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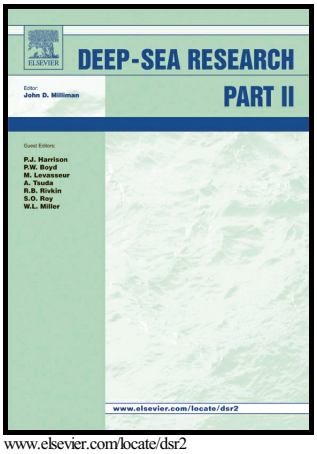

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Characterizing the sponge grounds of Grays Canyon, Washington, USA

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Abstract

Deep-sea sponge grounds are relatively understudied ecosystems that may provide key habitats for a large number of fish and invertebrates including commercial species. Glass sponge grounds have been discovered from the tropics to polar regions but there are only a few places with high densities of dictyonine sponges. Dictyonine glass sponges have a fused skeleton, which stays intact when they die and in some areas the accumulation of successive generations of sponges leads to the formation of reefs. In 2010 and 2016, we surveyed an area near Grays Canyon in Washington, USA, where dense aggregations of glass sponges and potential sponge reefs were discovered in 2007. Our primary aims were to make a preliminary assessment of whether the glass sponges form reefs at this location, characterize the sponge assemblage present at this site and examine associations between the sponges and commercially important species. Multibeam mapping and sub-bottom profiling indicate that the glass sponges at this site do not form reefs and are mostly attached to hard substrates. Analysis of photographs collected by an autonomous underwater vehicle and samples collected by a remotely operated vehicle guided by telepresence revealed the presence of two abundant dictyonine sponge species at this site, *Heterochone calyx* and *Aphrocallistes vastus* (mean densities = 1.43 ± 0.057 per 10 m^2, max = 24 per 10 m^2). We also observed a large number of non-reef-building glass sponges and various demosponges including a potentially new species in the genus *Acarnus*. A diverse fish assemblage was recorded at this site including eight species of