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Underwater noise pressure in exploited coastal environment and implication on dolphins communications.

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Underwater noise pollution is a globally relevant issue especially in coastal areas where multiple maritime activities are concentrated. In this context, the present work focuses on the assessment of underwater noise in the Northern Latium coast (Northern Tyrrhenian Sea, Italy) and its effects in coastal marine environment. Noise pollution evaluation was carried out taking into account Descriptor 11 of the Marine Strategy Framework Directive and in particular the indicator 11.2 for continues low frequency sounds to assess the issue of marine life chronic exposure to low frequency ambient noise. The underwater noise characterizing the area resulted highly variable both in space and time. Maritime traffic was identified as the main source of anthropogenic noise in the area. Among the various ship categories, related to their destination use, ferry boats represent the prevalent source of low frequency (<500 Hz) underwater noise.
Regarding marine life, attention was paid to understand the potential impact on bottlenose dolphins (Tursiops truncatus, Montagu 1821) vocal behavior, a cetacean species inhabiting coastal water, areas subject to an intensive human use. The vocal plasticity of bottlenose dolphins in the study area was evaluated comparing recordings coming from two Mediterranean areas (Pianosa Island and Sicilian Channel) representing two different scenarios. Bottlenose dolphin communications appeared to be masked by the ambient noise recorded in the research area. Comparison obtained with the two datasets, suggests that they used to adjust some vocal behavior features to compensate the environmental noise. The results obtained from this analysis suggests that the vocal plasticity of bottlenose dolphins whistles seems to be directly proportional to the underwater noise of the area they inhabit. Due to the ecologically important role of sound for cetaceans, this kind of response may affect relevant life processes. From this perspective, the assessment of noise pollution levels and its potential impacts affecting the species should play a key role to help the decision maker in management and conservation strategies.