



MINISTÈRE  
DE LA TRANSITION  
ÉCOLOGIQUE  
ET DE LA COHÉSION  
DES TERRITOIRES

*Liberté  
Égalité  
Fraternité*



# Séminaire du plan national d'actions en faveur du Puffin des Baléares

24 au 26 juin 2024



# Individual migratory patterns of the critically endangered Balearic shearwater in the NE Atlantic

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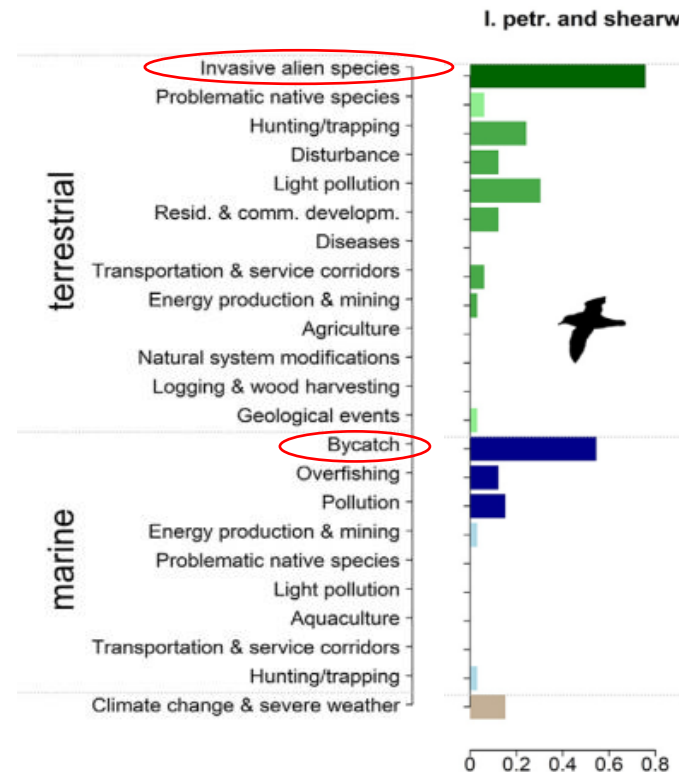
Marina Ramírez-Bal, David García, Isabel García-Barón, Gemma Carrasco, José Manuel Arcos, Maite Louzao

Séminaire du  
plan national d'actions  
en faveur du Puffin des Baléares

# Introduction

## General overview

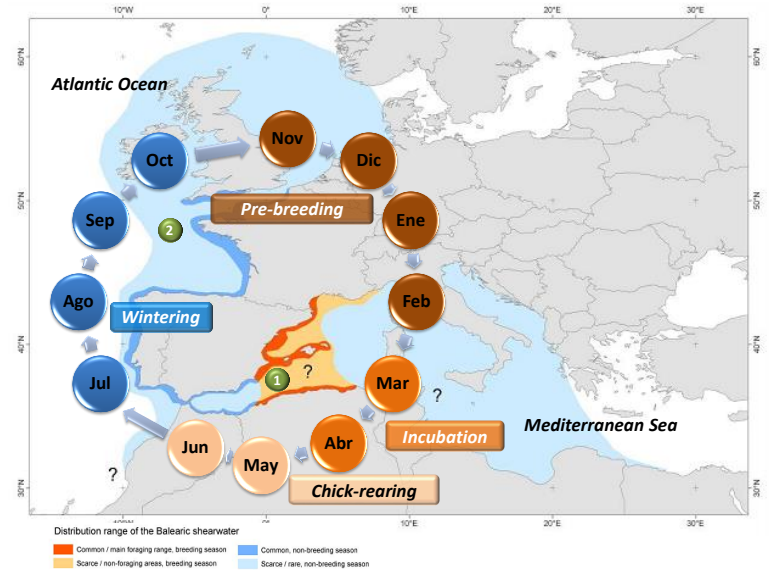
- **Human activity** is highly impacting marine ecosystems, changing the species composition and richness
- **Seabirds** are one of the most threatened groups of birds
- **Shearwaters** have as principal threats **invasive alien species** in terrestrial habitats and **bycatch** in marine habitats



# Introduction

## General overview.

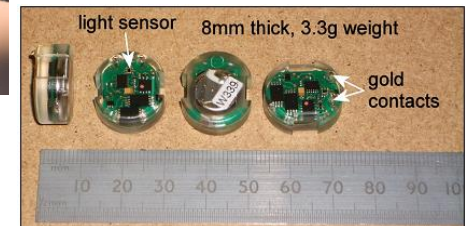
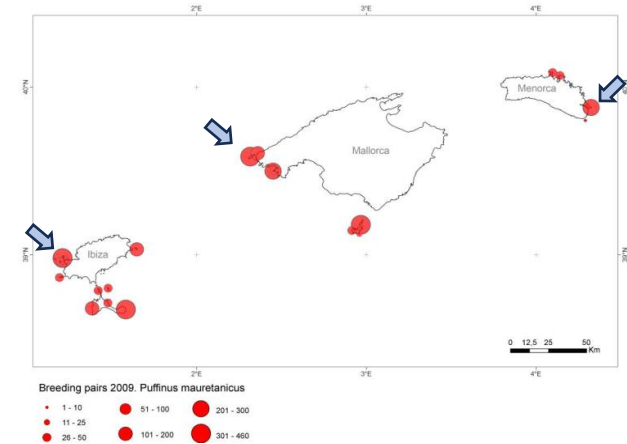
- **Migration** is an important part of the annual cycle of many marine species.
- The Balearic shearwater spent the **non-breeding period** in the **Atlantic Ocean** and the **breeding period** in the **Mediterranean Sea**



# Methods

## GEOLOCATION DATA

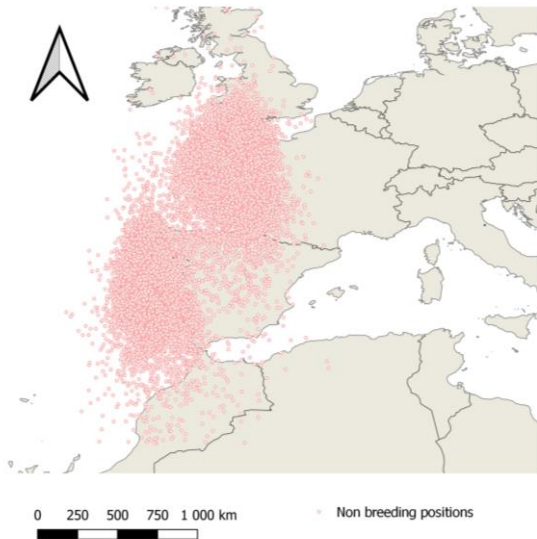
- **GLS** were used to tag individuals between 2017 and 2021 in Mallorca, Menorca and Ibiza.
- Geolocation data was obtained from 53 individuals that were recaptured, corresponding to 88 annual cycles
- GLS collect **light data** and estimate position. During the **equinoxes** it is not possible to estimate the latitude
- We used geolocation data of the **non-breeding period**



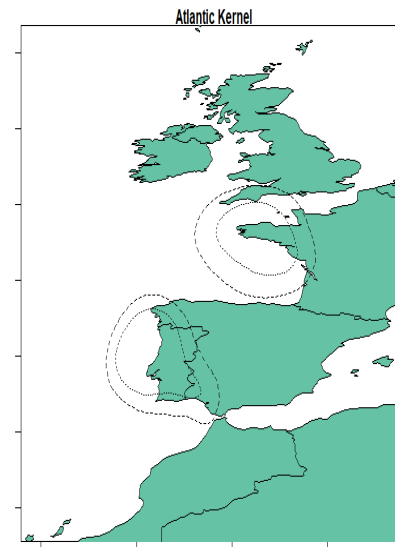
# Results

## Overall spatial patterns

Raw estimations of latitude and longitude derived from geolocator light data during the non-breeding period



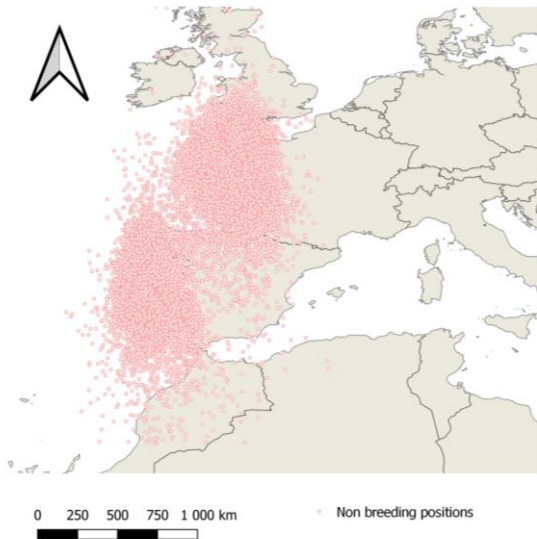
Mean population level kernel estimated from individual kernels



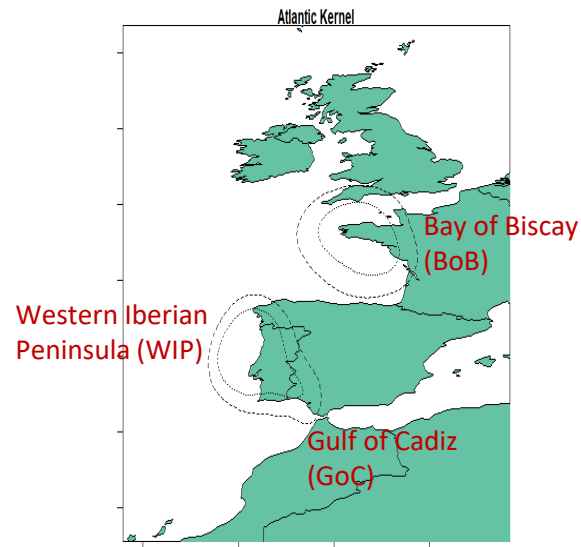
# Results

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Raw estimations of latitude and longitude derived from geolocator light data during the non breeding period



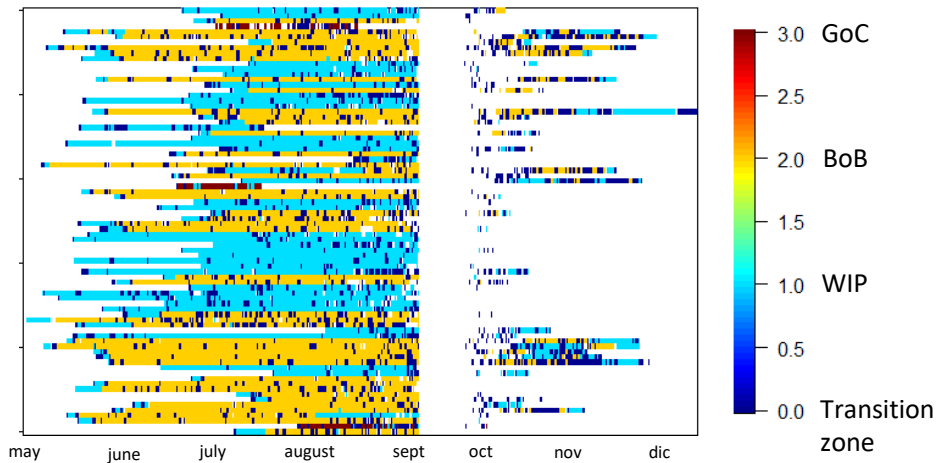
Mean population level kernel estimated from individual kernels



# Results

## Overall temporal patterns

Chronology of individual temporal patterns

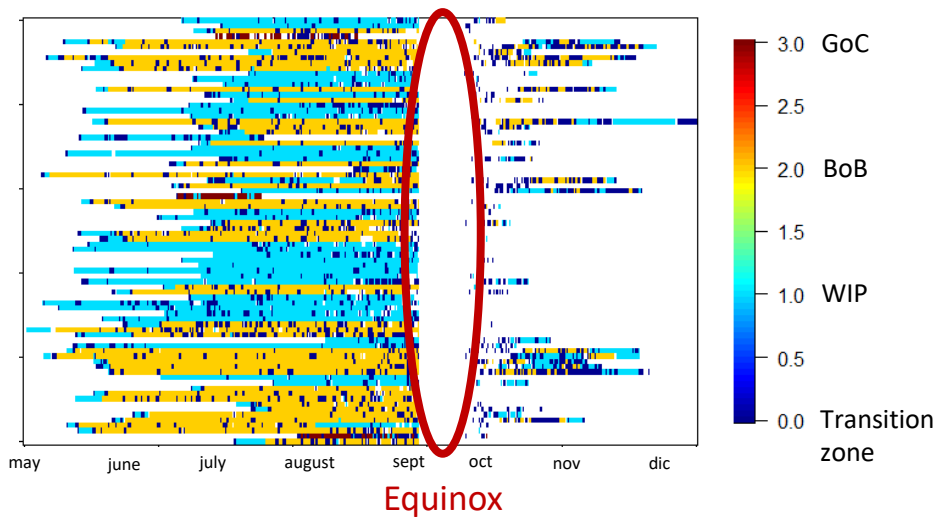




# Results

## Overall temporal patterns

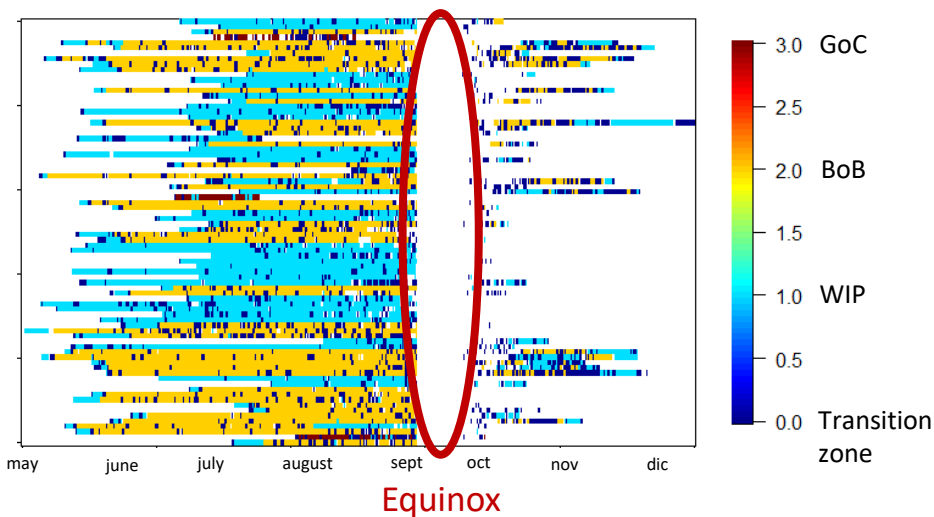
Chronology of individual temporal patterns



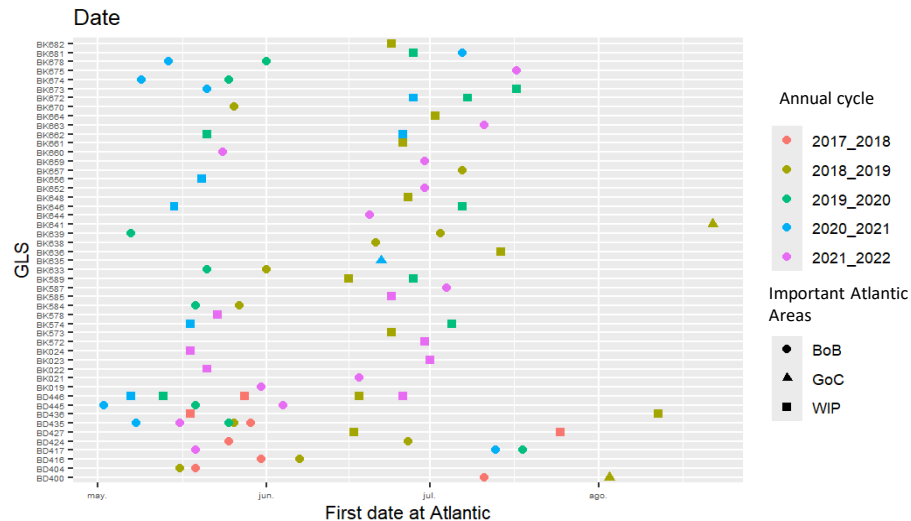
# Results

## Overall temporal patterns

Chronology of individual temporal patterns



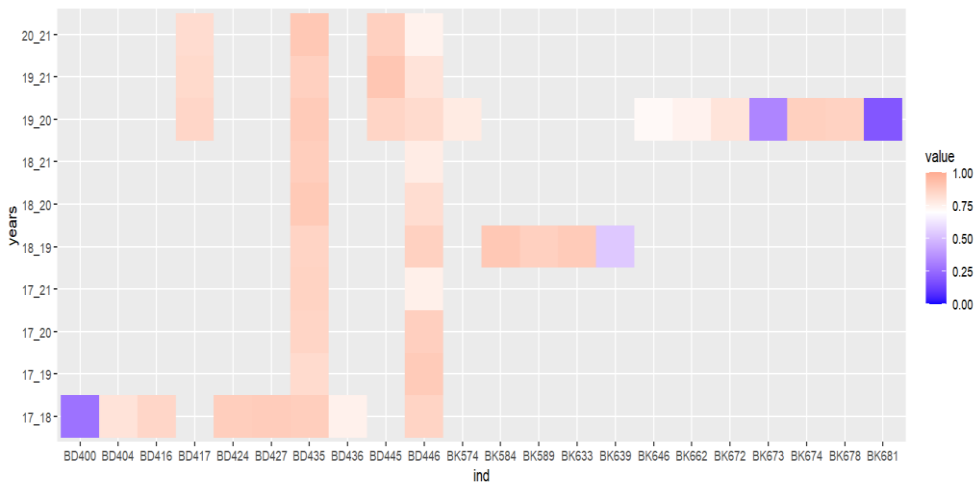
Individual date of entrance in the Atlantic by Important Atlantic Area and annual cycle



# Results

## Interannual consistency

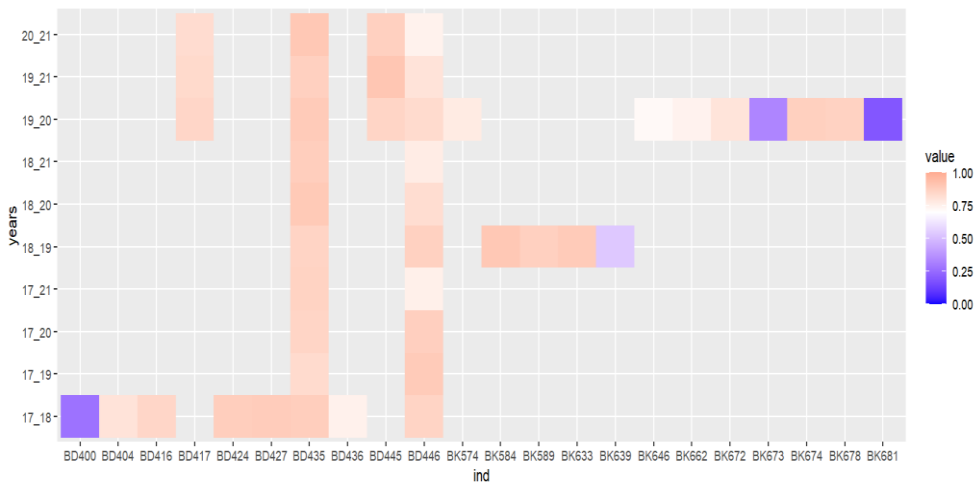
Bhattacharyya's index



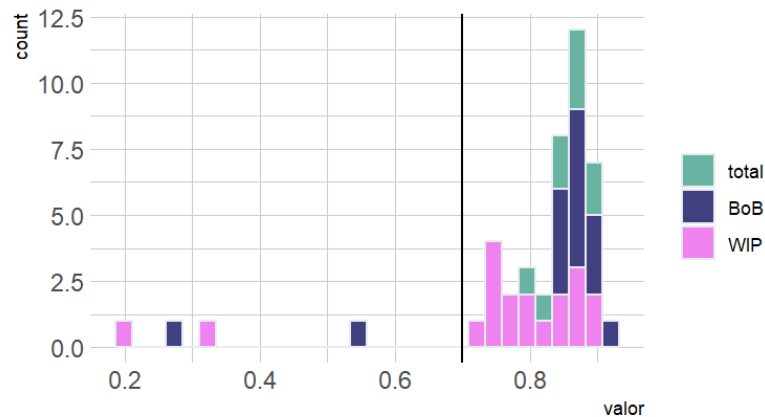
# Results

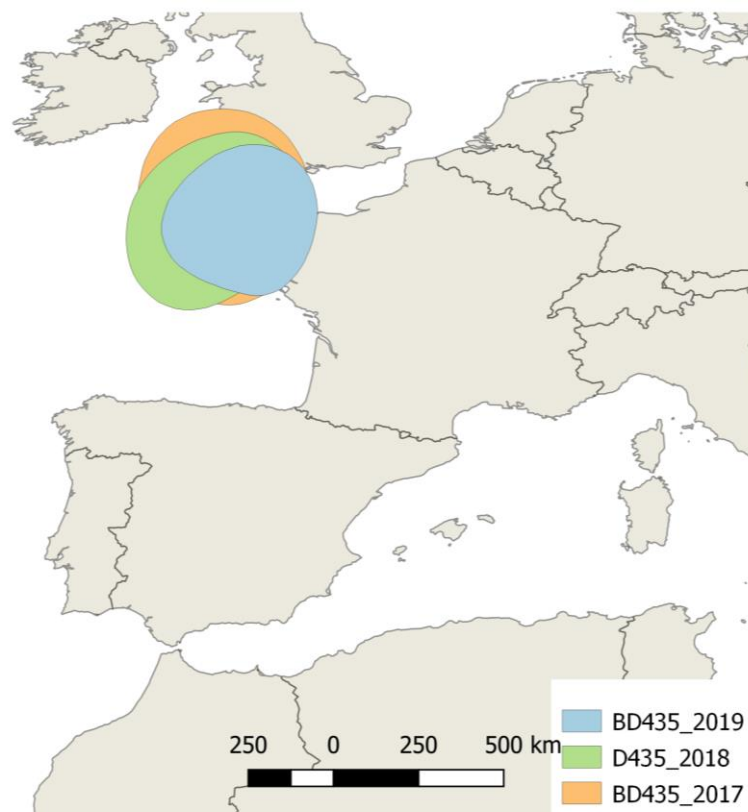
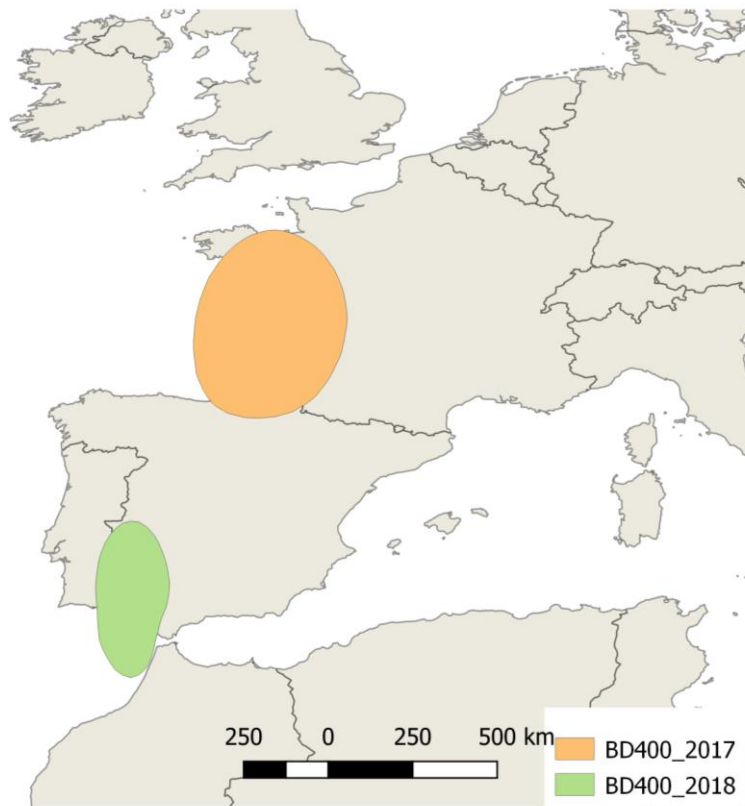
## Interannual consistency

### Bhattacharyya's index



Density of Bhattacharyya's index values in the BoB, the WIP and in total.

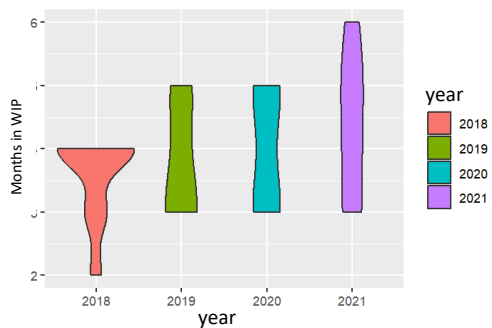
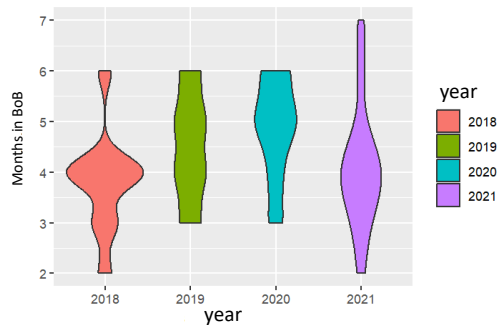




# Results

## Individual timing of Important Atlantic areas (IAA)

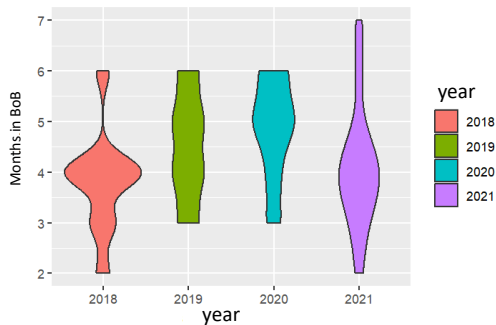
Time spent (number of months) in each IAA



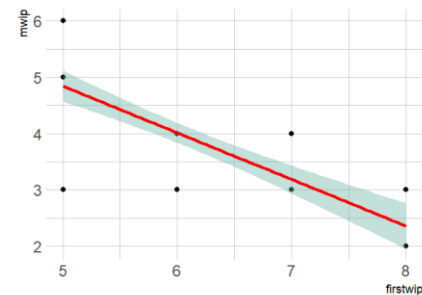
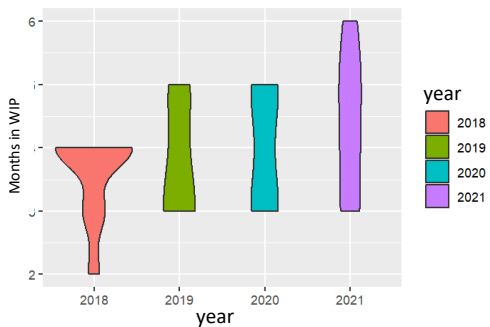
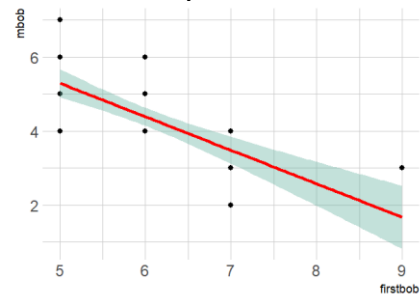
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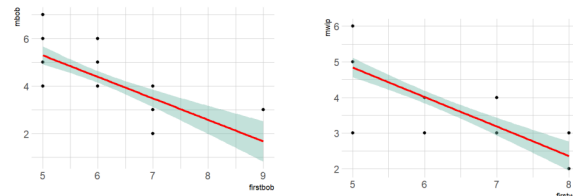
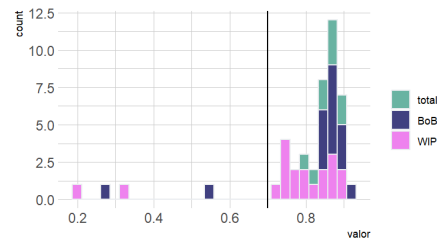
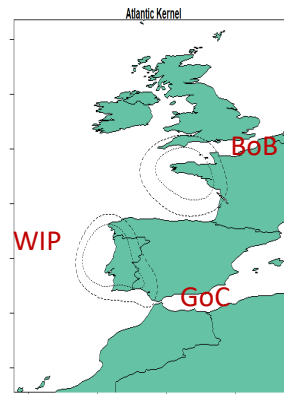


Correlation between months spent in the Important Atlantic Areas and the entry date into the Atlantic



# Conclusions

- Balearic shearwater individuals visit **three main Important Atlantic Areas**, as previously described (Lewin et al. 2024).
- Individuals demonstrated high **consistency**, repeatedly visiting the same Atlantic Important Areas each year
- There is a correlation between the duration of stay in the Important Atlantic Areas and the first month visiting these areas





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THANK YOU!

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