

# Monitoring of marine turtle reproductive activity in Juan de Nova using daily track counting

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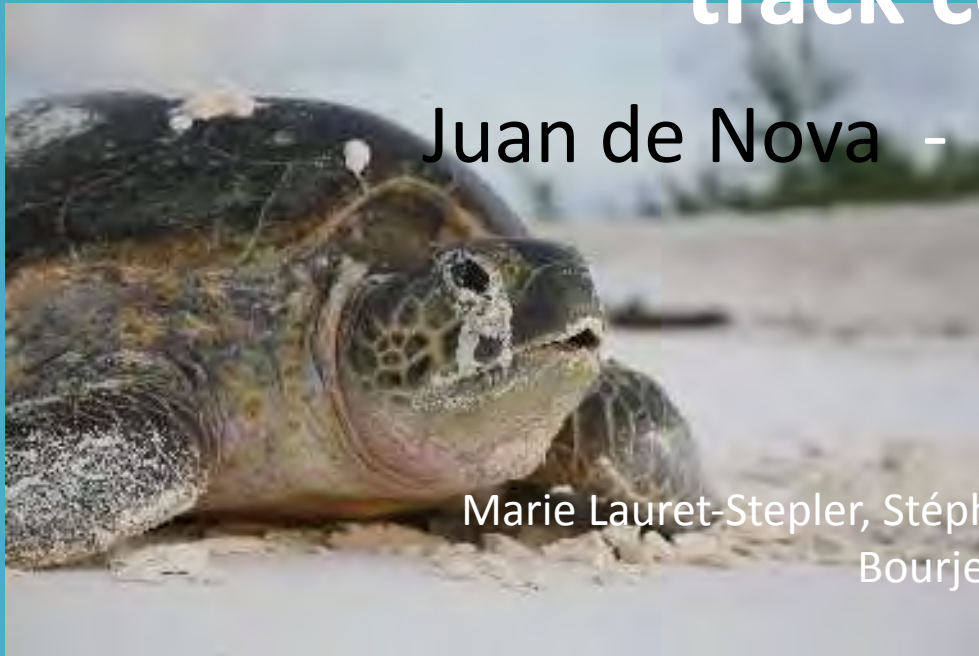
The Eparses islands are five French islands scattered across the South West Indian Ocean. Europa, Bassas de India, Juan de Nova and Grande Glorieuse spread along the Mozambique Channel, while Tromelin is located off the east coast of Madagascar. While nesting turtles activity is well known in Europa, Grande Glorieuse and Tromelin, it is not the case for Juan de Nova. This island is situated in the middle of the Mozambique Channel, right between the main green turtle genetic stocks in the region, one in the North of the Channel and the other one in the South.

Track count is an indicator often used in marine turtles monitoring studies to follow the trend of nesting females throughout the year. But it can also be used to differentiate species by analysing the pattern and the width of the track. Since 1984, a study based on daily tracks count in Juan de Nova has shown that nesting marine turtles increased in the last decade. It has also shown that turtles lay all year round on this island, with two distinct nesting peaks, one during the austral summer and one during the austral winter. Since 2007, the width of the tracks has been measured and showed that two species nest on the island. The hawksbill turtle was found nesting during the austral summer, while the green turtle nests all year round with a nesting peak during the austral winter. Such a result indicates for the first time that the very endangered hawksbill turtle nests in the Eparses islands.

# Monitoring of marine turtles reproductive activities using daily track count



Juan de Nova - Indian Ocean



Marie Lauret-Stepler, Stéphane Ciccione, Jérôme Bourjea

# Eparses Islands – Jewels of nature

- 4 islands, 1 atoll:

Tromelin



Glorieuses Archipelago:

- Grande Glorieuse
- L'île du Lys



# Eparses Islands – Jewels of Nature



Juan de Nova



Europa

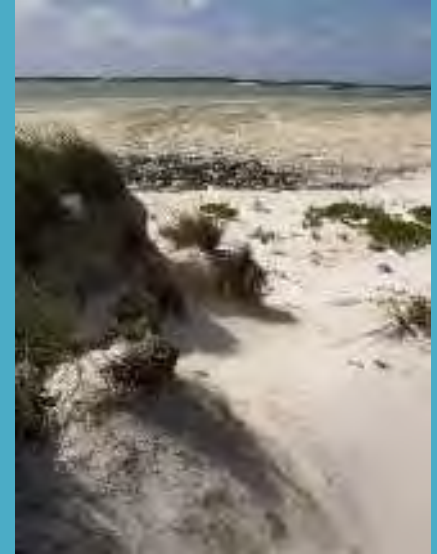
# History



- Discovered in the 16<sup>th</sup> century
- Failed attempts of long term colonisation
  - Remoteness
  - Difficulty of access
  - Lack of freshwater
- Exploitation of guano and coconut on Grande Glorieuse and Juan de Nova

# Realm of biodiversity

- Presence of migratory species
  - Colonies of seabirds
  - Nesting and feeding grounds for two species of marine turtles
- Pioneers in marine turtle studies in the SWIO
  - J Frazier
  - G Hughes
- Monitoring of nesting activity pursued in the 1970s

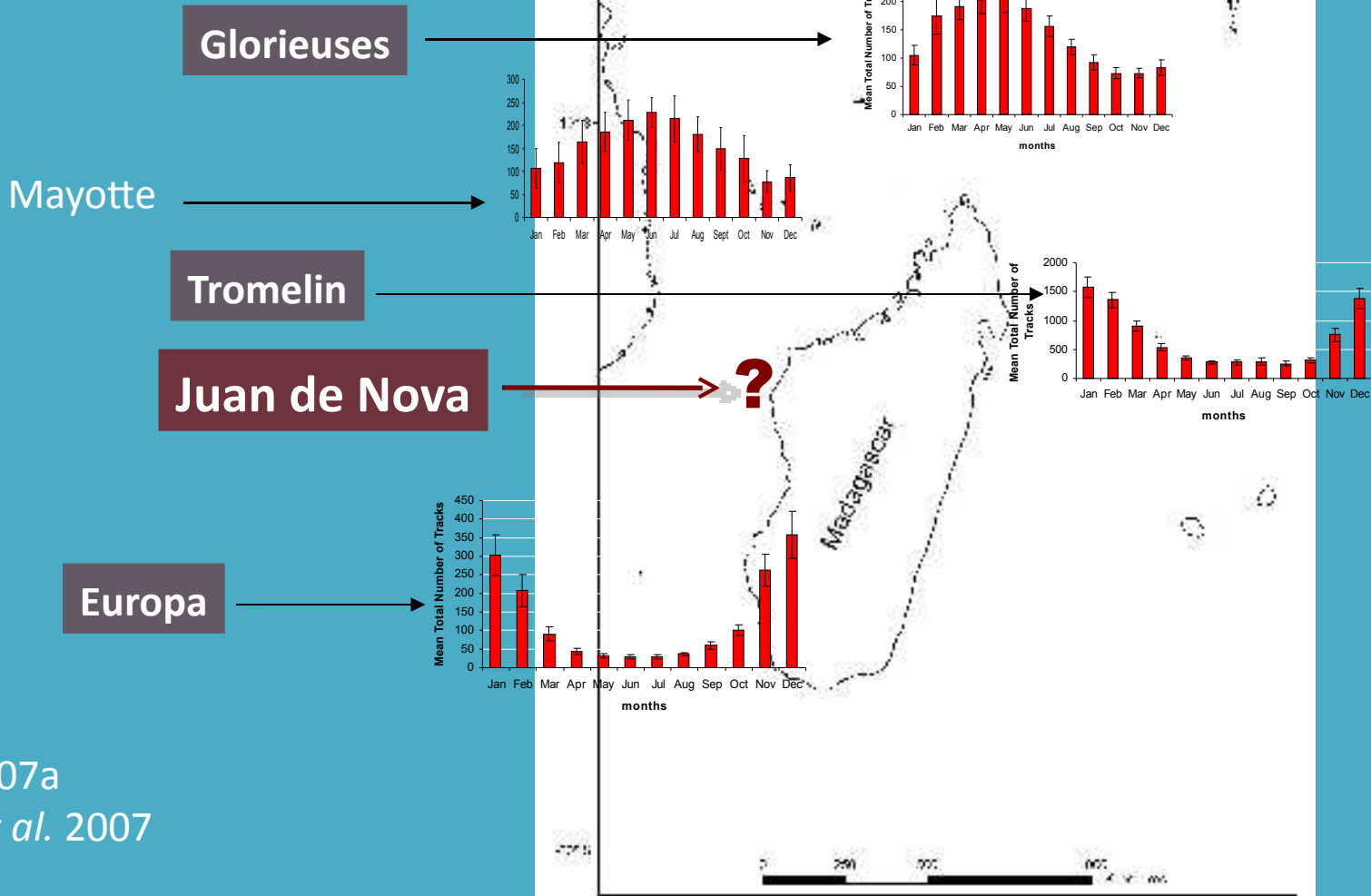


# MT population of the Eparses Island

- 20 years of data
  - Daily tracks count
- Trend and seasonality
  - Tromelin
  - Grande Glorieuse
  - Europa



# Nesting seasonality in the SWIO



Bourjea *et al.* 2007a  
 Lauret-Stepler *et al.* 2007



# Juan de Nova

- $17^{\circ}03'S, 42^{\circ}45'E$
- Middle of Mozambique Channel
- Anvil shape
  - 6km long, 1,6km max width
- Two seasons
  - Dry season: Apr to Nov
  - Wet season: Dec to Mar
- End of human occupation in 1975



# Marine Turtles

- Historical report of nesting activity on Juan de Nova
- Low nesting activity
- 2 species



# Objectives

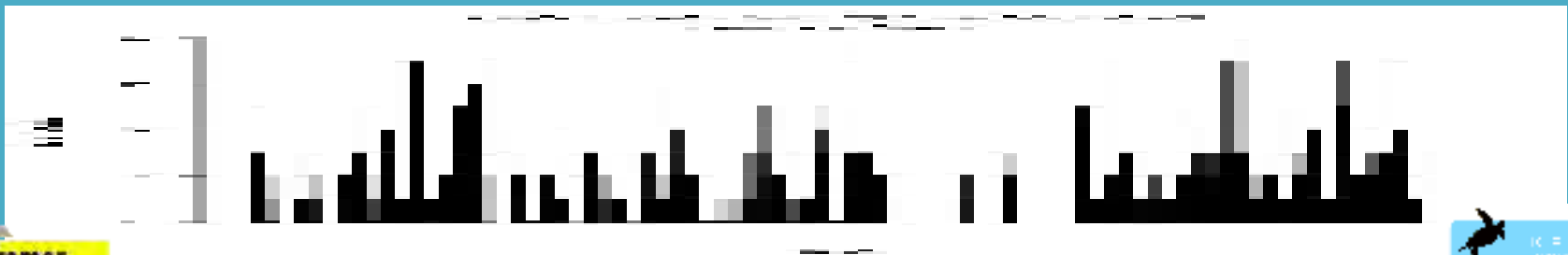
- Pattern of seasonality
- Relative importance of the two species

# Material & Methods



# Mean seasonality

- Daily track count
  - Since 1987
- Mean seasonality
  - Complete years (N=10)
- Sampling effort
  - 25,8% missing data
  - Improving from 2003



# Tracks width



*E. imbricata*

- Tracks width measurement
  - Since Dec 2006
  - Sp differentiation

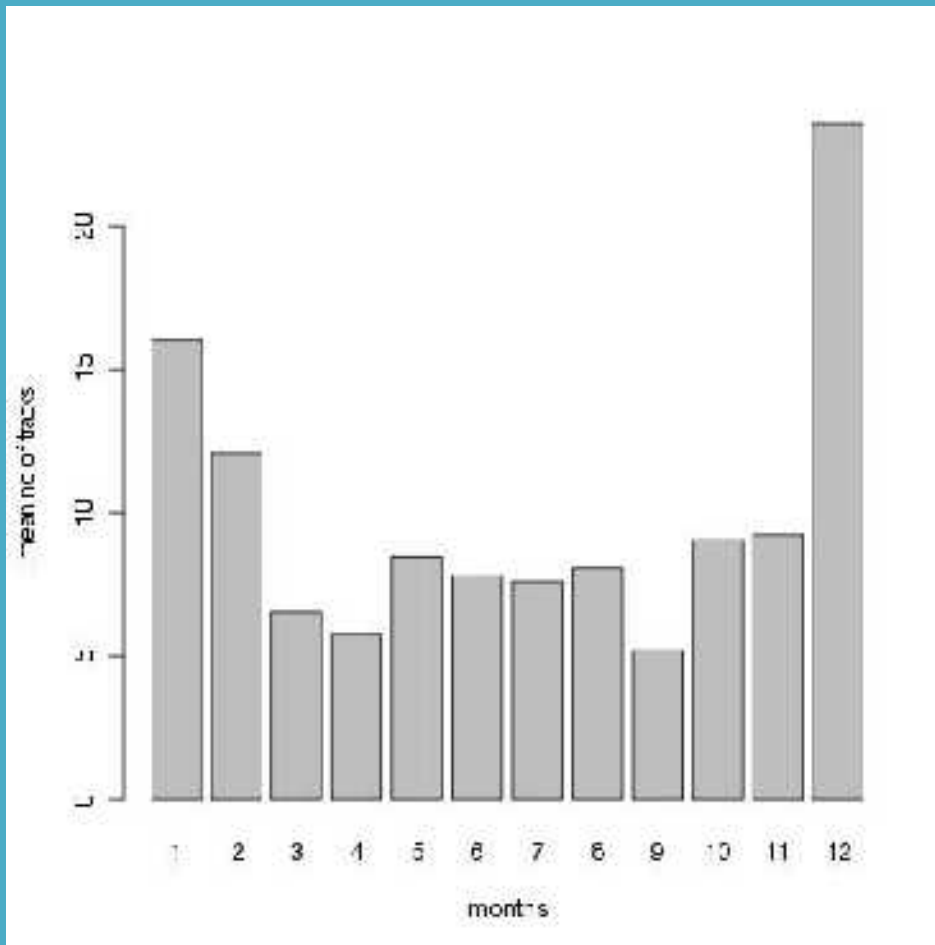
- Track width distribution
- Seasonality pattern for each species



*C. mydas*

# Results

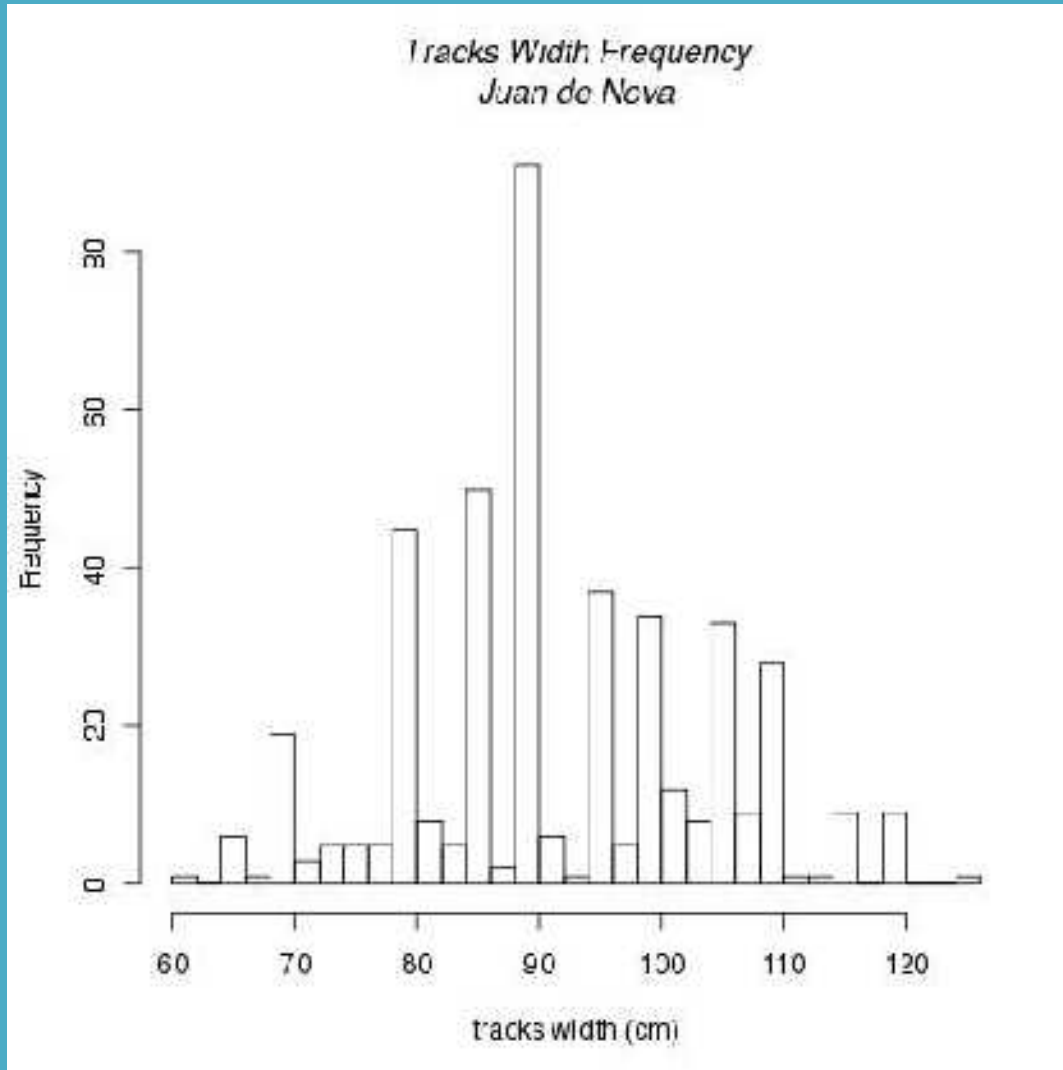
# Mean Seasonality



- N = 10 (complete years)
- Year round nesting
- Two peaks:
  - Oct to Feb
  - May to Aug
- Species seasonality?

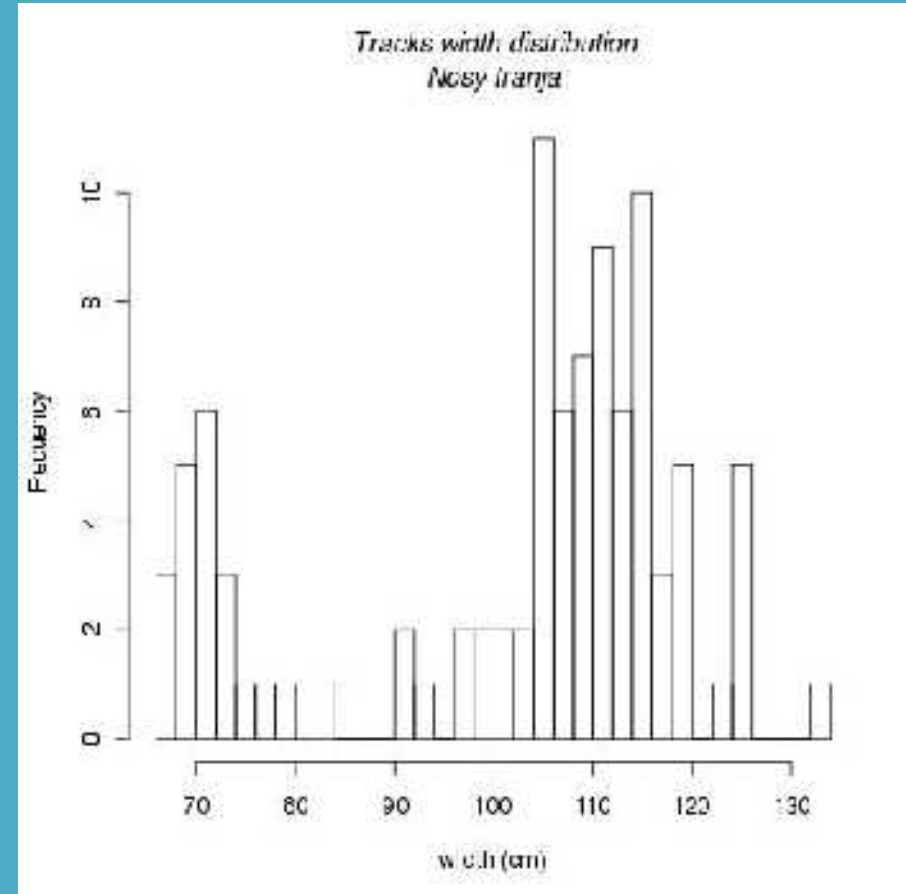
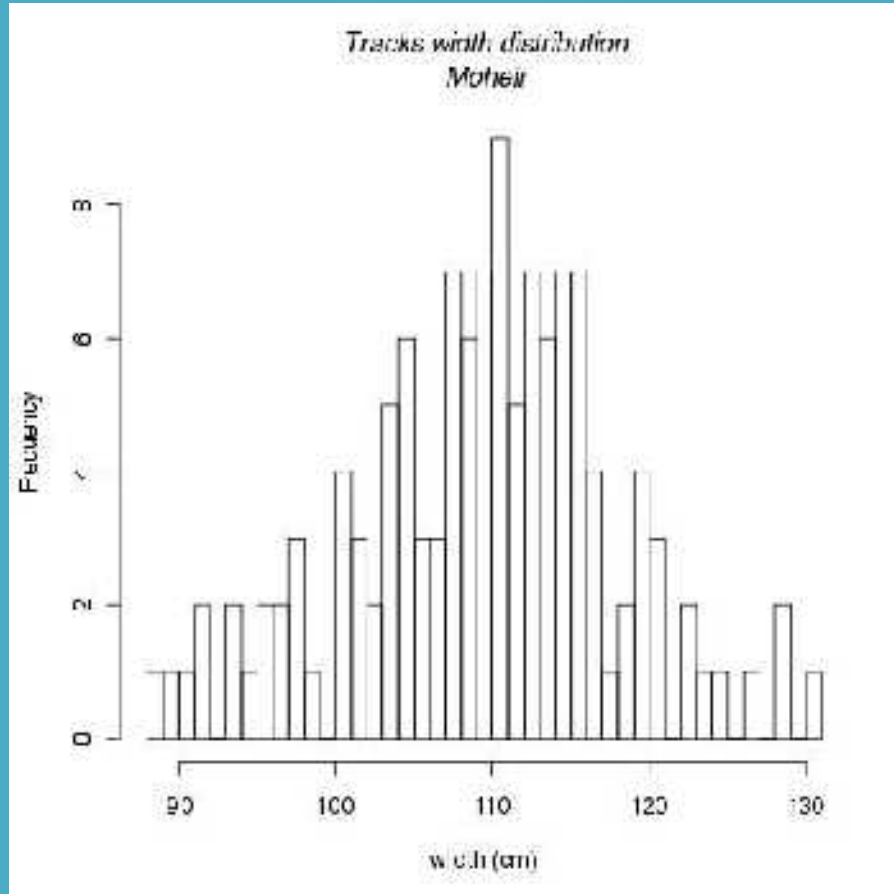


# Tracks width distribution



- N = 440, Dec 2006 to May 2009
- Range [60;125]
- Not a bell-shaped curve
- High count in the 80-90 cm class sizes
  - Overlapping in species?
- Separation of size classes containing both sp

# Mohéli and Nosy Iranja: tracks width distribution



Cm  
 N=125  
 [88;131]  
 109,83 ± 8,51 cm

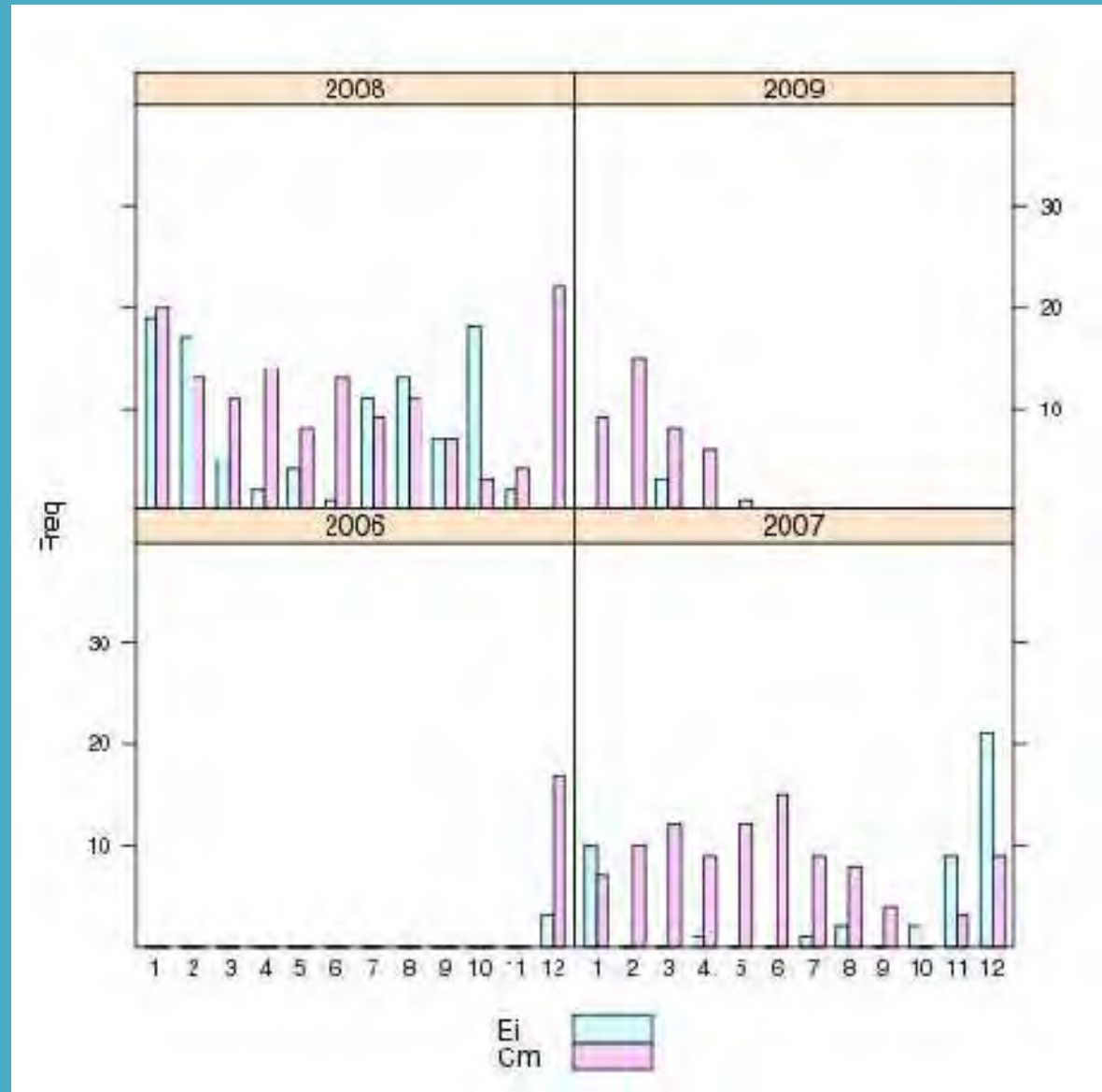
Ei  
 N=22  
 [66;84]  
 72,69 ± 4,58 cm

Cm  
 N=75  
 [91;134]  
 110,99 ± 7,99 cm

# Species differentiation



- Dec 2006 to May 2009
- $E_i \leq 85\text{cm}$
- $C_m > 85\text{cm}$
- $N = 440$ 
  - $E_i = 151$
  - $C_m = 289$

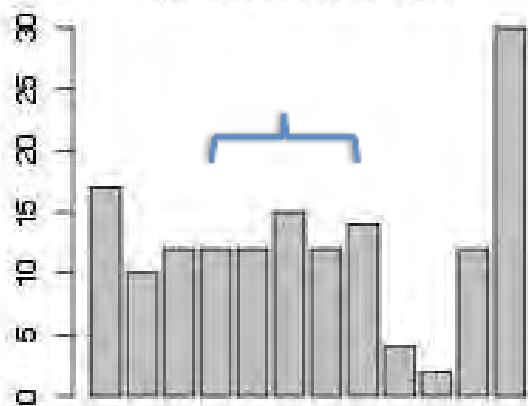


# Species seasonality

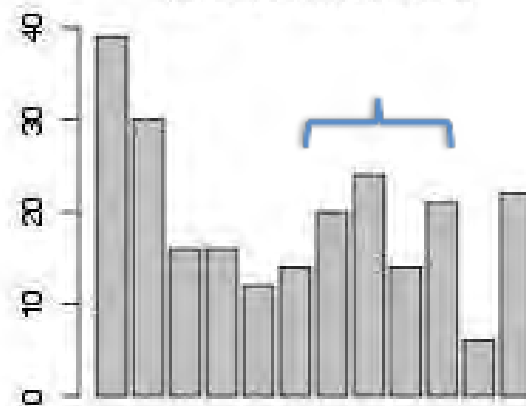
- Presence of *Cm* all year round
- *Ei* present in summer?
  - Through 2006/07 and 2007/08
  - Shift in 2008
- 2 complete years



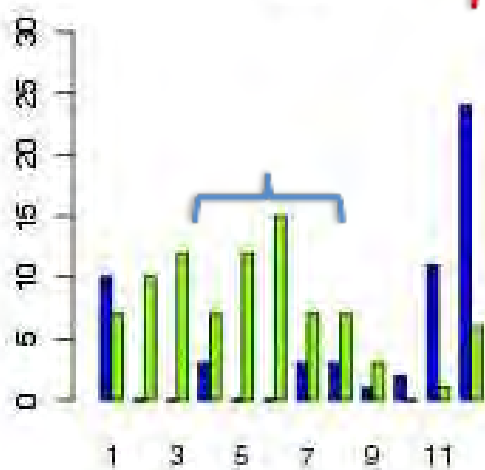
Monthly no of tracks  
Juan de Nova, 2007



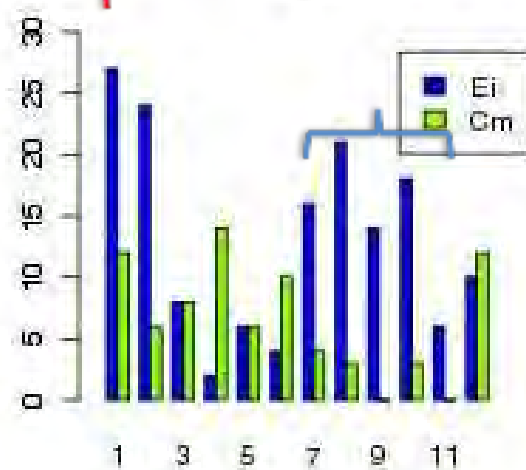
Monthly no of tracks  
Juan de Nova, 2008

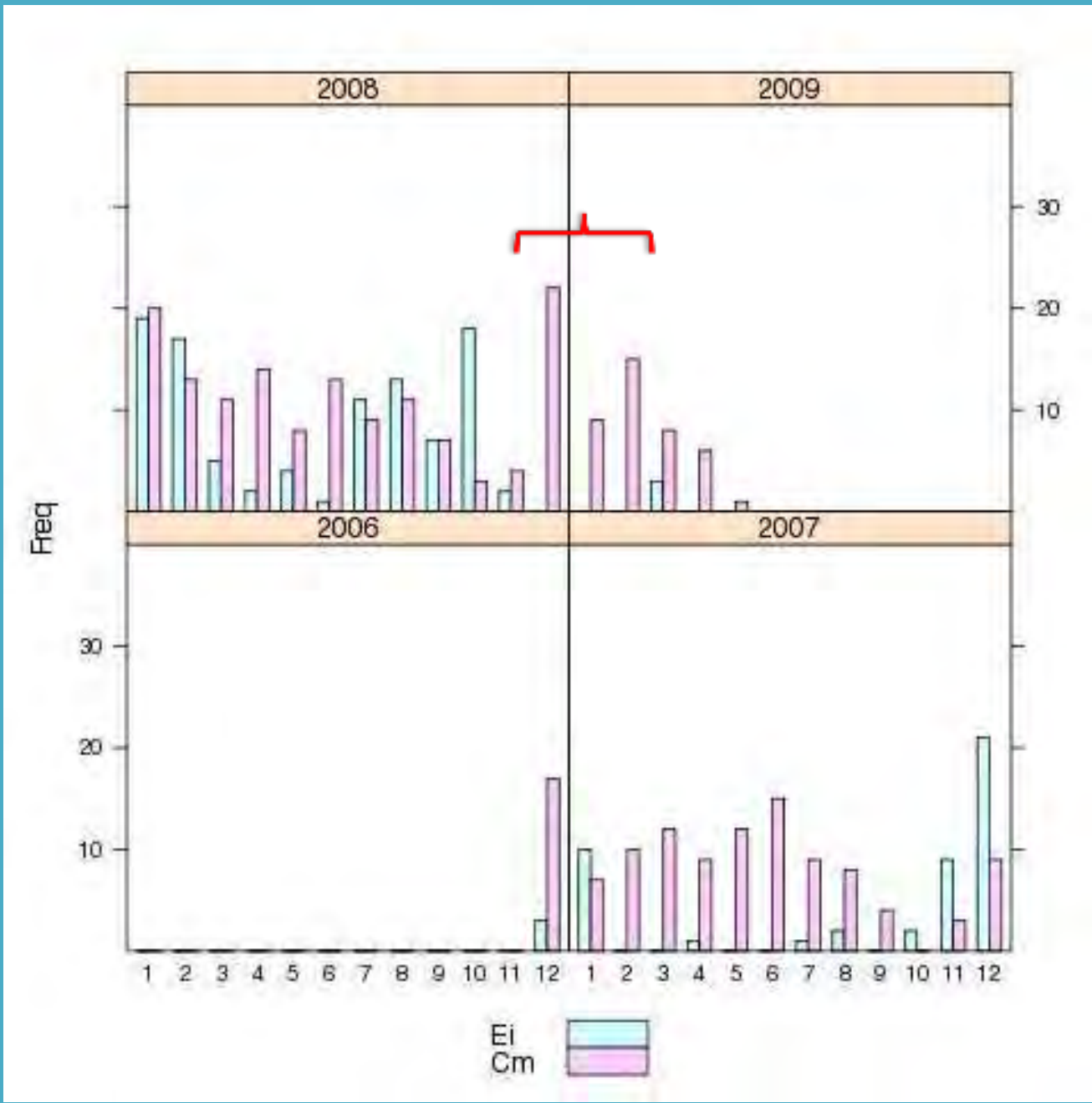


2007



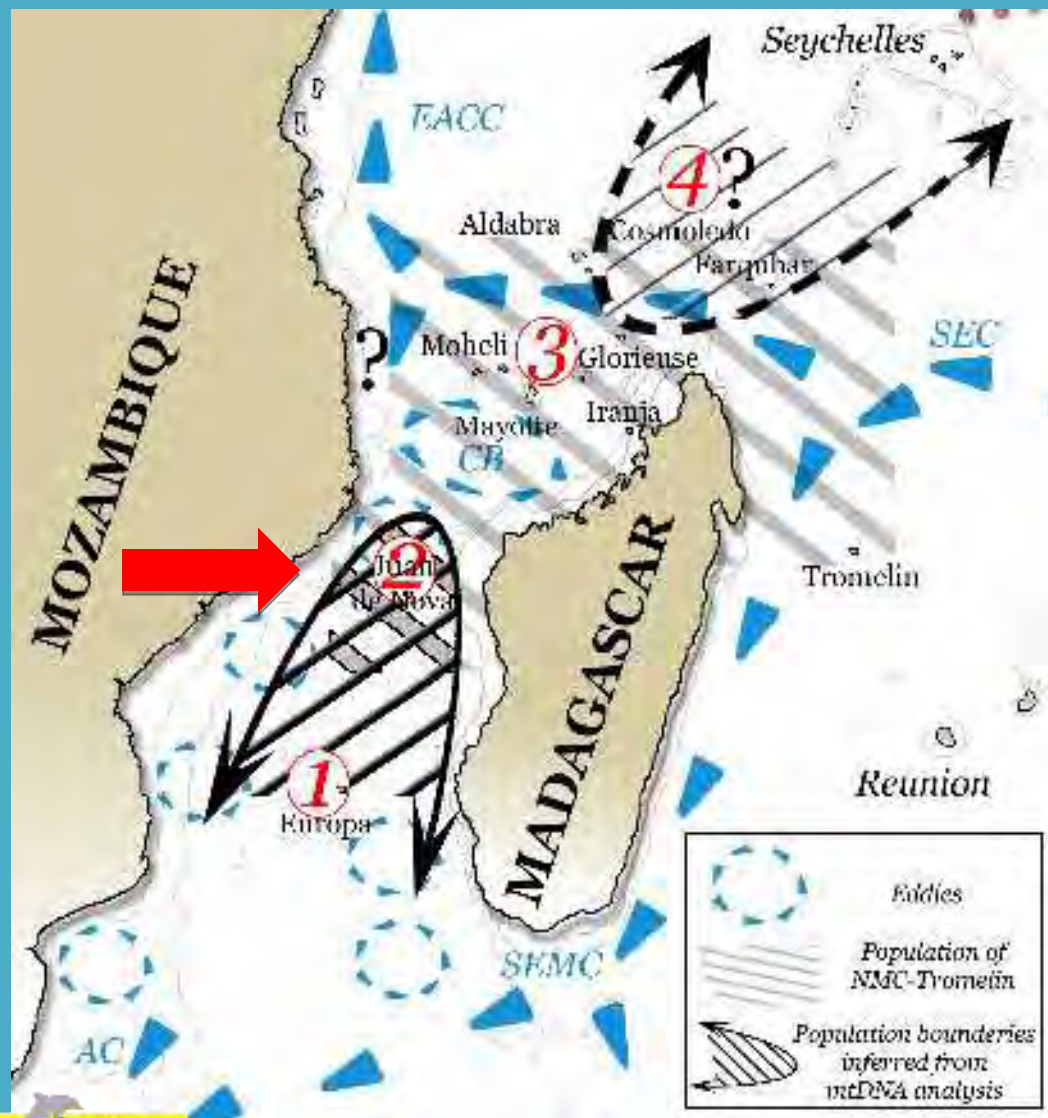
2008





# Discussion & Conclusion

# At the frontier

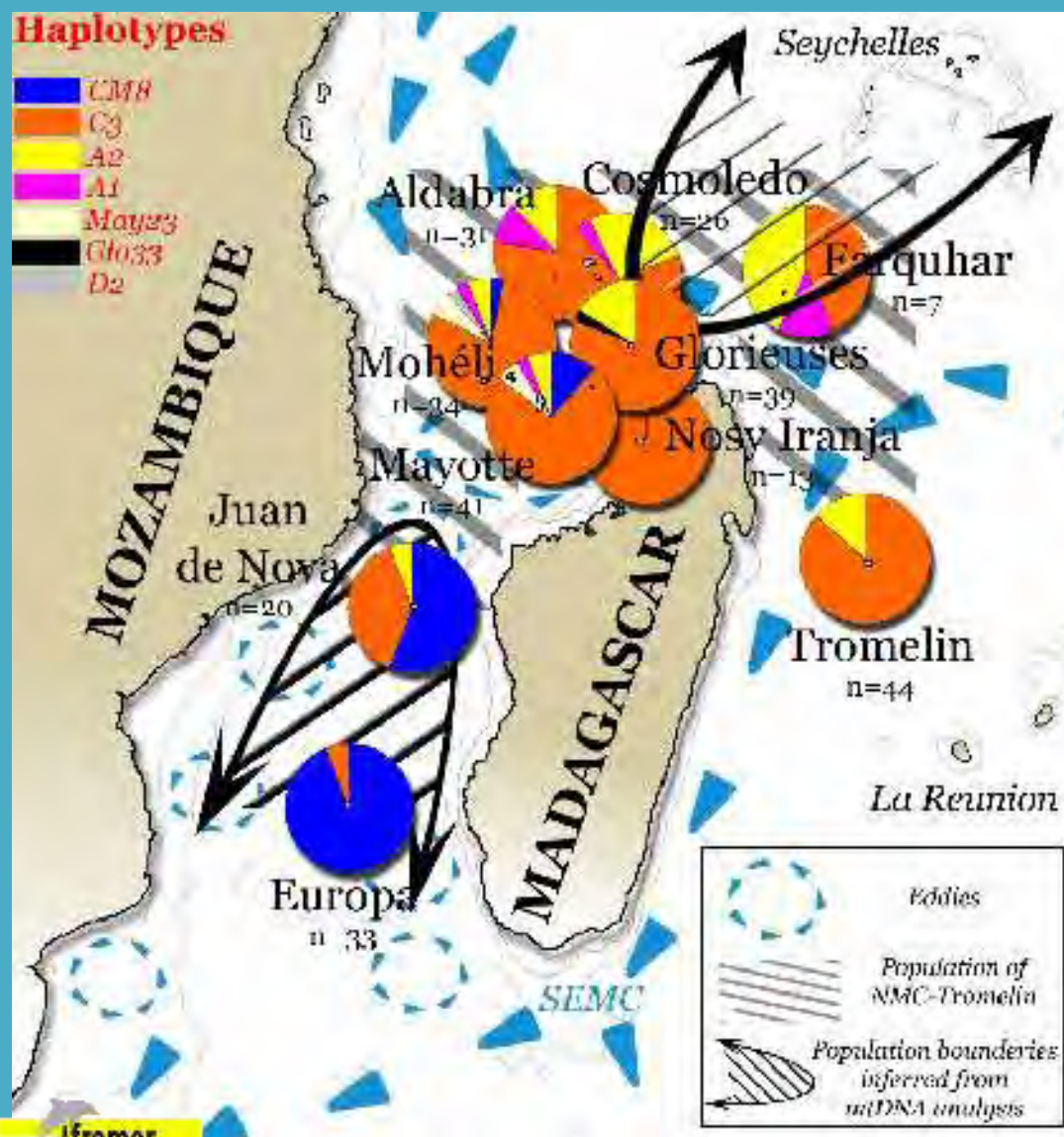


- Mozambique Channel Oceanography
  - Separation in 2 parts
- Juan de Nova at the frontier

Bourjea *et al.* 2007b



# Caught in between



- Two genetic stocks
  - Indo Pacific
  - Atlantic
- Equally present on Juan de Nova
  - Confirms frontier

Bourjea *et al.* 2007b

# Nesting seasonality in the SWIO

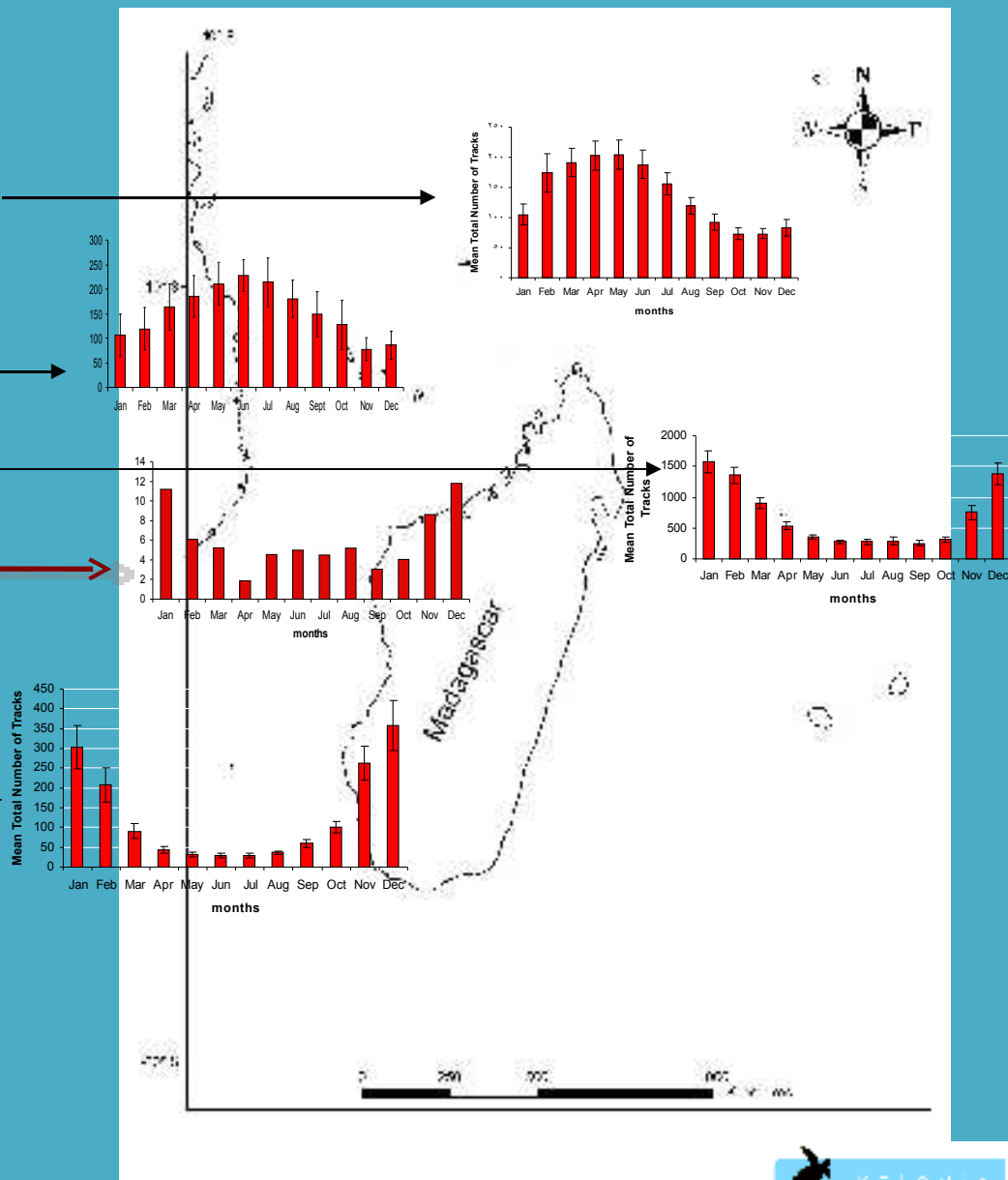
Glorieuses

Mayotte

Tromelin

Juan de Nova

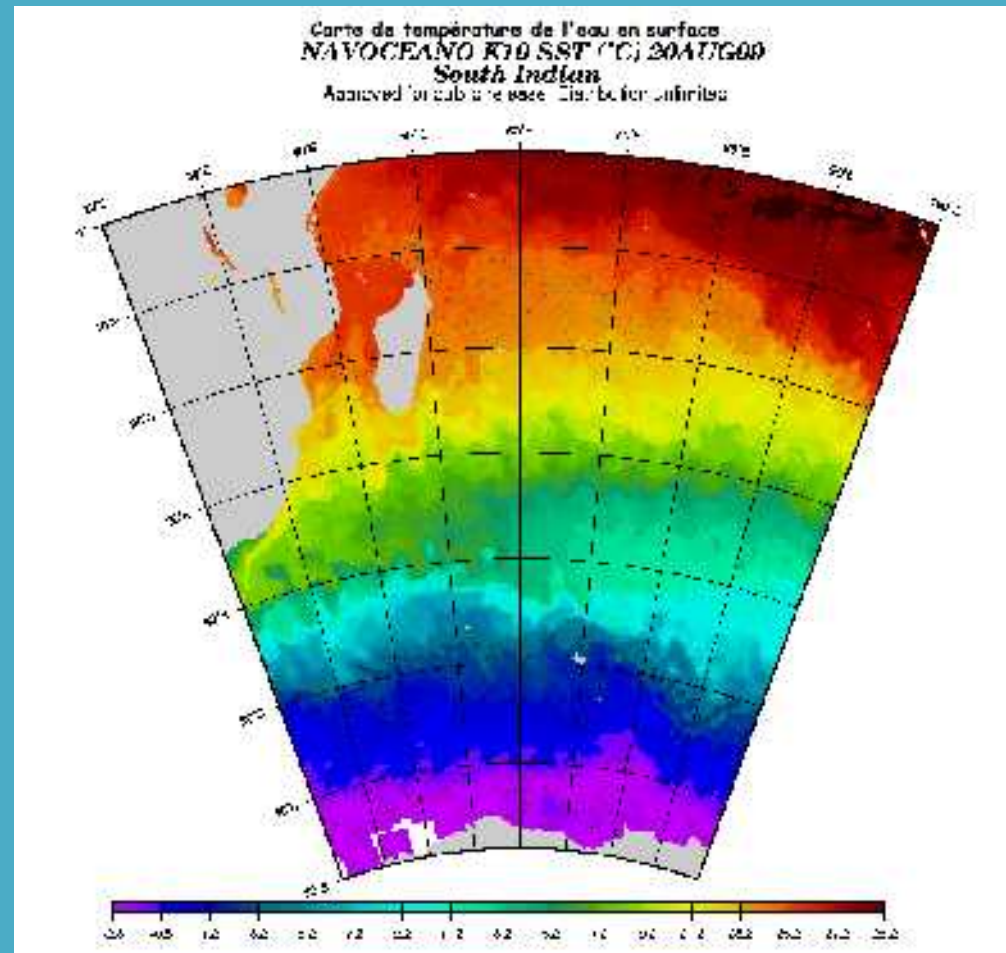
Europa



Bourjea *et al.* 2007a  
 Lauret-Stepler *et al.* 2007

# Future prospect

- Identification of sp with tracks measurement
- Associate SST and environmental conditions
- Migration to feeding ground



# THANK YOU

