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Impact of Covid-19 lockdown on shipping underwater noise in the Mediterranean Sea

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Marine traffic is an important noise contributor to the underwater soundscape. In addition to the growing marine traffic worldwide, the increase in both ship size and ship power tends to intensify the radiated noise, and thus the low-frequency noise level. Studies have shown that marine species can be impacted by the rapid growth of ambient noise levels. In particular, masking of communication or behavior changes in relation to noise exposure have been documented.

Shipping noise and its consequences on marine fauna are now monitored, and their evolution is of major concern for marine policies. Shipping noise modeling, based on Automatic Identification System (AIS) data is the most common approach to providing underwater noise levels at basin scales. Indeed, most ships are equipped with AIS transmitters, sending information concerning both the ship (ID, activity, length, etc.) and its navigation (position, speed, heading, etc.). This information is used to compute traffic density maps, and to model the ship's radiated noise. The ambient noise is finally inferred by propagating noise sources in the environment.

In France, a first Covid-19 lockdown occurred from the 17th of March to the 11th of May 2020, reducing significantly the marine traffic. In particular, cruise ships, passenger vessels, vehicle carriers and containerships harbor callings have decreased by 27%, 13%, 7% and 2 % respectively in member states harbors from 2019 to 2020, according to the European Maritime Safety Agency (EMSA). This traffic decrease affected only specific categories of ships, and contributed to some extent to a decrease of the anthropogenic underwater noise.

This study aims to analyze the impact of the traffic density reduction due to the lockdown on the shipping noise in the occidental part of the Mediterranean Sea by use of AIS datasets from 2019 and 2020, and eventually to discuss the potential benefit of traffic density reduction as a mitigation measure.