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Modeling underwater sound from future offshore wind farms southeast of Gran Canaria Island

Melania Cubas Armas¹, Alonso Hernández-Guerra¹, Eric Delory², David Dellong³, Verónica Caínzos¹, M. Dolores Pérez-Hernández¹, Daniel Santana-Toscano¹, Cristina Arumí-Planas¹, and María Casanova-Masjoan¹

¹Unidad Océano y Clima, Instituto de Oceanografía y Cambio Global, IOCG, Universidad de Las Palmas de Gran Canaria, ULPGC, Unidad Asociada ULPGC-CSIC, Canary Islands, Spain

²Plataforma Oceánica de Canarias (PLOCAN)

³Département Acoustique Sous-marine (ASM), Service Hydrographique et Oceanographique de la Marine (SHOM), 13, rue du Chatellier, CS 92803, 29228 Brest cedex 2, France

The European Union aims to achieve carbon neutrality by 2050. Therefore, it is crucial to increase the use of renewable energy. One clean energy source is the wind, and during the last decades, several countries have developed wind farms, not only on land but also in the ocean. Most offshore wind farms have been installed in shallow waters; however, recently, open ocean offshore floating wind farms are being installed in deep waters due to stronger and steadier wind occurring in these areas. Thus, offshore wind turbines are a potential new source of underwater noise. Noise can propagate underwater having the potential to affect marine mammals and fish, among others. Floating wind turbines are known to reduce the installation and decommissioning noise in contrast to fixed-bottom turbines but, nevertheless, the noise produced by the operation of the turbines and the anchoring systems have been scarcely studied, and it is still unknown whether added noise could significantly affect behavior or even hearing capacity in the long term. In the framework of the JONAS European project we anticipate a regional use case with a future installation of a commercial offshore wind farm, to determine how noise would propagate in the region, from installation to operation, and potentially impact (or not) local fauna, focusing initially on mammal groups. In this study, we use the RAM model (Range-dependent acoustic model) which is a parabolic equation (PE) code that calculates the propagation of sound in the ocean using the split-step Padé solution. RAM needs information about the temperature and salinity in the water column to calculate sound speed profiles, as well as the bathymetry and a geo-acoustic model of the bottom. It returns the transmission loss depending on the depth and distance to the source. We have applied the RAM model to an area located in the southeast of Gran Canaria Island, where a plan for a floating wind farm is under consideration. Results and suggestions about the negative impact on marine mammals known to live in this location are presented.