Future distribution shifts of the short-beaked common dolphin (*Delphinus delphis*) in the Northeast Atlantic

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Introduction

Climate change is reshaping marine species distributions, making predictive habitat modelling a critical tool for conservation planning. The short-beaked common dolphin (*Delphinus delphis*) is widely distributed throughout the Northeast Atlantic, where it is strongly associated with productive shelf and slope environments. Here, we **model current and future habitat suitability under contrasting climate scenarios and assess implications for the existing Marine Protected Area (MPA) network.**

Fig. 1 – *Delphinus delphis* © AIMM

Methodology

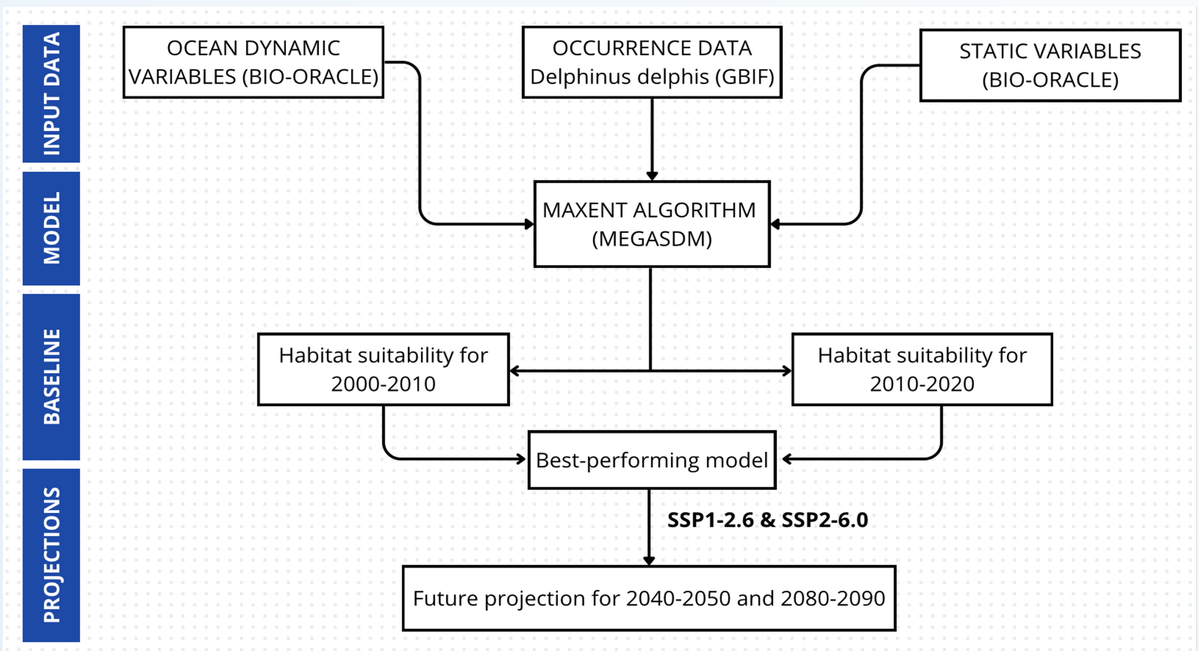

Fig. 2 - Modelling workflow and study design.

Results

- **Sea surface temperature, phytoplankton biomass, salinity, and dissolved oxygen** were the main drivers of habitat suitability;
- **Core suitable habitat** occurs in the Azores, Bay of Biscay, English Channel, and Iberian shelf;
- **Core suitable areas remain relatively stable across scenarios**, with spatially distinct expansions projected by mid- and late-century;
- Expansion **patterns differ** between **SSP1-2.6 and SSP2-6.0,** reflecting scenario-specific shifts in ocean conditions.

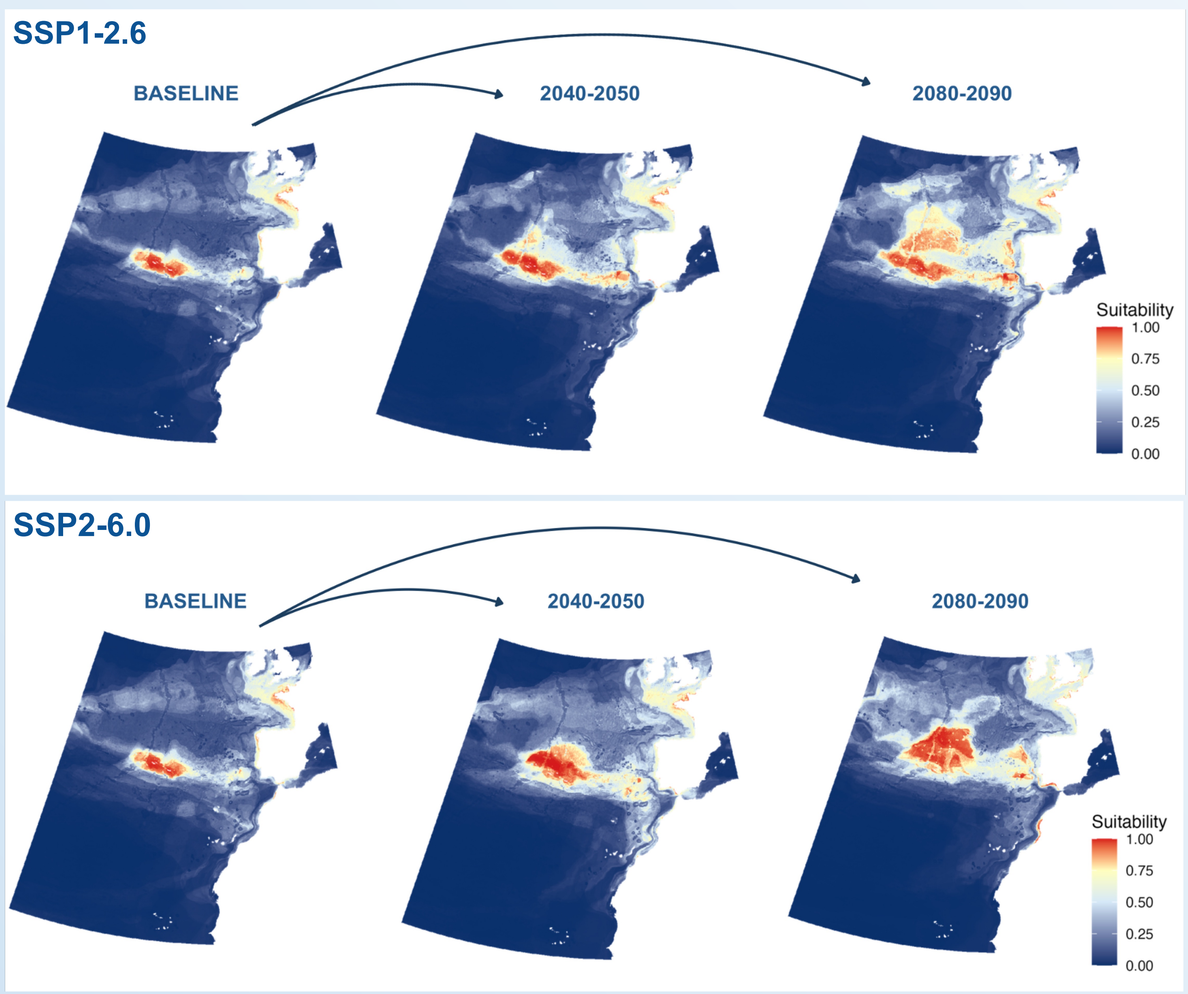

Fig. 3 - Habitat suitability under SSP1-2.6 and SSP2-6.0 (baseline, mid- and late-century).

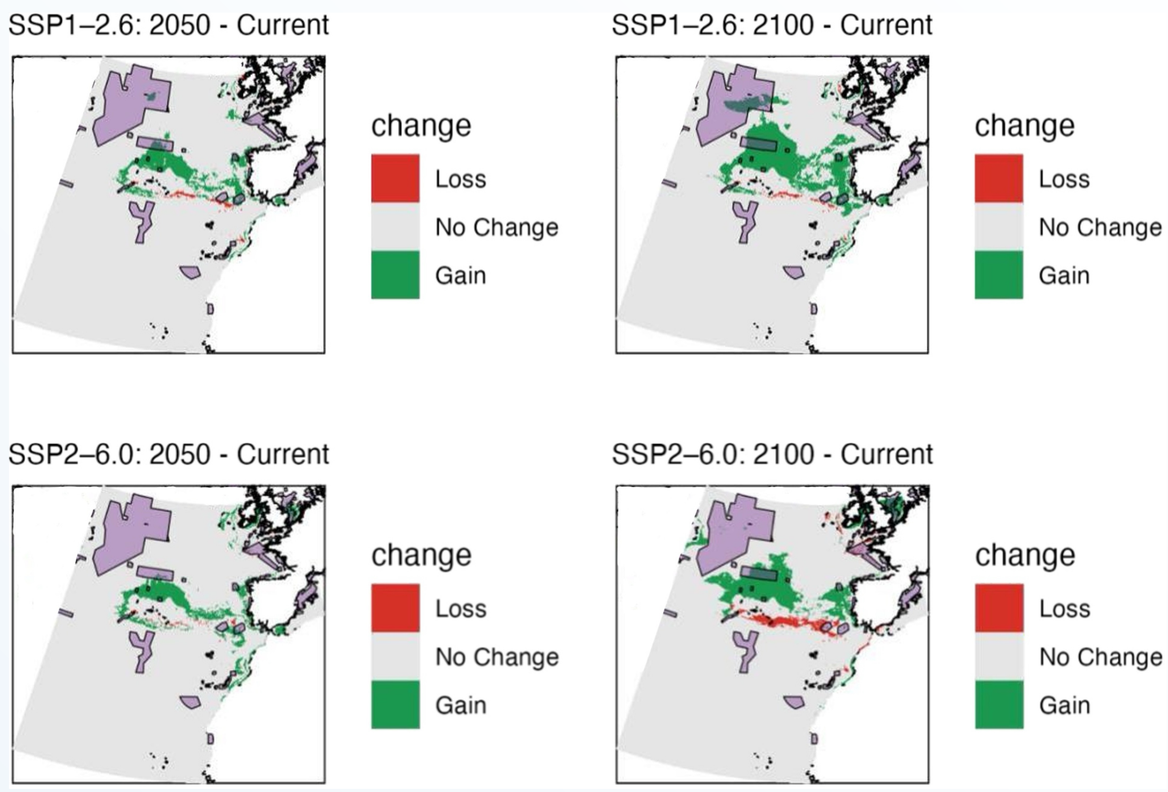

Fig. 4– Relative changes in habitat suitability between time periods and overlap with Marine Protected Areas (MPA) in the study region.

Discussion and Conclusion

Habitat suitability of *D. delphis* is primarily governed by sea surface temperature, phytoplankton biomass, salinity, and dissolved oxygen. **Core suitable areas remain stable** under both scenarios, while **spatially distinct expansions emerge** by late century. Overlay analyses indicate that, although several future high-suitability areas coincide with existing MPAs, substantial portions of projected gains extend beyond current boundaries, particularly in offshore sectors. These findings highlight the **need for adaptive spatial planning**, maintaining protection where habitat remains relevant while adjusting or expanding MPA boundaries to accommodate projected range shifts.

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