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Whistles production of bottlenose dolphins during specific behavioral contexts in the Algarve region (Portugal)

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Introduction

The bottlenose dolphin (*Tursiops truncatus*) is one of the most frequently observed cetacean species in the Algarve, South of Portugal. This study provides the first insight into the acoustic behavior of bottlenose dolphins in the Algarve region (Fig.1).

Methodology

Recordings were made with a dipping hydrophone deployed from a research boat and connected to a digital recorder (Fig 2). After 10 minutes of habituation, the recordings were made in 3-minute samples with 5-minute intervals.

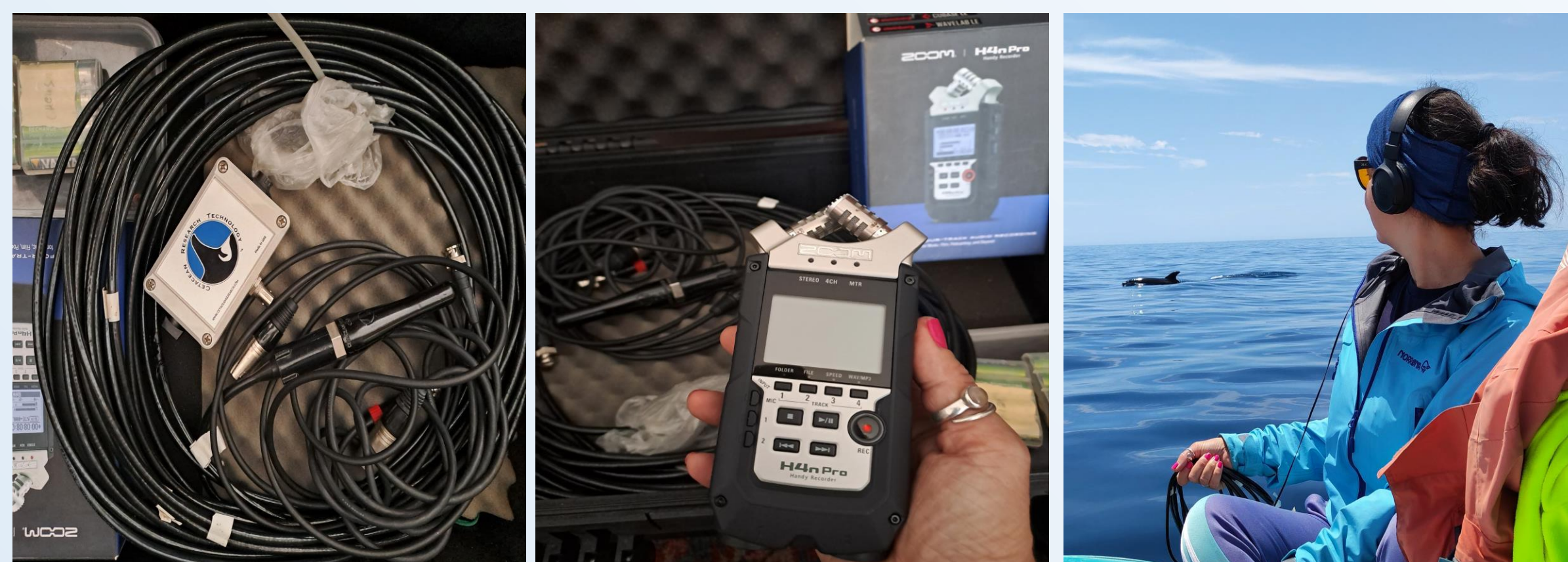


Fig. 2 – Acoustic Recording Equipment & Data Collection

Data were collected from May to October 2023. The species' whistles were recorded in different behavioral contexts and categorized according to the key activities observed at the surface ⁽²⁾ (Table 1):

Tab.1 – Ethogram of *Tursiops truncatus* in Algarve Region.

Behavior	Description
Traveling	linear position of a compact group moving between areas without aerial behavior.
Foraging	zigzag movements of a subdivided group, occasionally with dives longer than 1 minute and aerial activity.
Socialization	active surface and aerial behaviors, with physical contacts and no detectable prey, synchronized movements.

The group size was estimated by direct counts of the observers and later average calculation. The sound emissions were analyzed using spectrograms plotted in Raven 1.6.5 (Cornell Lab of Ornithology, NY). The whistle rates were obtained by dividing the number of whistles by the number of minutes of each sample and by the group size.



Fig. 2 – *Tursiops truncatus*.

References

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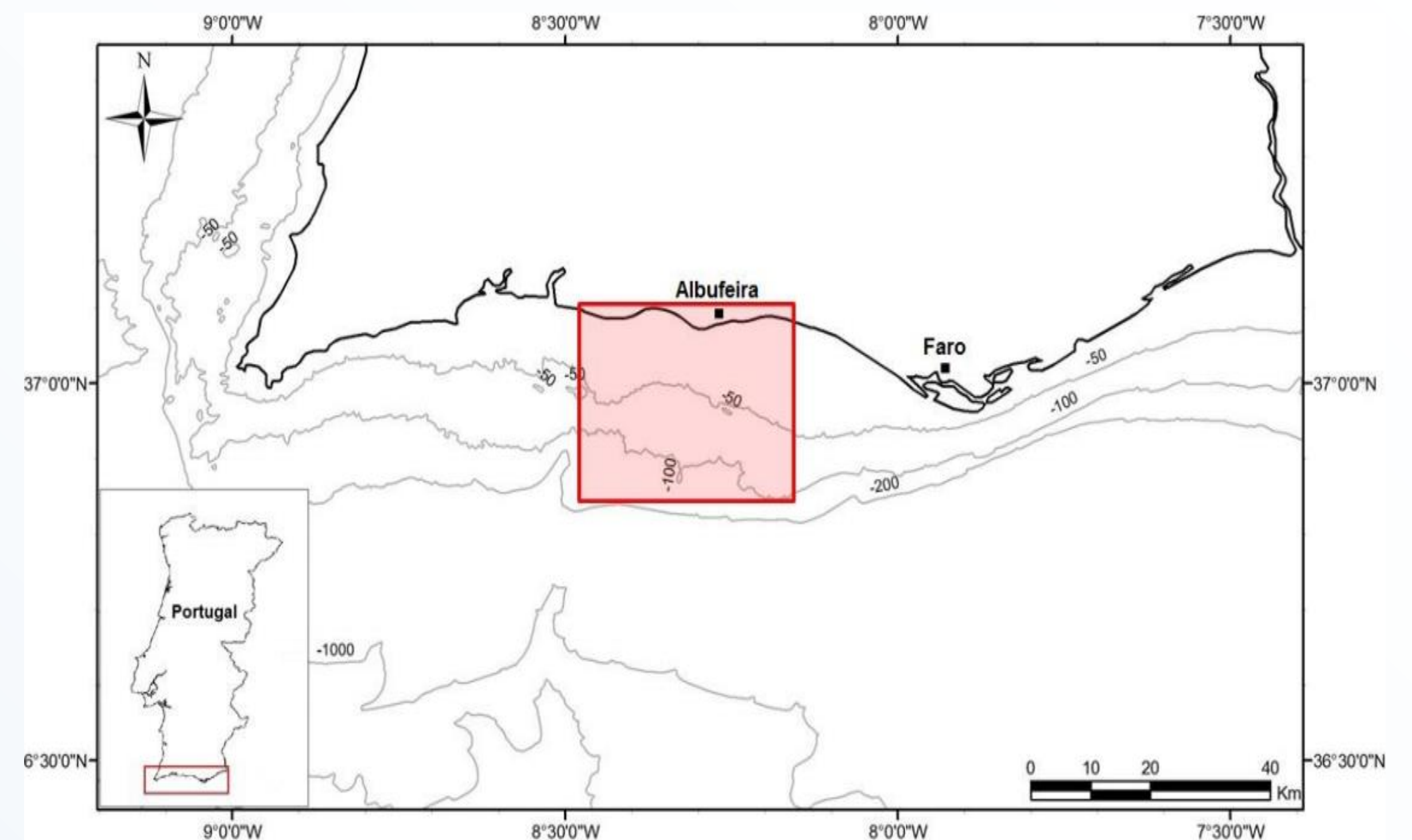


Fig. 1 – Study Area.

Results

Twelve encounters with bottlenose dolphins resulted in 55 acoustic recording samples (121 minutes and 2.883 whistles).

Foraging (2.37 whistles/min/dolphin; 18% of total observation time) and **socialization** (1.58 whistles/min/dolphin; 47% of total observation time) were the activities that presented the highest whistles emission, while **traveling** (0.92 whistles/min/dolphin; 35% of total observation time) had the lowest whistles emission (Fig.4).

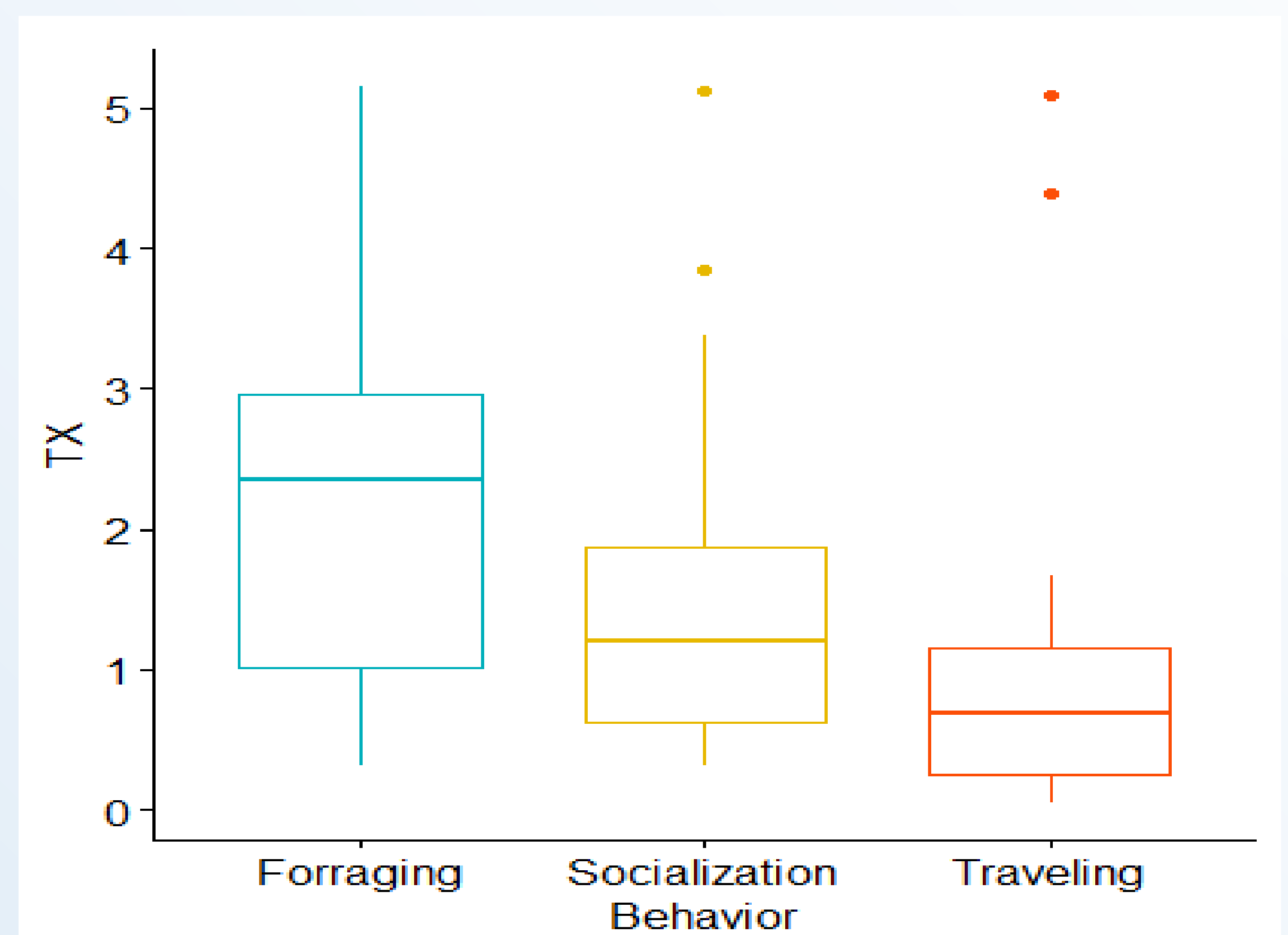


Fig. 3 – Whistle Rates by Surface Behavior Context.

Spearman's correlation was calculated between the number of whistles and group size ($r = 0.17$; $p > 0.05$; $n = 2883$), and there was no significant correlation.

Discussion and Conclusion

During the feeding-related behavior and social interactions, larger groups and higher rates of whistles per minute per animal suggest that these dolphins use whistles to coordinate or regulate these activities. During socializing, whistle rates may increase as the animals communicate information or try to maintain contact with other group members who may be dispersed ^(1,2,3,4,5). However, during travel, these animals tend to stay close to each other with physical and/or visual contact making acoustic communication less necessary ⁽¹⁾.

The results of this 2023 pilot project in the Algarve region highlight how bottlenose dolphin acoustic behavior depends on the dominant activity.

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