Combining acoustic and visual cetacean monitoring in Northern Portugal

PARIS

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OBJECTIVES

Combine acoustic and observation cetacean data.

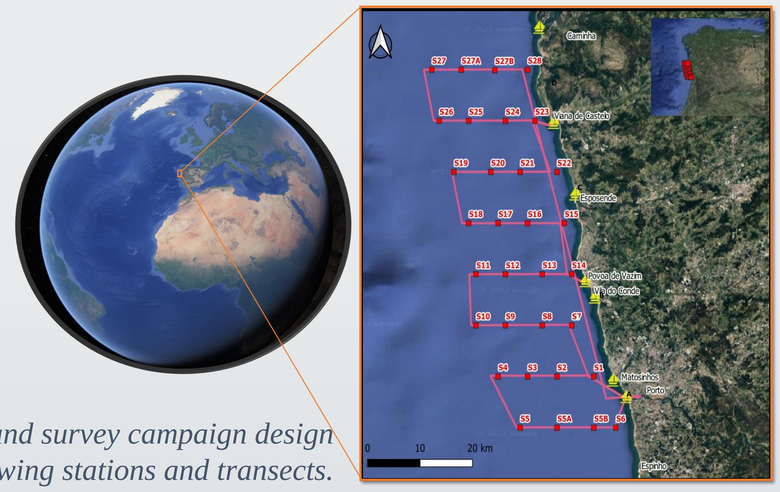
Characterize the distribution, abundance and habitat of cetaceans on the north coast of continental Portugal and relate it to environmental conditions.

CETACEAN SOUNDS

MYSTICETES	ODONTOCETES
2 blowholes, Dewlaps	1 blowhole, Teeths
Signal types difficult to classify	Tonal sounds and pulsed sounds
No Echolocating system	Echolocating system (20kHz to 150kHz)
Low to moderate frequencies (12Hz to 8KHz)	Moderate to high frequencies (1kHz to 20 KHz)

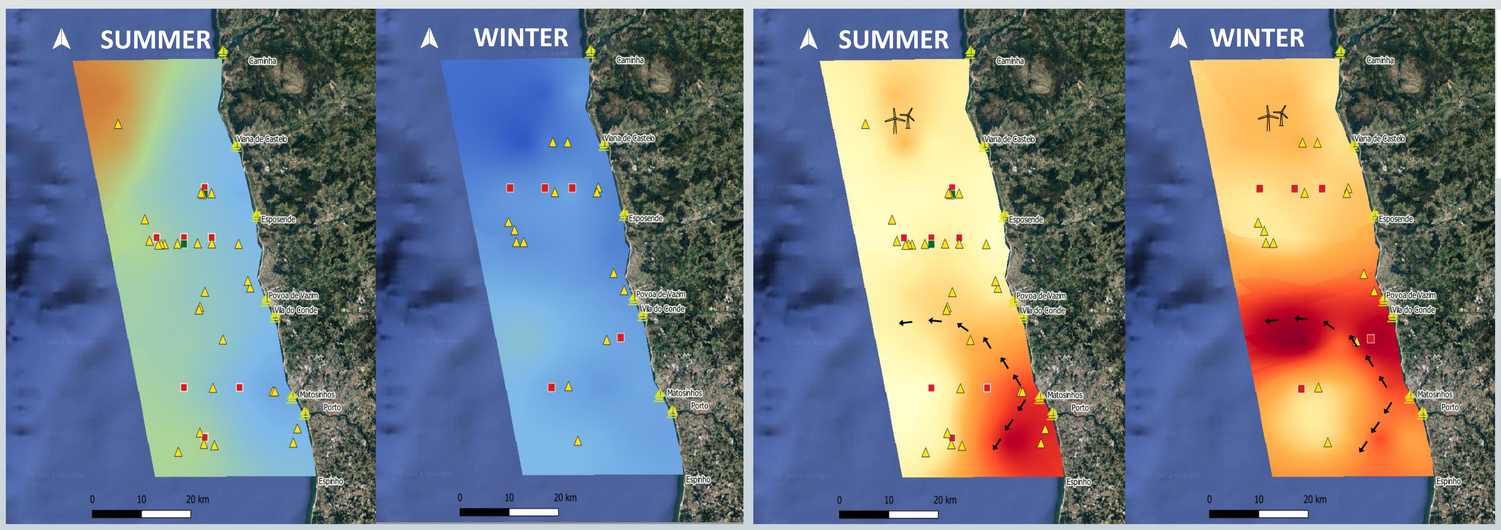
SURVEYS

- 4-day campaign with 32 stations, connected by linear transects
- Visual cetacean monitoring along transects and opportunistic, using standard methodology
- Acoustic survey on each station (noise, cetaceans and shrimp)
- Summer campaign 2021 and winter campaign 2022



Study area and survey campaign design showing stations and transects.

RESULTS

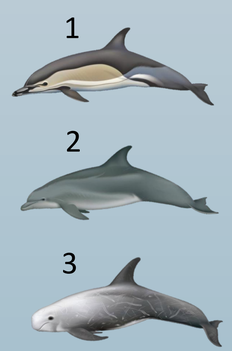


Distribution of cetacean sightings and cetacean acoustic records with distinct biophonic sound, in summer and winter, projected on temperature (left) and background noise (right) maps.

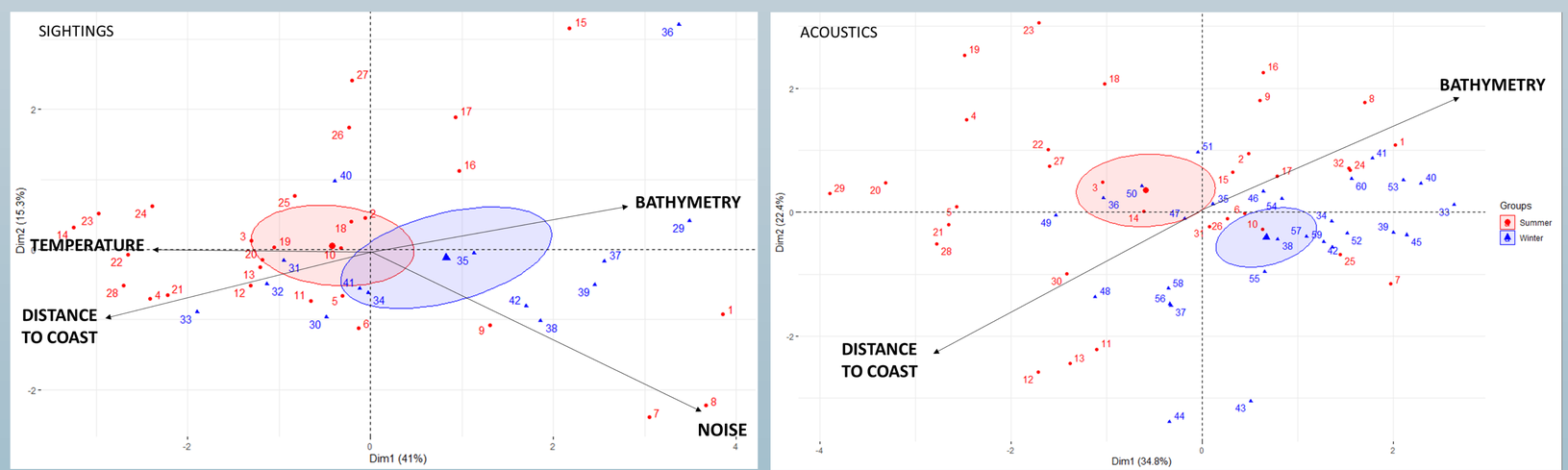
Water temperature varied between 14°C and 16.9°C in summer, being more homogeneous and colder in winter, between 13°C and 14.9°C. On average, cetaceans were identified in areas where the temperature was between 14°C and 15°C.

The background noise maps show a noisy areas in the north, related to the presence of a wind farm, and very high noise in the center-south representing the maritime traffic routes (different in summer and winter) to and from the ports of Matosinhos (Porto) and Vila do Conde.

Sighted species



[1] Common dolphin : *Delphinus delphis*
[2] Bottlenose dolphin : *Tursiops truncatus*
[3] Risso's dolphin : *Grampus griseus*



Principal component analyses of the cetacean sightings (left) and cetacean acoustics detections (right), and variables with high contribution, for the summer (red) and winter (blue) data.

Analyses of the sightings and the acoustic data show differences between seasons. In summer individuals tend to occur far from the coast, in higher water temperatures, while in winter they are closer to the coast and at lower temperatures.

The visual monitoring indicates a larger habitat in winter and therefore a greater dispersion of individuals in the study area.

CONCLUSIONS

- Differences in habitat conditions between seasons. In summer, dolphins are present in greater abundance, distributed over a wider habitat, whereas in winter they are predominantly found in colder waters and closer to the coast.
- Dolphins typically avoid noisy areas. The area is highly disturbed by the presence of heavy shipping traffic, fishing activity and wind farming.
- The results show the advantage of a complementary use of visual and acoustic surveys.

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