

An Approach to Assessing the Impact of Hurricane Matthew on Meiofaunal Communities in Sandy Beach Environments

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January 30, 2024

Abstract

Hurricanes are natural periodic events that disrupt marine ecosystems along their path, altering the distribution and abundance of organisms. In October 2016, Hurricane Matthew struck the Santa Marta region and impacted its coastal zone, yet there have been insufficient studies to measure its effects. The aim of this study was to assess the impact of Hurricane Matthew on the meiofaunal community in the Santa Marta region. To achieve this, sediment samples were collected from the intertidal zone of three beaches five days after the hurricane had passed. The results were compared with previous data on the abundance and diversity of taxonomic groups of intertidal meiofauna, as well as physicochemical variables such as granulometry, organic matter, salinity, and water temperature. Following Hurricane Matthew, the physicochemical variables showed changes due to the effect of the cyclonic surge in the coastal zone. The average organism density on the beaches ranged from 29.3 to 250.8 ind./10cm², which were lower values than those recorded before the hurricane. However, the total number of recorded taxa was 13, which is close to the 15 previously registered. The ANOSIM test confirmed differences in the meiofaunal community before and after Hurricane Matthew, with nauplius and copepod being the groups that contributed the most to the dissimilarity between periods. The environmental variables of organic matter and temperature best explained the structure of the meiofaunal community after the natural phenomenon. This study highlights the importance of meiofauna as a monitoring tool for beaches and the effects of environmental disturbances such as hurricanes, which are expected to become more common in coastal areas due to climate change.

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