maurizio.ingrosso@uniba.it

26

Distribution pattern of common dolphin (*Delphinusdelphis)* in the Dodecanese archipelago (Eastern AegeanSea, Eastern Mediterranean Sea)

Ingrosso M.[1,2], Tintorè B.[2,3], Cipriano G.[1], Carlucci R.[1], Santacesaria F.C.[4], Miliou A.[2], Tsimpidis T.[2], Ricci P.[1]

1 Department of Biosciences, Biotechnologies and Environment, University of Bari Aldo Moro, Bari, Italy - 2 Archipelagos Institute of Marine Conservation, Pythagorio, Samos, Greece

3 Department of Mechanical Engineering, Brunel University London, Uxbridge, United Kingdom - 4 Jonian Dolphin Conservation, Taranto, Italy

INTRODUCTION

Cetacean distribution across ecosystems is determined by a combination of anthropogenic and environmental factors over different spatial and temporal scales. This study aims at identifying the environmental factors that locally influence *Delphinus delphis* (DD) distribution in the Eastern Aegean Sea (Eastern Mediterranean Sea).

METHODS

Presence/absence data of DD were collected between 2017 and 2021, during 284 standardized vessel-based surveys over an area of 7072 km^2 (Fig.1).

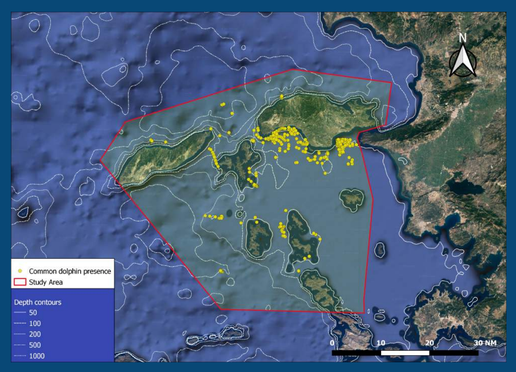

Fig.1 Study area and DD sightings.

VARIABLE SELECTION

16 bio-geo-chemical explanatory variables were considered to test their influence on the spatial distribution of the species (Fig.2). A Variance Inflation Factor (VIF) and correlation matrix analyses were performed (Fig.3).

Variable	Code	Unit	Resolution
Longitude	X	WGS 84	0.001°*0.001°
Latitude	Y	WGS 84	0.001°*0.001°
Sea bottom Temperature	BottomT	°C	0.042°*0.042°
Water column temperature	WCT	°C	0.042°*0.042°
Salinity	S	PSU	0.042°*0.042°
Net Primary Production	PPN	mg·m³·day⁻¹	0.042°*0.042°
Dissolved Oxygen	Diss_O2	mmol·m³	0.042°*0.042°
Dissolved Carbon	Diss_C	mmol·m³	0.042°*0.042°
pH	pH	pH units	0.042°*0.042°
Dissolved Nitrates	NO3	mmol·m³	0.042°*0.042°
Dissolved Ammonium	NH4	mmol·m³	0.042°*0.042°
Dissolved Phosphate	PO4	mmol·m³	0.042°*0.042°
Chlorophyll a	Chl-a	mg·m³·day⁻¹	0.042°*0.042°
Phytoplankton	Phyc	mg·m³·day⁻¹	0.042°*0.042°
Distance from coast	Dist_c	m	1 m
Depth	Depth	m	1 m

Fig.2 List of bio-geo-chemical variables.

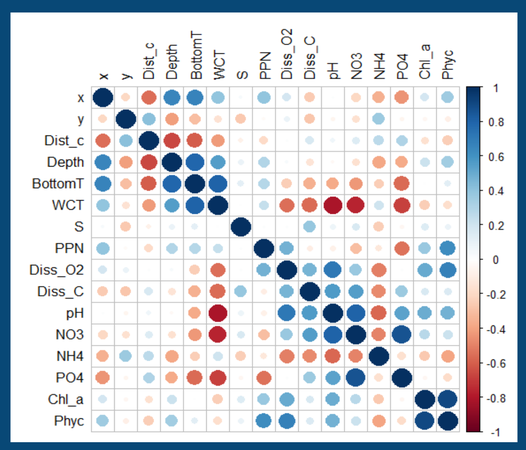

Fig.3 Correlation matrix.

MODELLING APPROACH

Binomial GAMs with logit as link function have been performed using the R package *mgcv* (REML method). Model evaluation and selection were based on:

- 10-fold cross-validation with 70/30% random data splitting
- Area Under Curve > 0.75
- Akaike Information Criterion
- Explained deviance
- Coefficient of determination (R^2)
- REstricted Maximum Likelihhood

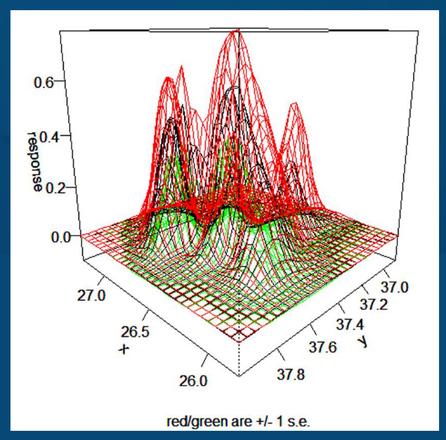

Fig.4 Smooth terms (X and Y) are plotted pairwise on the response scale (vertical axis).

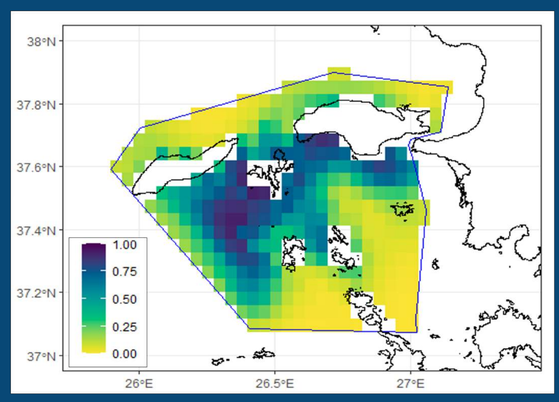

Fig.5 Probability map of DD distribution within the study area.

RESULTS

The variables with the highest impact on the model were depth and the smoothing interaction between longitude and latitude (Fig.4). A predictive map has been produced (Fig.5).

DISCUSSION

This study increases the knowledge gained by previous studies about DD distribution across the area. Results confirm that long-term time-series of satellite-derived data is useful to assess the occurrence and the spatial distribution of DD, suggesting future assessments of its presence at different scales, such as seasonal and temporal.