Physeter macrocephalus and oceanography conditions in high maritime traffic areas

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Poster N° OOS2025-1109

INTRODUCTION

*The **Pelagos Sanctuary**, a crucial marine protected area in the northwestern Mediterranean Sea, provides important habitat for the sperm whale (Physeter macrocephalus) [1].*

***Long-term monitoring of oceanographic conditions** is essential to evaluate the impacts of environmental variability and human-induced pressures, such as **climate change** and **maritime traffic** (Fig. 1), on sperm whale populations.*

*This information is required to **refine conservation strategies** and **advance the sustainable management** of the Pelagos Sanctuary.*

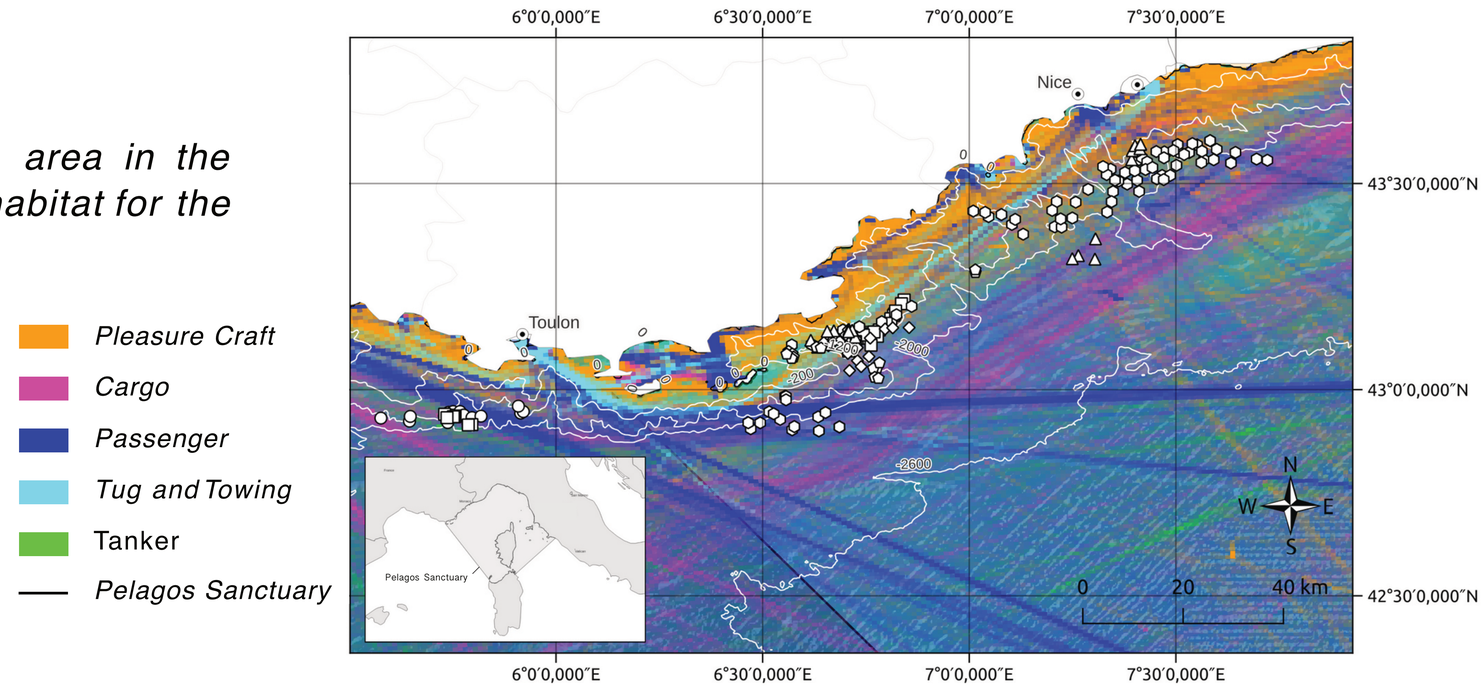


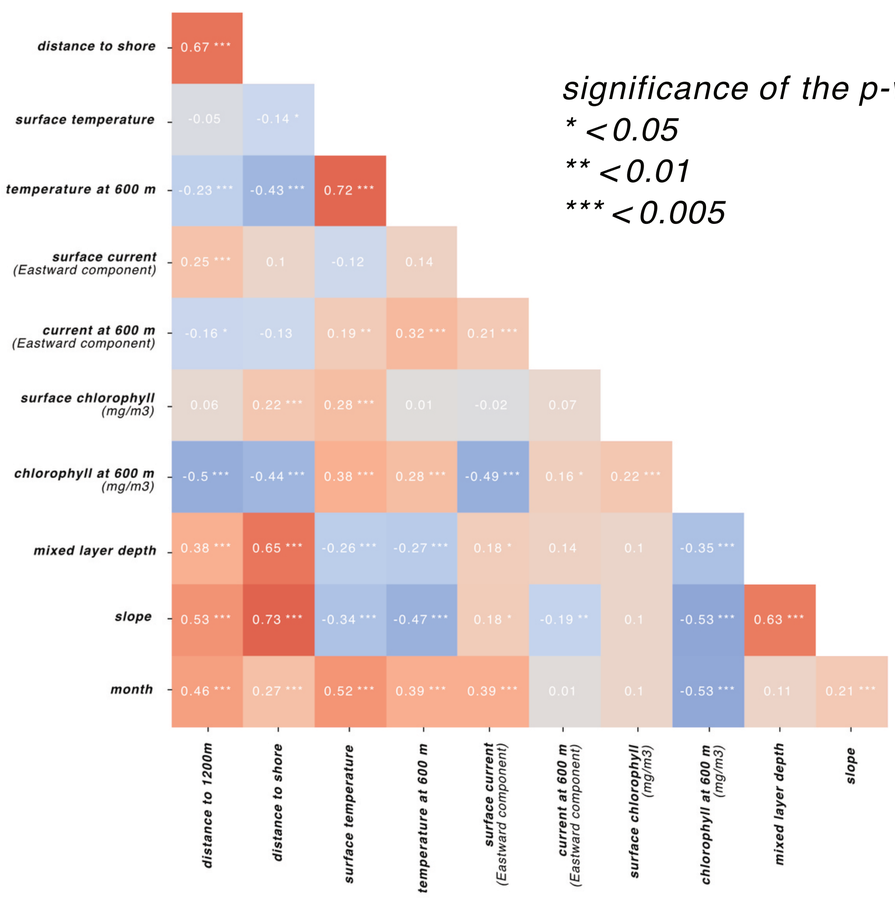
***Fig. 1.** Sperm whale positions with maritime traffic density in September 2022 [2]*

MATERIALS & METHODS

- ***10-minutes listening** protocol with a hydrophone, followed by 30 minutes of navigation according to bathymetry to collect GPS positions ;*
- *Positive listening is followed by an estimation of orientation using a directional antenna ;*
- ***Visual observers locate the blow** and then a small boat approaches to photograph the individual's features ;*
- *Dive "footprint" is measured by positioning the boat over it, and the listening continues on the located individual ;*
- *Bathymetry data comes from the **GEBCO** dataset [3] ;*
- *Temperatures, currents, chlorophyll concentrations and mixed layer depths are extracted from the **Copernicus Marine service** (NEMO CMCC models) [4, 5] ;*
- *Slope values are calculated between 200 and 2000 meters depth.*

RESULTS

- *A positive correlation is observed between the distance to the -1200m isobath and the considered months (Fig. 2) ;*



significance of the p-value
** < 0.05*
*** < 0.01*
**** < 0.005*

***Fig. 2.** Spearman correlation matrix with coefficients and p-values*

- *70% of observations were recorded within a 3-km radius of the -1200 m isobath (Fig. 3) ;*
- *+ 95 % of observations were located in the **first 10 nautical miles** (where 93% of the time were spent, i.e. 248 hours) ;*
- *Only few observations were made beyond 10 nautical miles.*

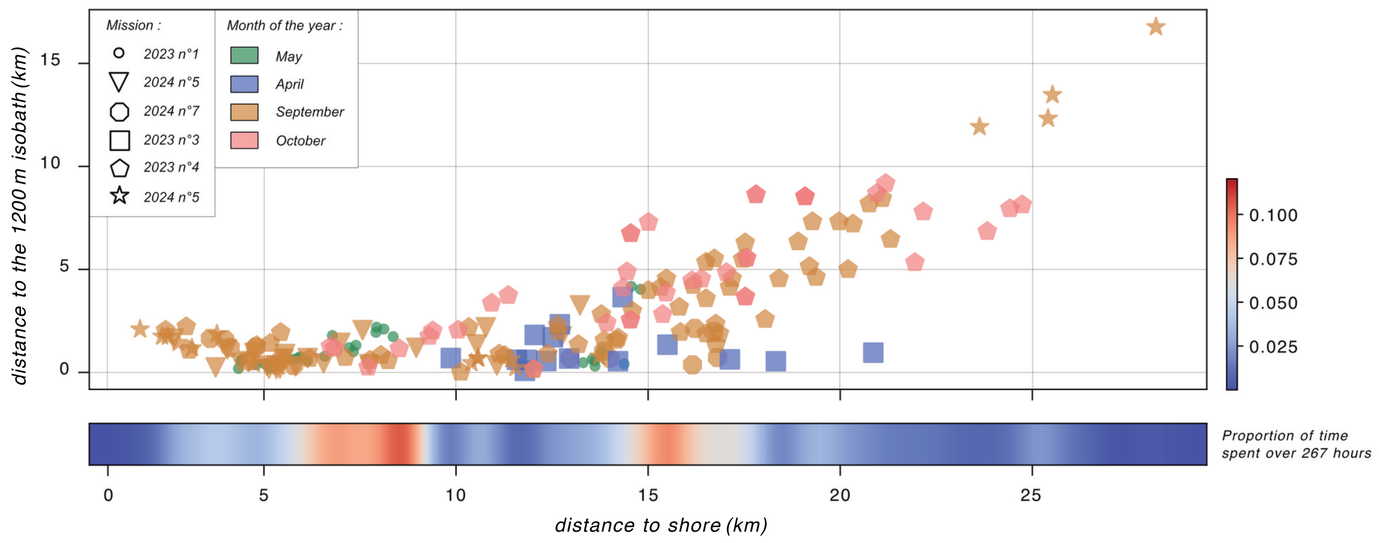


***Fig. 3.** Distance between observations and 1200m depth as a function of distance to shore with spatial effort*

CONCLUSION

- *According to our observations, the first 10 nautical miles constitute a zone of strong presence in this part of the Mediterranean sea ;*
- *In summer, as the Northern Mediterranean current is wider, the observations may be further away from the 1200 m isobath ;*

An effort to characterise the parameters of the surrounding canyons will be undertaken to highlight the eventual optimal conditions regarding sperm whale hunt.

Ackowledgment :

We thanks EUROPAM Biodiversa project and European project SEAsteMAR.
H.G thanks ANR for grants ULPCochlea ANR-21-CE04-0020 & DGA IAD for AI Chair ADSIL ANR-20-CHIA-0014

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