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Long-Term Monitoring of Cetacean Bioacoustics using Cabled Observatories in Deep Waters of the Mediterranean Sea

EMSO and KM3NeT Research Infrastructures operate multidisciplinary seafloor-cabled observatories in a deep-sea area offshore Eastern Sicily (2100 m of depth). In a data-lacking zone, Passive Acoustic Monitoring (PAM) activities revealed new information on cetacean bioacoustics over multiple ecological scales. Expert operators investigated the presence of cetacean vocalizations within the large acoustic datasets acquired. Then, algorithms were developed to provide information on the behaviour and ecology of the recorded species. In 2005-2006, the acoustic activity of toothed whales was investigated through the OvDE antenna (100 Hz ÷ 48 kHz). The assessment of the size distribution of sperm whales was acoustically possible and the tracking of the animals showed the direction of movement and the diving profile. The biosonar activity of dolphins resulted mostly confined in the nighttime, linked to seasonal variation in daylight time and prey-field variability known for these deep-pelagic waters. Furthermore, in 2012-2013, we monitored the annual acoustic presence of fin whales thanks to the NEMO-SN1 station (1 Hz ÷ 1 kHz). The results showed that the species was present throughout all seasons, with peaks in call detection rate during spring and summer months. Fin whale calls were mostly detected in low background noise conditions (low marine traffic and absence of seismic prospectings).

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