Biological and environmental drivers of deep-sea benthic ecosystem functioning in Canada’s Laurentian Channel Area of Interest (AOI)

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Abstract

Ongoing environmental changes and accelerating biodiversity loss raise concern and interest about the role of environmental factors and biodiversity in determining marine ecosystem functioning. This study aims to identify the main drivers of benthic ecosystem functioning in deep-sea sedimentary habitats in the Laurentian Channel Area of Interest (AOI), and in particular the role of sea pens (*Pennatulacea*) as potential keystone species in the area. Using the ROV ROPOS we collected sediment cores and measured environmental variables from 6 stations inside the AOI (depths 348–445m) in September 2017. Through 48-hours incubations and flux measurements (oxygen, inorganic nutrients), we estimated organic matter remineralization, a key benthic function. Preliminary analyses show no significant variation in fluxes among stations, despite significant differences in environmental variables. However, the presence/absence of *Pennatulacea* inside the cores indicated some capability to enhance remineralization and particularly nitrification. Ongoing analyses will address sediment properties, macrofaunal biodiversity, prokaryotic abundance, and biological traits as drivers of remineralization. Shedding new light on the primary drivers of ecosystem functioning in the area will inform the design or monitoring strategies proposed for this AOI and offer new perspectives and tools for MPA design.