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Correlation of Sea Surface Temperature and Bottom Water Temperature with the presence of Sperm Whales (*Physeter macrocephalus*) and Cuvier's beaked whales (*Ziphius cavirostris*) in the NE Aegean Sea, Greece

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Introduction

The Mediterranean populations of *Physeter macrocephalus* (Pm) and *Ziphius cavirostris* (Zc) are facing increasing anthropogenic threats and yet little is known about their populations [1]. In comparison to other regions within the Mediterranean, the distribution and habitat preferences of these species in the NE Aegean Sea are extremely understudied [2]. Improving site specific knowledge on the distribution, abundance and habitat preferences of these cetacean species is essential for mitigating the impacting factors in this highly exploited region.

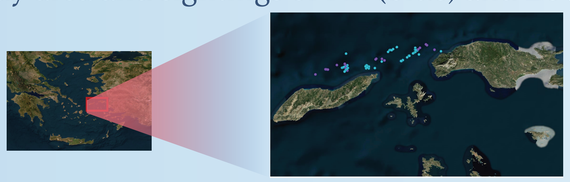
Aims

- Explore the **relationship** between **depth**, **SST**, **SBT** and the **distribution of the species**
- Highlight the importance of **satellite data** when **modelling cetaceans**

Methods

Presence/absence data for Pm and Zc were collected during **290 standardised boat-based surveys** along the **Ikarian trench** between **January 2017** and **August 2022**.

Fig 1. Study area and sightings of Pm (blue) and Zc (purple)

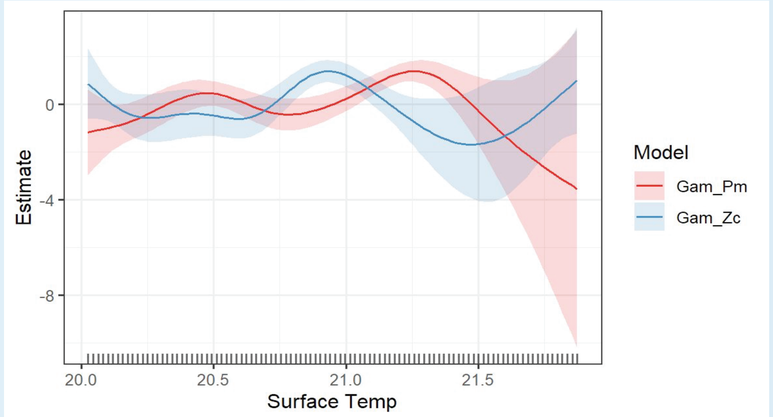


Satellite variables [3] included in the **GAM** using the **mgcv package** [4]:

- SST and SBT (**Copernicus Portal**)
- Depth (**EMODnet Portal**)

Results

2109 points of data were used for the model, 138 with presence of Pm and 882 with presence of Zc. The values of SST and SBT ranged from **20.03°C - 21.89°C** for SST and from **13.61°C - 18.05°C** to SBT. The depth where these cetaceans were found ranged from **800 - 1200 meters**. Presence of both species analysed in this study were strongly influenced by **depth ($p < 0.001$)**. The model suggested an influence by **SST ($p < 0.001$)** for both species and **SBT ($p < 0.1$)** only for sperm whales.



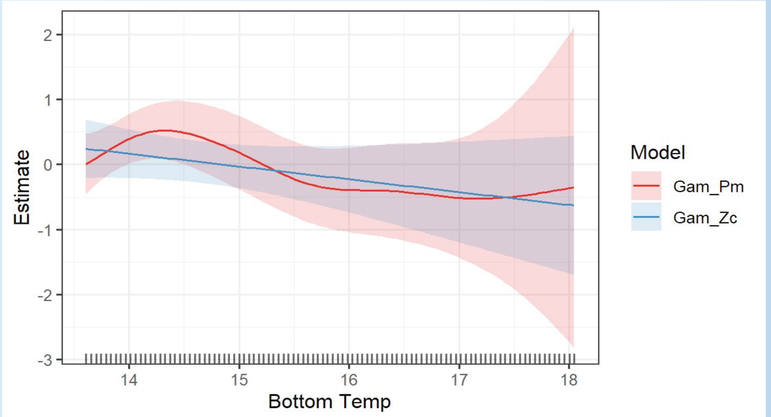


Fig 2. Predicted smooth splines of the response variable presence/absence of *P. macrocephalus* and *Z. cavirostris* in function of explanatory variables

Discussion

Exploration of the data showed that the **range of SST and SBT** was **too weak** to be relevant within the model **without taking seasonality into consideration** [5]. The results obtained from this study were inconclusive, however they indicate a **link between** the **presence of these species** and **SST**, **SBT** and **depth**. This association is likely driven by the **higher prey densities** present in colder, deeper waters [3 ,6]. Further, extensive research is recommended with the inclusion of additional variables such as **slope** and **seasonality** [5].

1. Rogan *et al.* Deep Sea Res. Part II Top. Stud. Oceanogr. **2017**, 141
2. Cañadas *et al.* Ecol. Ind. **2018**, 85
3. Martino *et al.* Ecog. **2021**, 44,10
4. Dalla Rosa *et al.* Cont. Shelf Res. **2012**, 36
5. Camrin *et al.* Anal. Rev. Mar. Sci. **2022**, 14, 1
6. Virgili *et al.* PLoS ONE. **2021**, 16, 8