow from SGD have both positive and negative effects on coastal biota. In this study, we investigate the effect of SGD on benthic meiofaunal assemblages at two areas of different environmental condition of SGD. The SGD flow rate and the proportion of fresh water to seawater were measured using a seepage meter at Kamaiso Beach along the Mt. Chokai volcanic coast in Yamagata Prefecture Japan in June 2016 (10 sampling stations) and at Kogasaki Beach, Obama Bay, Fukui Prefecture Japan in August 2016 (nine sampling stations). Meiobenthos that pass through a 0.5 mm sieve but were retained by a 0.55 mm mesh size, were collected using core samplers (3.5cm in diameter and 10 cm long) at the same sampling stations of the two study sites where the seepage meters were installed. Three replicate samples were taken and the benthic organisms were identified to the major taxonomic group. The sediment samples were divided into three consecutive layers (0-3, 3-6, 6-9 cm). The negative ecological impacts of SGD on meiofaunal abundance were confirmed at the high seepage areas of Kamaiso where the small spatial scale presented strong heterogeneity in SGD environmental conditions. However, the meiofaunal abundance was not low at the low seepage area located slightly apart from the high seepage area. Therefore, the effect of SGD on meiofaunal communities could be limited. However, the environmental heterogeneity significantly enhanced the conservation of the meiofaunal diversity. Thus SGD determined the property of benthic communities.

Keywords: meiobenthos, SGD, biodiversity, biomass, Mt. Chokai, Obama Bay