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ROCK SHORE BIO-ACOUSTIC SIGNATURE IN CABO FRIO ISLAND

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ABSTRACT

In coastal areas close to rocky shores, the bio-acoustic chorus produced by benthic invertebrates can be quite representative. Those sounds can be originated by the movement of organisms on the substrate or by the friction and/or impact of the hard structures of their bodies. Thus, when many individuals are active in the same environment, their sounds merge into a unique characteristic bio-acoustic signature that resembles that of a frying pan. This work aims to characterize this rock shore bio-acoustic signature, its temporal variation and its possible relation with abiotic factors. A structure with 4 hydrophones (positioned in the vertices of a regular tetrahedron with ~ 1 m of side) was installed near Cabo Frio Island, in Arraial do Cabo, Brazil, and a visual census of the benthic fauna was carried out on the rocky shore located 5 m from the hydrophone. Water temperature and light data were collected and acoustic data were analyzed together with environmental data (tide, rain, wind, solar radiation). The area of study is recognized as one of the main points of occurrence of the upwelling phenomenon on the Brazilian coast. This is due to the geomorphology of the coastal zone and the predominance of the winds of the Northeast quadrant. This phenomenon is characterized by the outcropping of deep, cold and nutrient-rich waters to the surface, especially during the spring and summer months and makes the site an unique and diverse environment in species of organisms. The bio-acoustic interest groups recorded in this survey were barnacles, bivalves, sea urchins and snap shrimps, which were recorded in different areas of the rocky shore. Apart from the usual diurnal pattern showing biological activity increase during the night period and at dawn and dusk, an after dusk noise increase in the lower band was detected. This temporal pattern may be related to the biological activity of the species that live near the rock shores and the hydrophone. In addition, the average power is modulated by water temperature (decreases at lower temperatures) and light intensity (increases during cloudy periods). The relationship between abiotic factors and bio-acoustic signature can contribute to the understanding of rock shore organisms behavior and to the development of biotechnological applications.