

Cory's Shearwater (*Calonectris borealis*) spatiotemporal information in the southeastern waters of Gran Canaria (Canary Islands)

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Introduction

Pelagic birds spend most of their lives at open sea and, therefore, their morphology is perfectly adapted to life in marine environments. Cory's Shearwater (*Calonectris borealis*) is the most abundant seabird in the Canary Islands, with an estimated population of around 30,000 breeding pairs (1). The Canarian populations of this species carry out well-known migratory movements, which use the surface wind regime of the atmospheric circulation to reach their wintering quarters in the waters of the South Atlantic Ocean (2).

The objectives of this work are to provide new information on the seasonality of the species in the Canary Islands, to estimate its density and to assess the flight behavior in relation to the intensity of the wind. This information is very useful in view of the multiple installation projects for offshore wind farms (OWF) planned off the southeastern coast of the island of Gran Canaria, following the Canary Islands sustainable energy strategy.

Method

Study Site

The study area is located off the coast of Arinaga (Agüimes), Pozo Izquierdo (Santa Lucía de Tirajana) and Castillo del Romeral (San Bartolomé de Tirajana), located on the southeast of Gran Canaria (Las Palmas, Canary Islands, Spain, Figure 1). The area has been chosen for its potential for the installation of OWF due to the predominant wind intensity with an annual average wind velocity of 11 m/s (3).

Methodology

- For data collection, censuses were carried out from a boat. The design of the itineraries and the density analyses performed using the Distance software, version 7.3 (4). We sampled through 57 km of zigzag transects, covering a total area of 58 km² where three areas or group of transects were identified: coastal, central and outer.
- The surveys were carried out from 10 am to 4 pm at a speed of about 6-7 knots (11-13 km/h). Censuses were undertaken in eight pelagic trips distributed through the year (two censuses per season).
- To estimate the density of shearwaters, different models were built considering the functions that explain the loss of detectability with distance. Akaike Information Criterion (AIC) was used to choose the model that best fit the data and obtain the density value.
- The relationship between the flight height of the shearwaters and the wind intensity according to the Beaufort scale was analyzed.

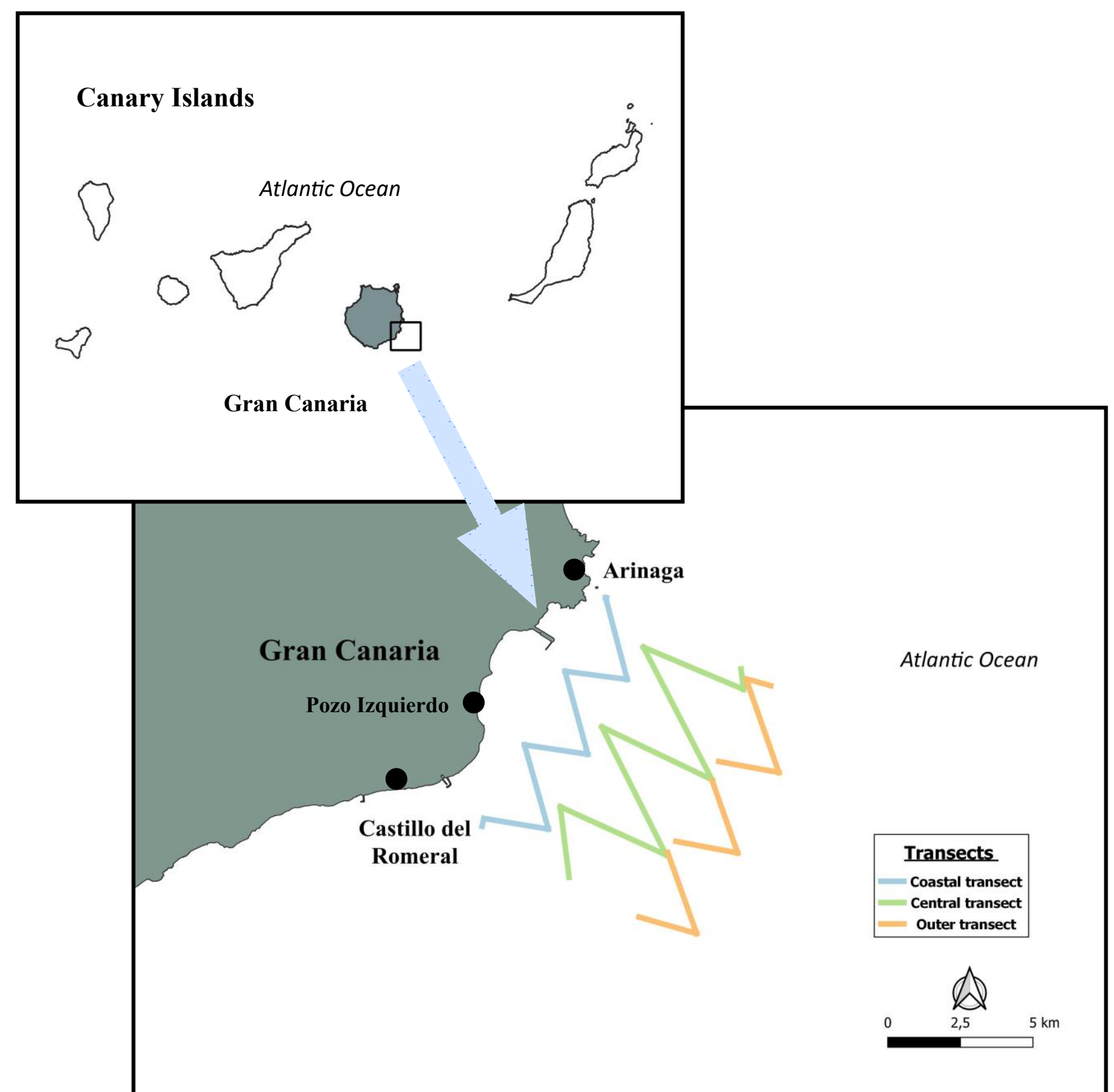


Figure 1. Location of the study area (southeast of Gran Canaria, Spain) showing zig-zag transects sampled by boat.

Results

Data

- 225 Cory's Shearwater were detected in six of the eight censuses carried out. The species was not detected in one visit in autumn and one in winter (from December to February).
- The density of Cory's Shearwater was similar in the three areas, with an average value of 3.64 birds/km² (95% CI: 2.14-6.20).
- A correlation coefficient of 0.58 between the flight height of the shearwaters and the wind intensity was estimated. The correlation test showed a significant association ($t = 10,679$, $df = 224$, $p < 0.05$), although the regression analysis showed little predictive power (linear coefficient of determination of 0.34, Figure 2).

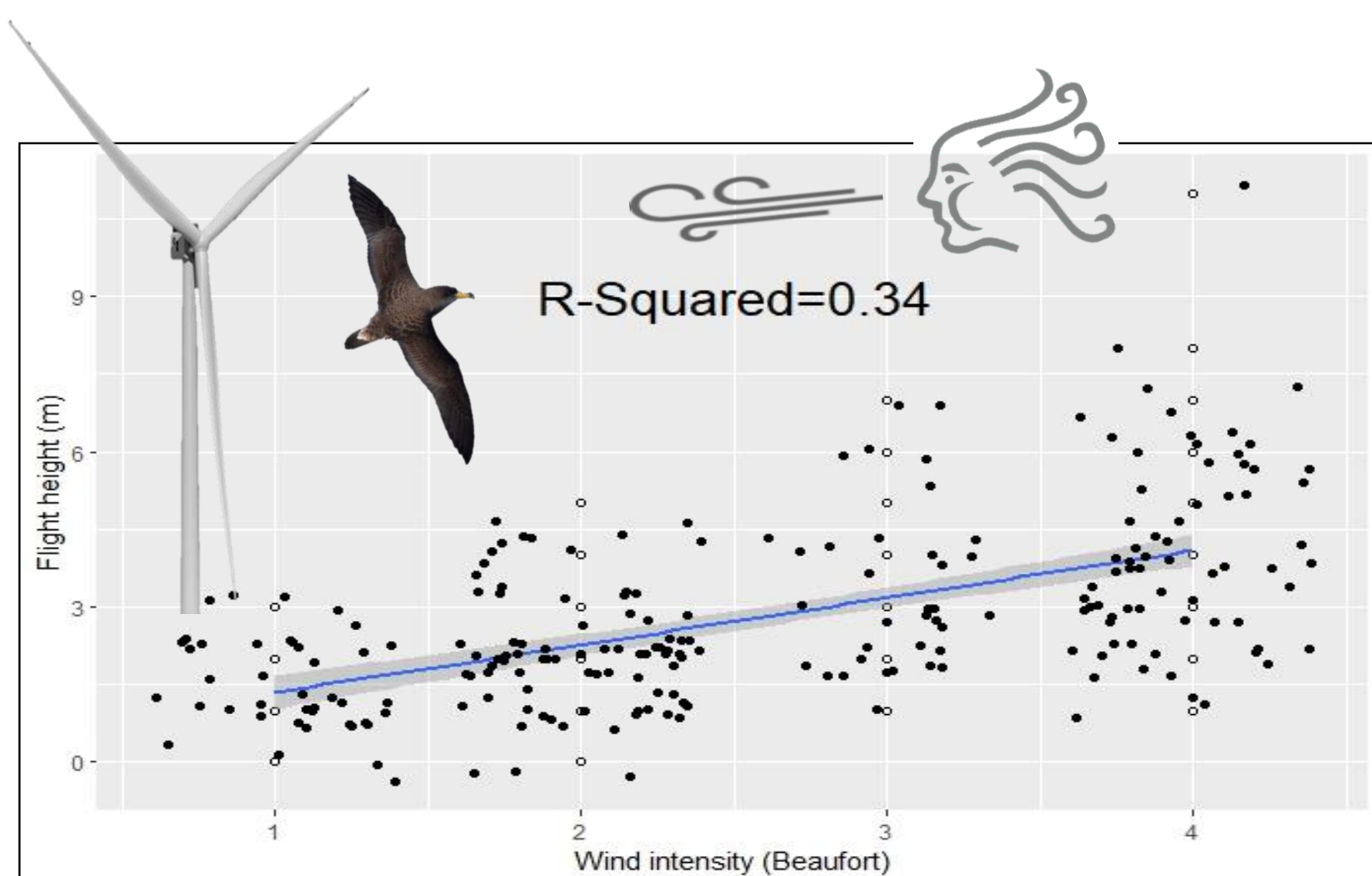


Figure 2. Relationship between flight height of the shearwaters and the wind intensity. Jittered points are showed for handling overplotting caused by discreteness.

Discussion and Conclusion

- Cory's Shearwater is present in the Canary Islands between spring and autumn. These dates agree with their reproductive phenology on the islands, which begins in March with the arrival of the bulk of the population and ends in November with the chicks leaving the burrows and leaving for southern waters (2).
- The densities recorded in the southeast of Gran Canaria are the first obtained in the waters surrounding this island. The values are similar to those obtained in other areas of the Canary Islands (5).
- The flight height of the shearwaters is positively related to the wind intensity (6). The shearwaters rise due to the push of the wind and then descend in order to cover greater distances, so that they manage to move with the minimum energy expenditure.
- The information generated in this work is useful to assess the potential risks of OWF on this species.

Bibliography

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