

Migratory Routes and Responses to the Marine Environment of Female Loggerhead Turtles Visiting the Waters off Kochi Prefecture

高知県近海に来遊するアカウミガメ雌個体の回遊経路と海洋環境への応答

Koki SUGIURA, Noah YAMAGUCHI, and Tomomi SAITO

(Usa Mar. Biol. Inst., Kochi Univ.)



Introduction

Surveys in Kochi



Nesting

- Nest at beach from May to August
- Largest number in Shikoku Region



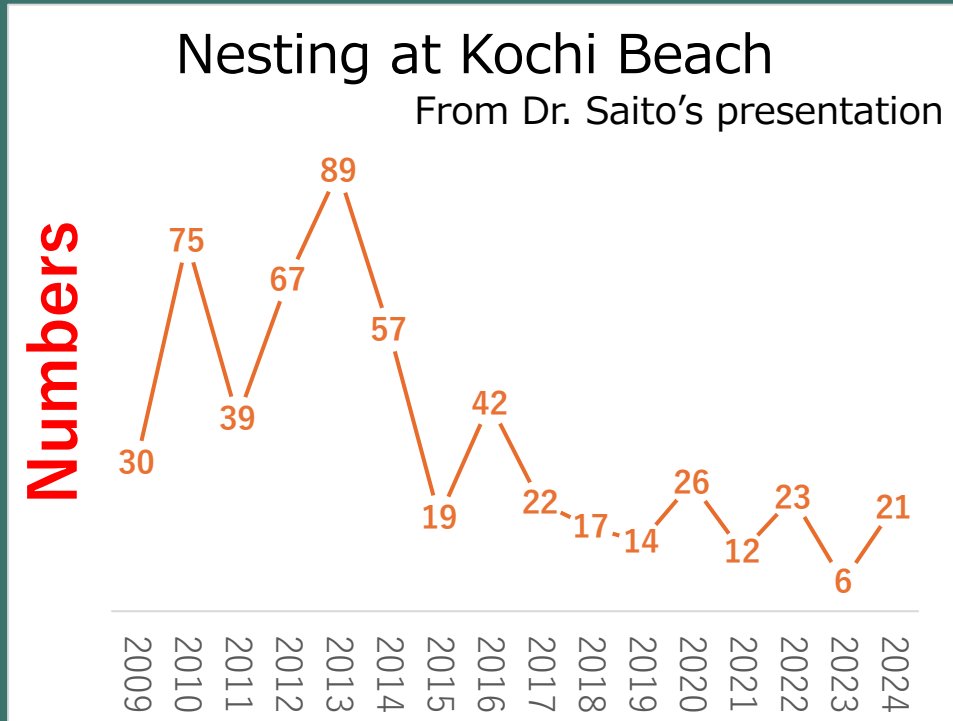
Bycatch

- Caught adult & subadult year around
- Almost survive in fixed nets

→ This area is assumed to have an important role in the foraging and reproduction of loggerhead turtles.

Introduction

Purpose of this research



- The number of nests is decreasing.
(Sea Turtle Association of Japan, 2024)
- Satellite tracking data helps prevent bycatch. (Howell et al., 2008)
- Not many reports on migration routes from nesting sites in Japan.

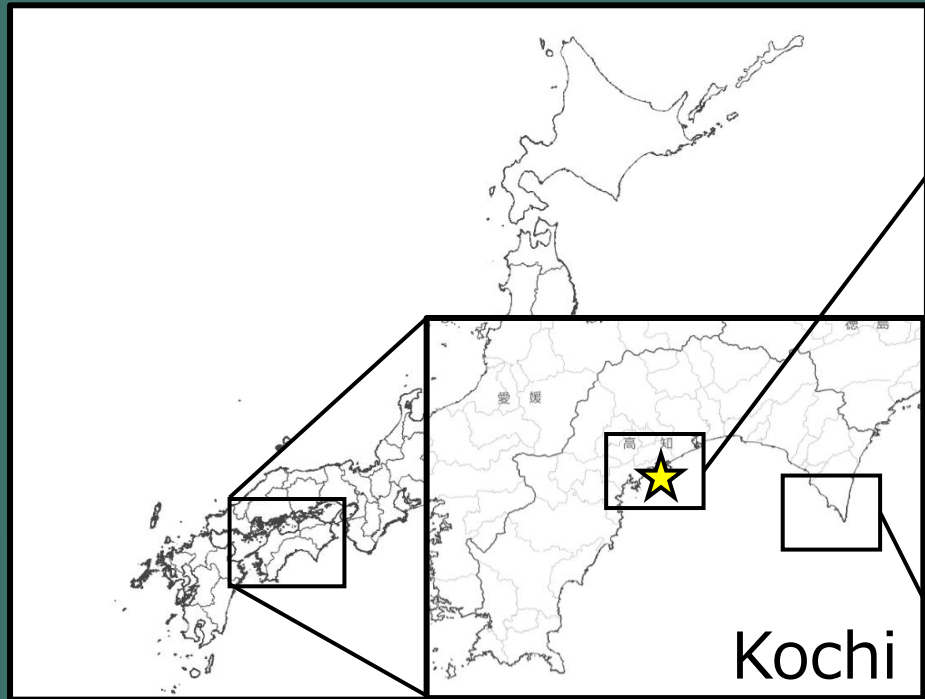
Purpose:

- Identify where and when are adult turtles
 - Investigate their responses to environments
- contribute to the conservation of the loggerhead turtles

Materials and Methods

Study Site and Samples

Total of 7 loggerhead turtles captured from 2023 to 2025.



★ …Release point



Nesting

- Landing at Kochi Beach
- Two females
(SCL: 87.8-91.9cm)



Bycatch

- From fixed nets at Muroto
- Five females
(SCL: 70.1-82.7cm)

Materials and Methods

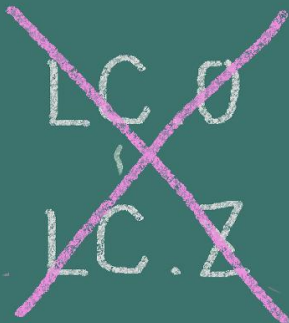
Remotely Sensed Data

Attachment of tags

- Use Wildlife computer's Spot Tag.
- Method of attachment is the same as STRETCH program. (Balazs et al., 1996)



Filtering



(1) Low quality



(2) Landing



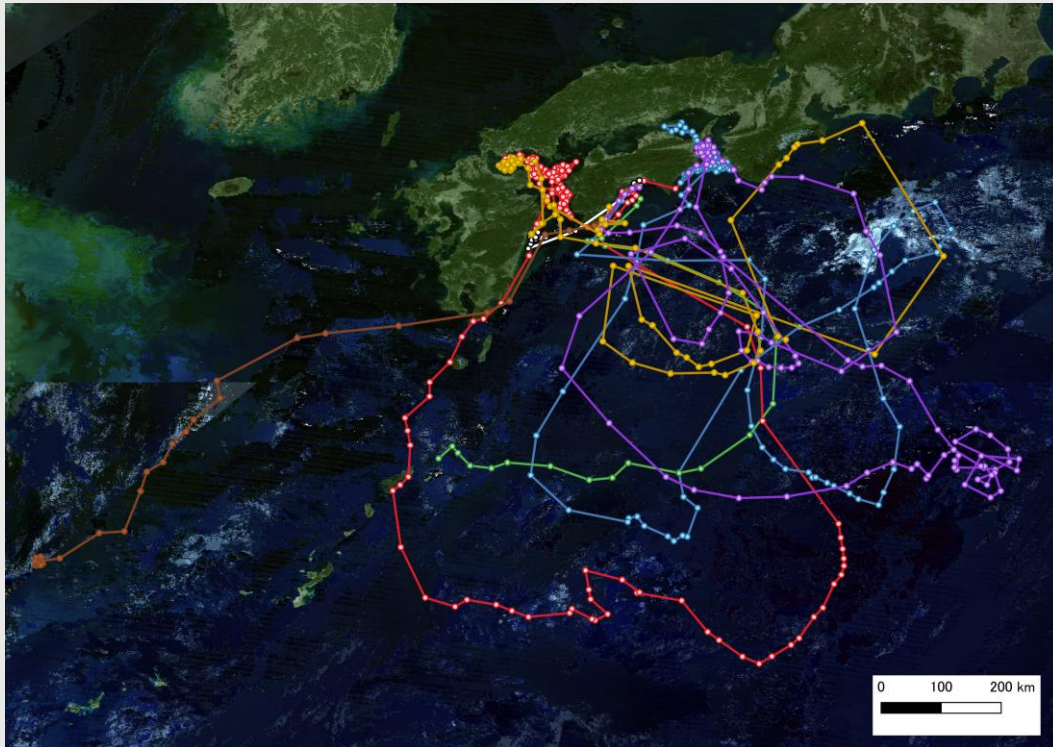
(3) Swim speed 5km/h or high

Recasting daily location data

Materials and Methods

Marine Environment

Data set



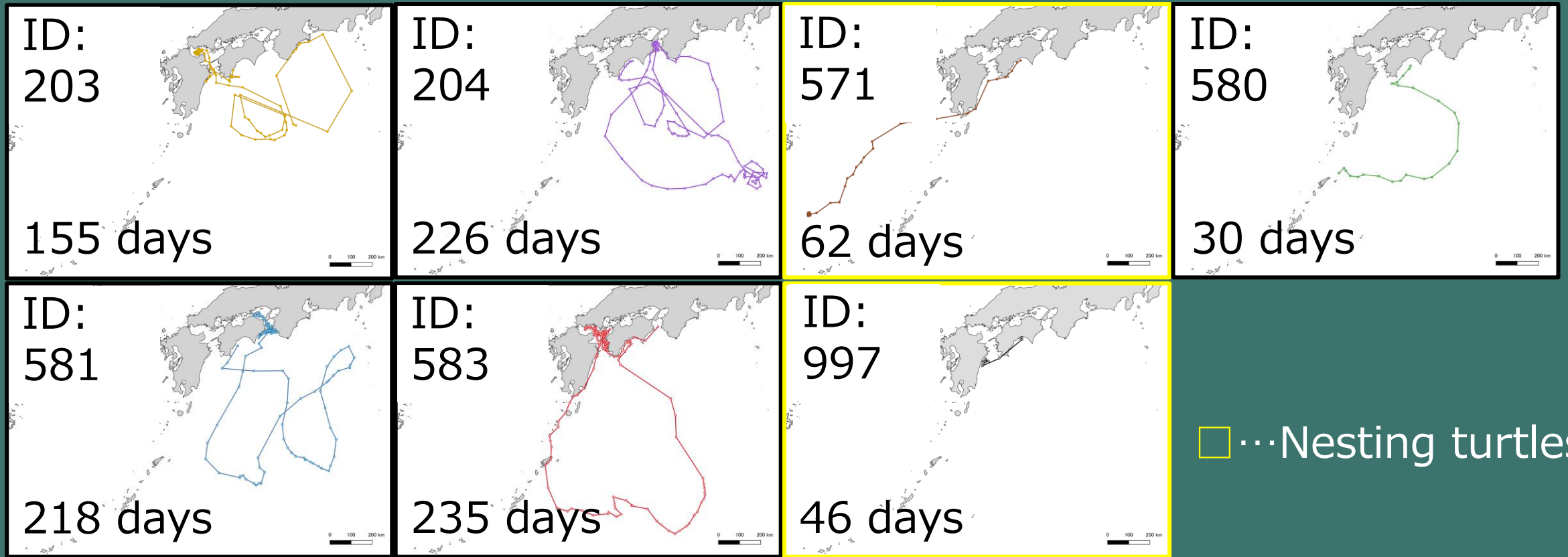
- Sea surface temperature (SST)
- Sea surface salinity (SSS)
- Chlorophyll-a
- + • Depth
- Current magnitude & direction
- (from NOAA & CMEMS)
- Swim speed & direction

Examining environmental responses for the daily location data.

Results

Migratory Routes

The 7 tags transmitted the total of 972 days tracked.



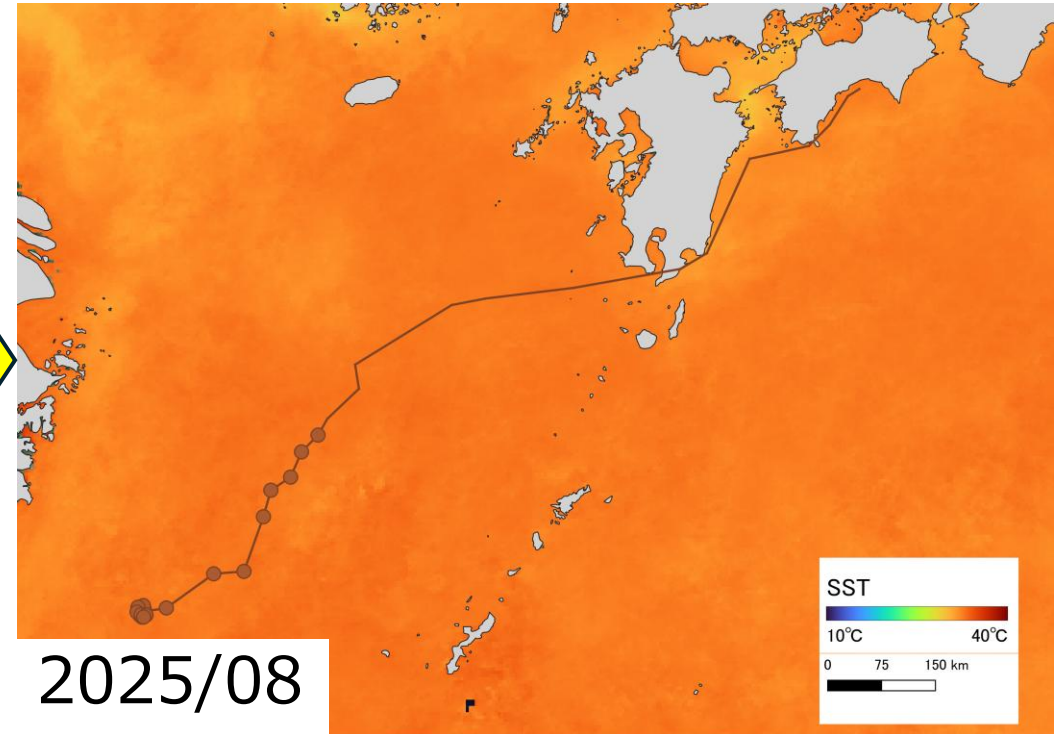
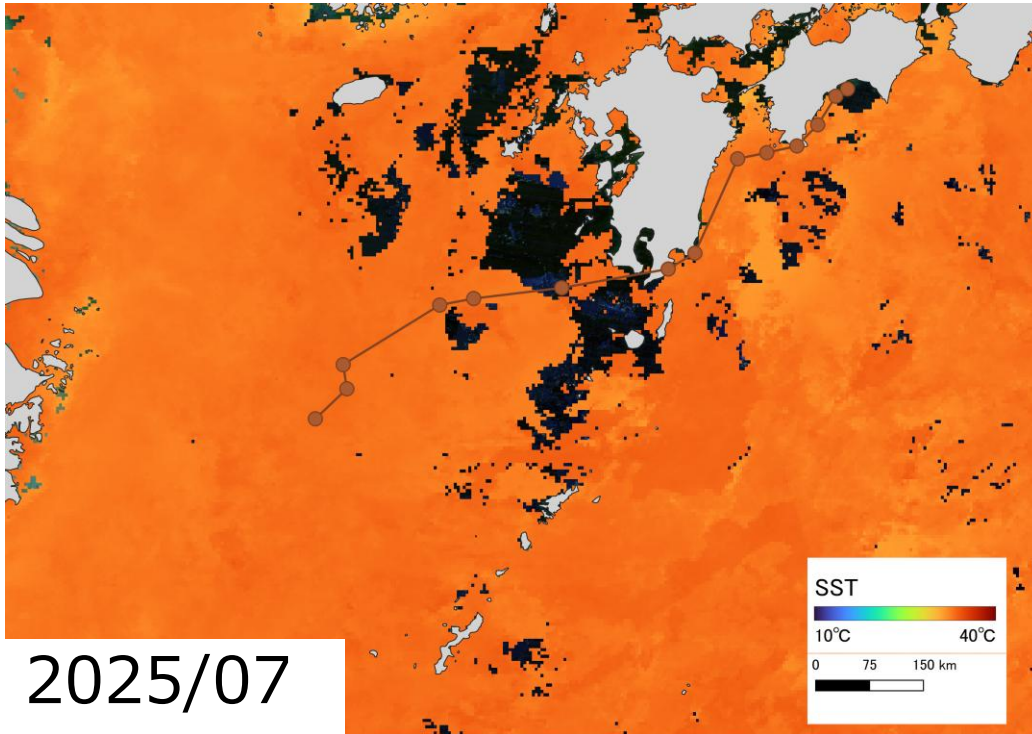
Let' t chase these!! →

Results

Nesting females

- ID 571 Cohort-IV's mother!!

Date: 6 Aug., 2024 ~ 3 Oct., 2024; Total 62 Days
SCL: 91.9 cm; BM: 103 kg



Results

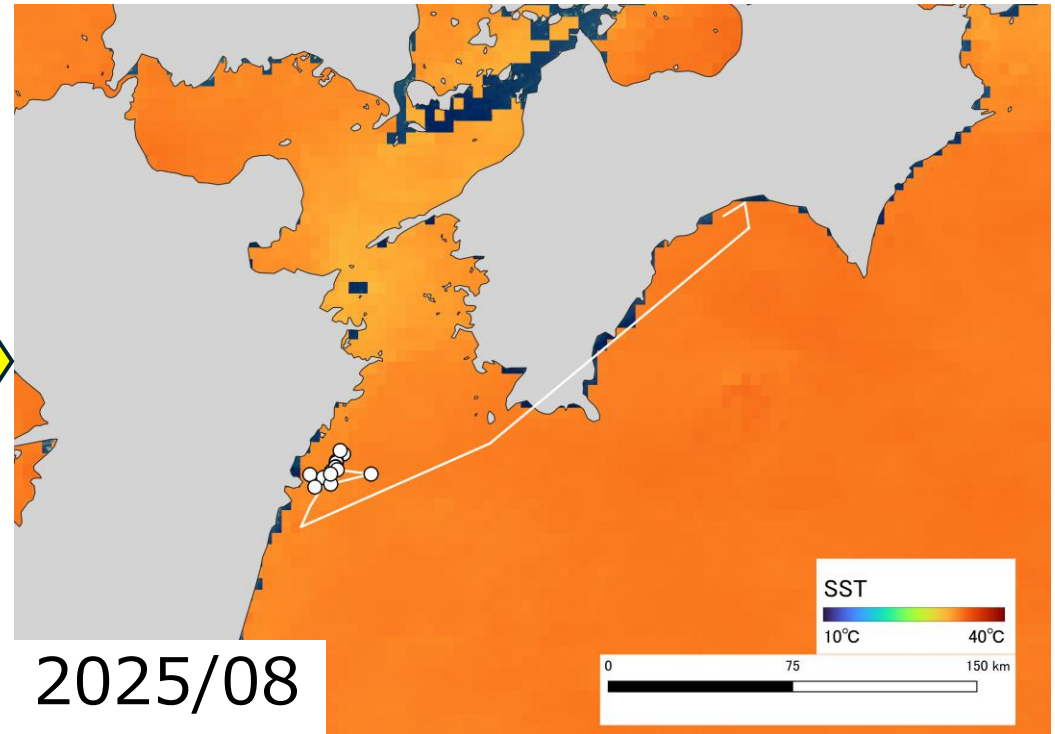
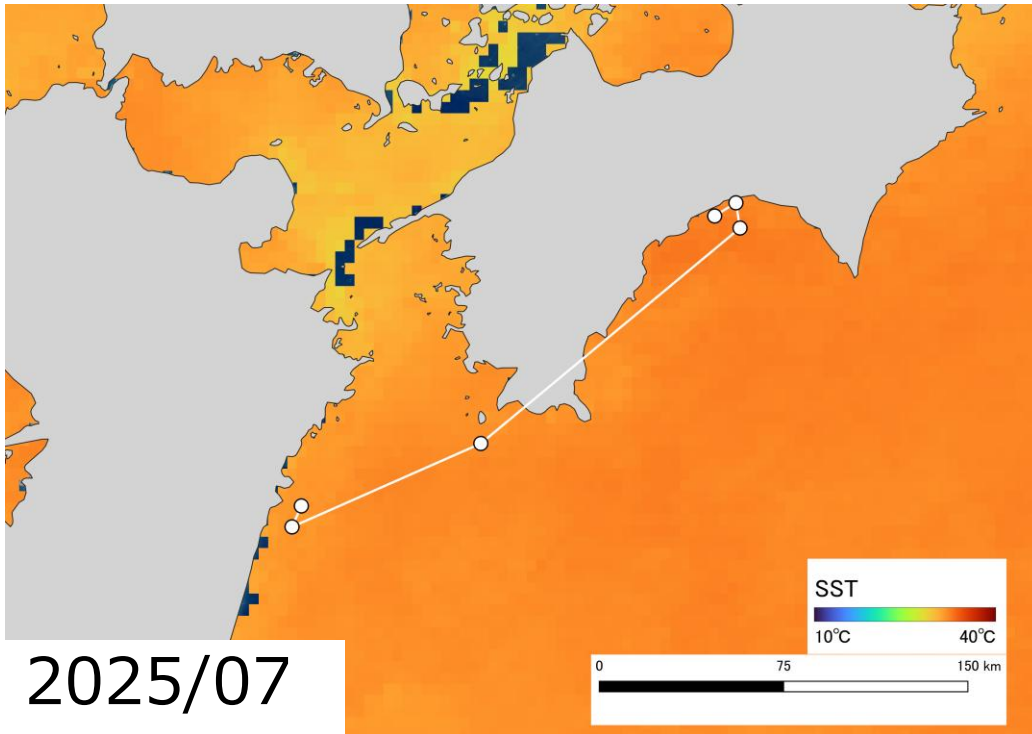
Nesting females

- ID 997 Still tracking!!

Date: 17 Jul., 2025 ~ current; Total 46 Days

SCL: 87.8 cm; BM: 84 kg

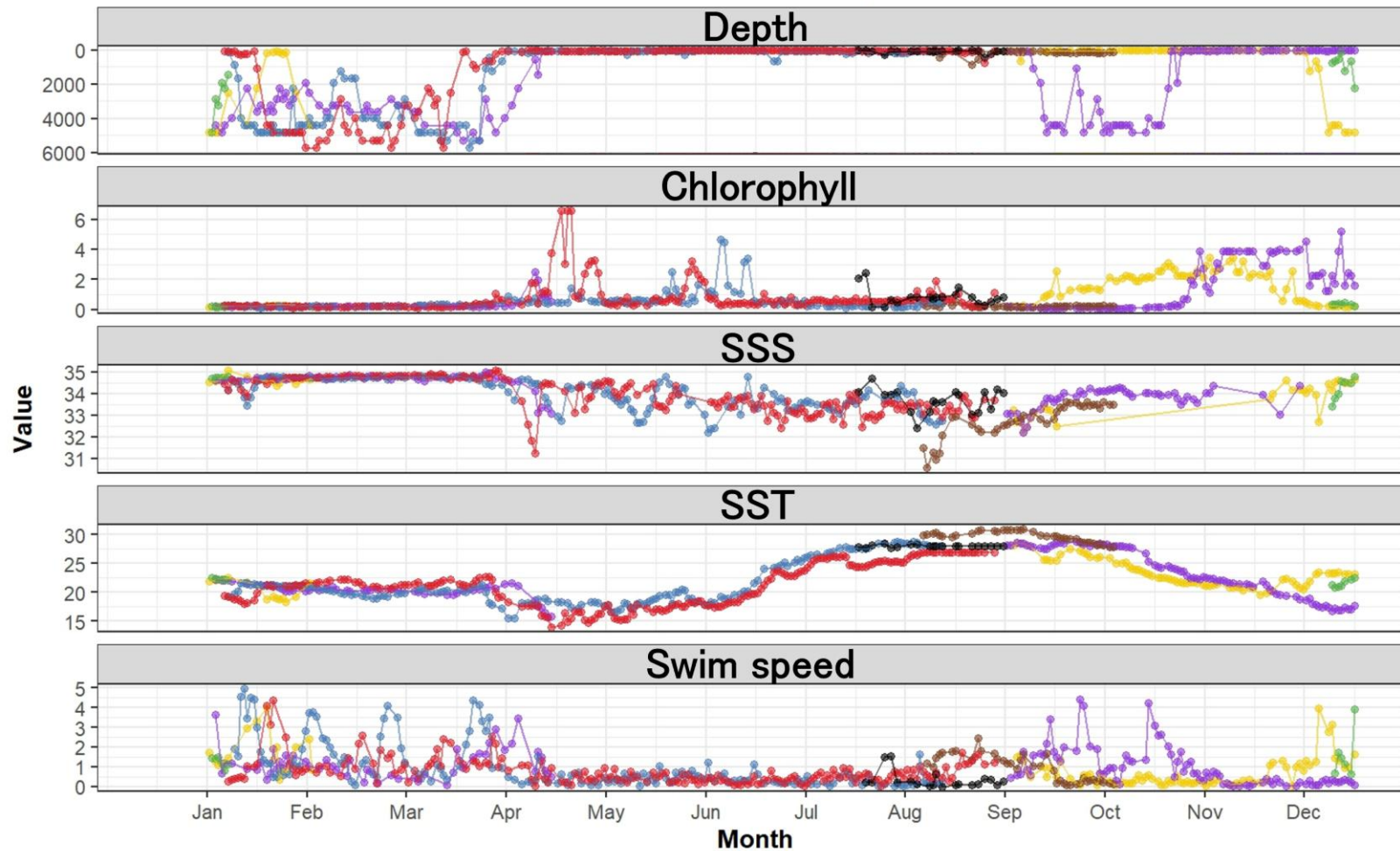
(as of 31 Aug.,2025)



Results

Environmental Parameters

Seasonal trends (with daily variation)



individual

- 203
- 204
- 571
- 580
- 581
- 583
- 997

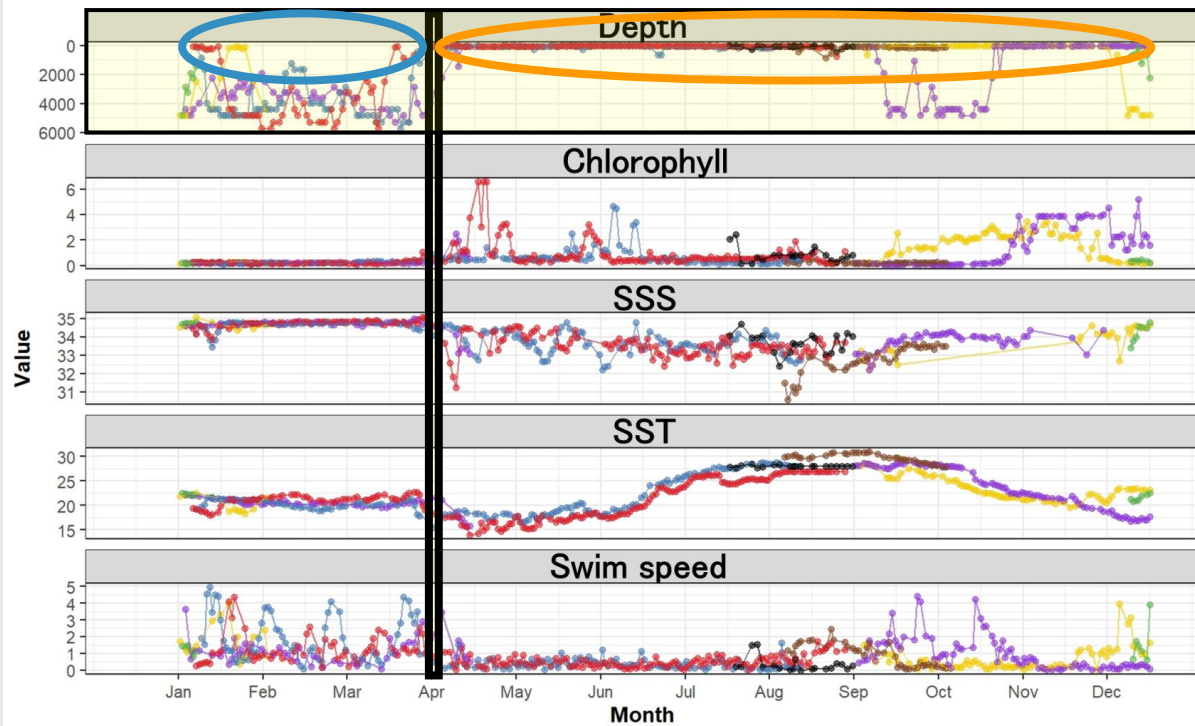
Plotted daily data
Seemed seasonal trends

Discussions

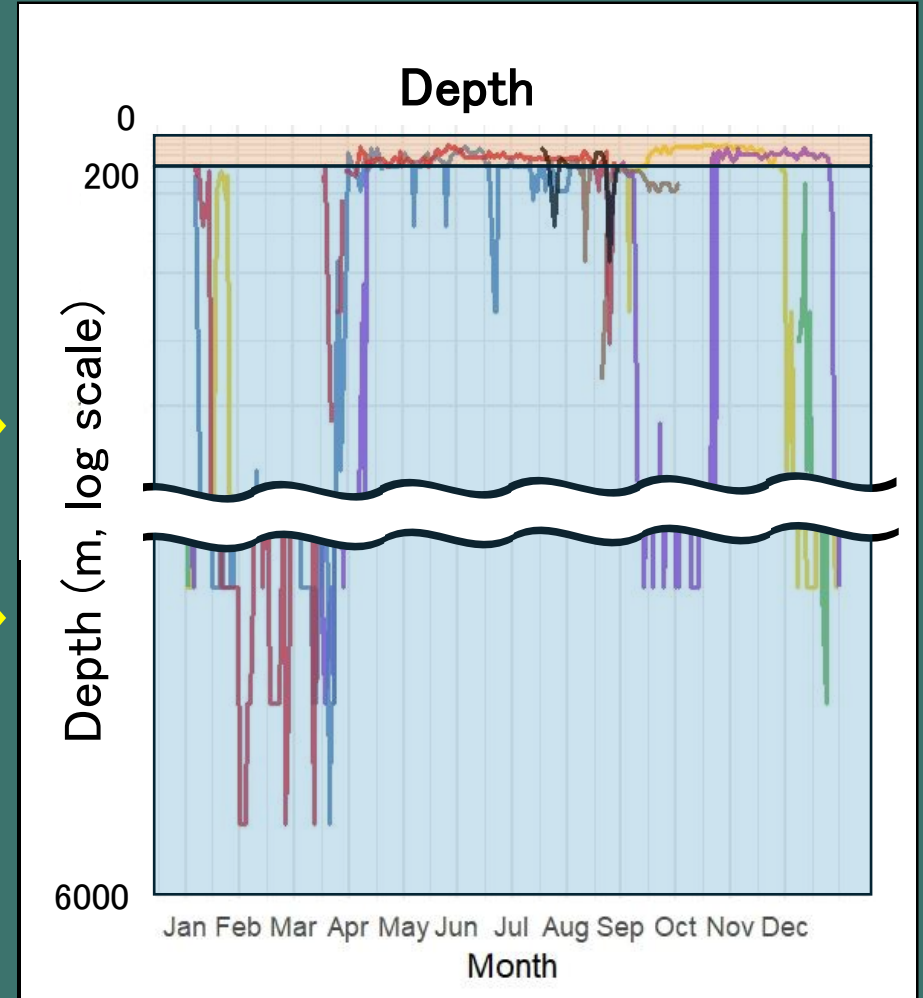
Responses to Environments

Question

Especially noticeable



Are there any changes in the movements since April?



Compared neritic with oceanic.

Discussions

Comparison

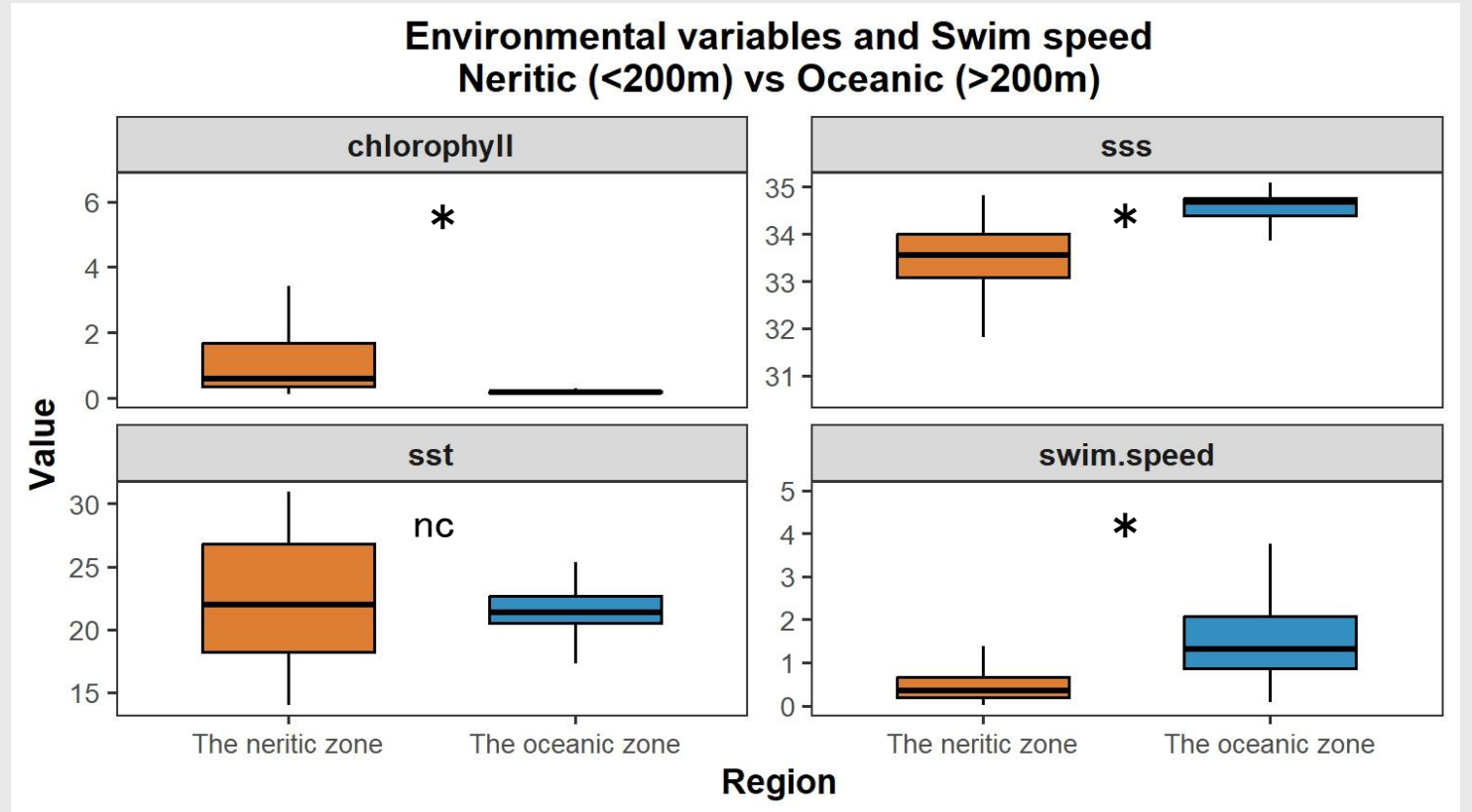
Neritic vs. Oceanic

Neritic

Stayed in areas with wide temperature range and high primary production.

Oceanic

Moved stable areas with little fluctuation.



Wilcoxon rank sum test

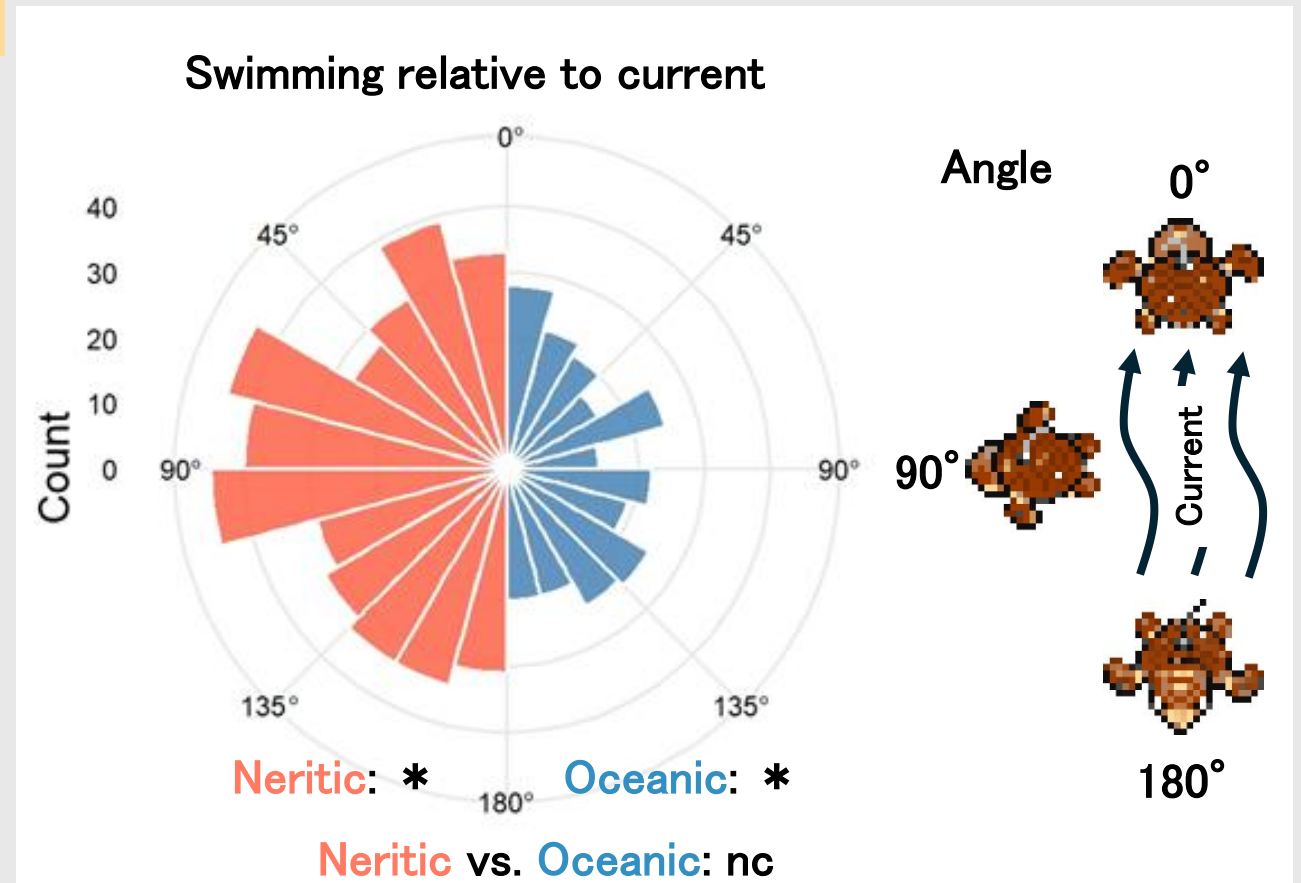
They switch between neritic and oceanic to feed depending on SST.

Discussions

Comparison

Current vs. Turtles Swimming

- Swimming direction biases: neritic & oceanic
(Rayleigh test: $P < 0.05$)
- No significant difference between neritic & oceanic
(Watson–Williams test: $P > 0.05$)
- Actively swims independent of current direction

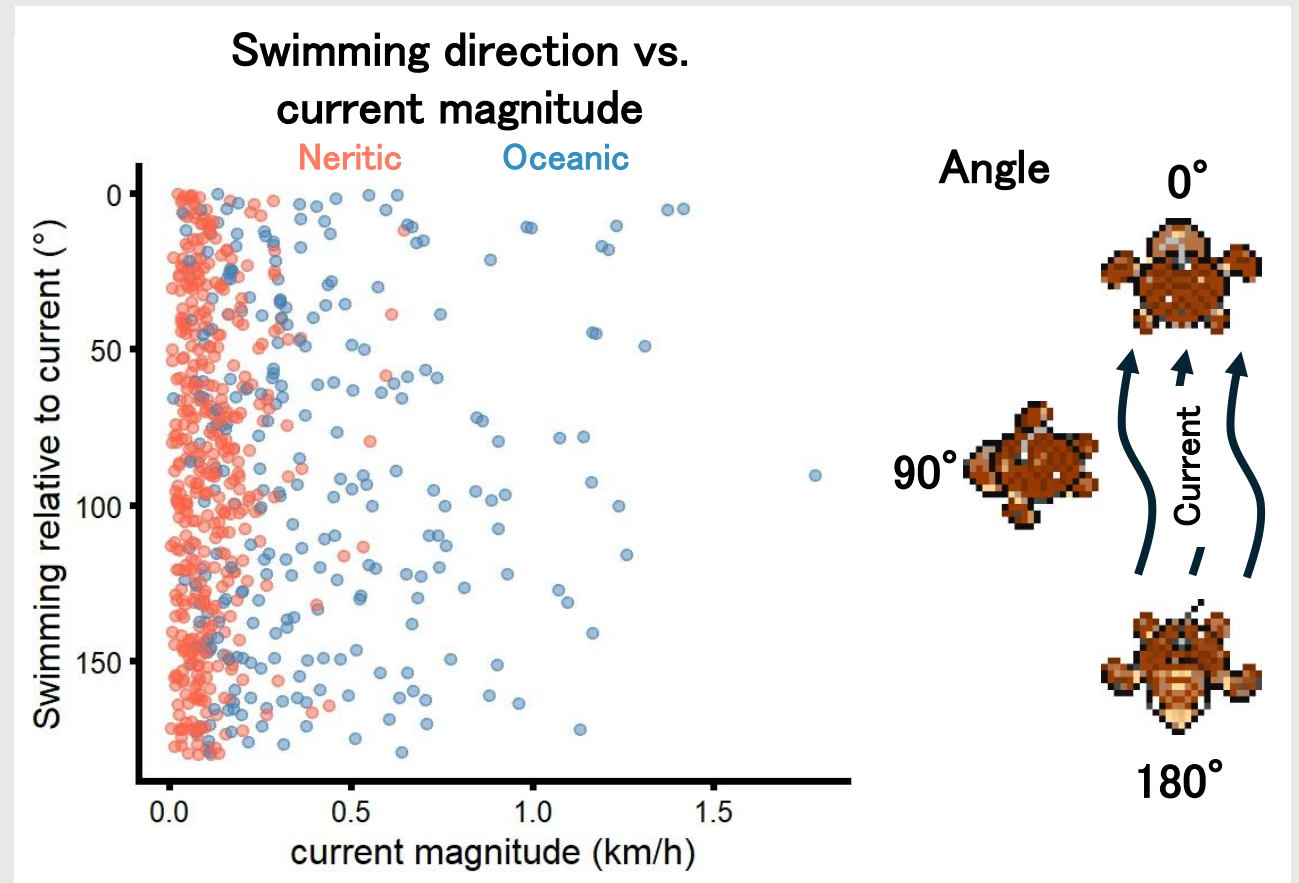


Discussions

Comparison

Current vs. Turtles Swimming

- Swimming direction unrelated to current magnitude
- No significant difference between neritic & oceanic areas



Moved without following the current, actively choosing the habitat.

Discussions

Summary

Supports the previous studies

- Moved southward in winter and northward in summer, depending on SST.
(Okuyama et al., 2022: Fujita et al., 2023)
- Actively selected and moved to the area without depending the current.
(Sakamoto et al., 1997: Briscoe, et al., 2016)
- Reported that neritic with high chlorophyll-a have the biomass of benthos.
Likely to feed on benthos in neritic as the loggerheads in other regions.
(Berezina et al. 2022: Mariani et al. 2023)

Future tasks

- Analysis of location (latitude and longitude) according to seasonal trends.
- Increase the number of samples to estimate frequently used areas.