THE INFLUENCE OF LIGHT IN ROCKY SHORE BIOACOUSTIC SIGNATURE OFF CABO FRIO ISLAND

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In the southeast of Brazil, rocky shores are common features, present in coastal areas and islands. This is one of the most productive environments on Earth, and show a high diversity and ecological importance. Near rocky shore areas, the sound produced when many benthic invertebrates are active can be quite representative in the marine soundscape. These sounds merge into a timed signal, characterized as Rocky Shore Bioacoustic Signature (RSBS). However, RSBS patterns can be influenced by many factors, including circadian and lunar cycles, wind, tide, temperature and luminosity. Other factor that can change the RSBS is the sound attenuation caused by photosynthesis bubbles. The present work aims to characterize the relationship between RSBS and light. A structure with 4 hydrophones and 1 luminosity sensor was installed near the Cabo Frio Island, Brazil, acquire data during 82 days. Solar radiation data from National Institute of Meteorology (INMET) was utilized for RSBS modelling. The RSBS model was based on a nonlinear regression technique. Two frequency bands were under analysis: Band B (1.5-8kHz) and Band C (8-24kHz). Spearman's correlation showed that Band B and C have a negative correlation with solar radiation and luminosity. It suggests that solar radiation and RSBS have a nonlinear relationship. Regression analysis revealed that solar radiation explain approximately 27% and 19% of RSBS variance in B and C, respectively. Probably, the benthic invertebrates biorhythm can be the main contributor for RSBS decreasing during daytime. Furthermore, the study area presents a high density of macroalgae, and during the period of higher luminosity, some species produce bubbles caused by photosynthesis that can influence the local marine soundscape. The amount and size of these bubbles affect the underwater sound propagation, and the presence of free gas in the bubbles attenuates and reflects the sound energy due to absorption and scattering. The interference caused by bubbles will be evaluating in further works.

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