

Variations in Heart Rate of the Loggerhead Sea Turtle (*Caretta caretta*) over 28 hours

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Background

- The circadian rhythm consists of a series of intrinsic biological processes that regulate daily cycles in physiology and behavior.
- Heart rate is a key physiological indicator of metabolism and health in terrestrial mammals.



Research question

What is the influence of **day and night** on sea turtles' heart rate, taking into account activity, and breathing frequency?

Procedure

- 5 juveniles were tested (Otsuchi, Japan)

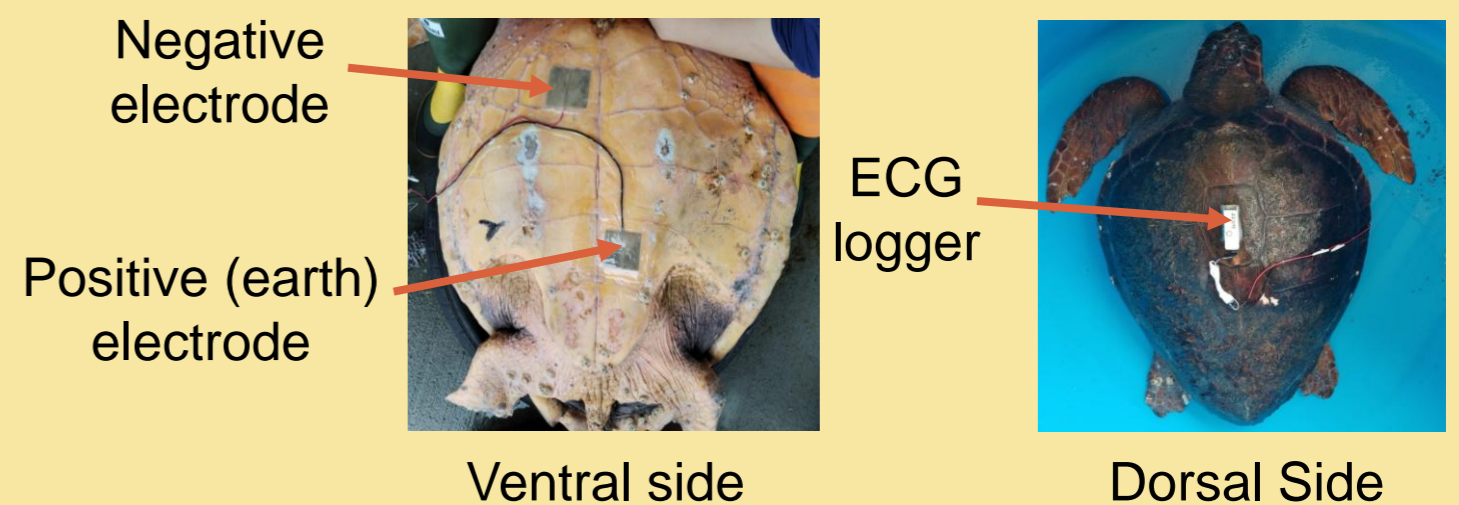


Fig. 1 – Loggerhead sea turtle with the ECG logger.

Acceleration & video data

Acceleration
(ODBA) **threshold** to
classify activity

Video, heart rate,
acceleration, temperature
& time of day data

Algorithm to predict
breathing frequency

Results

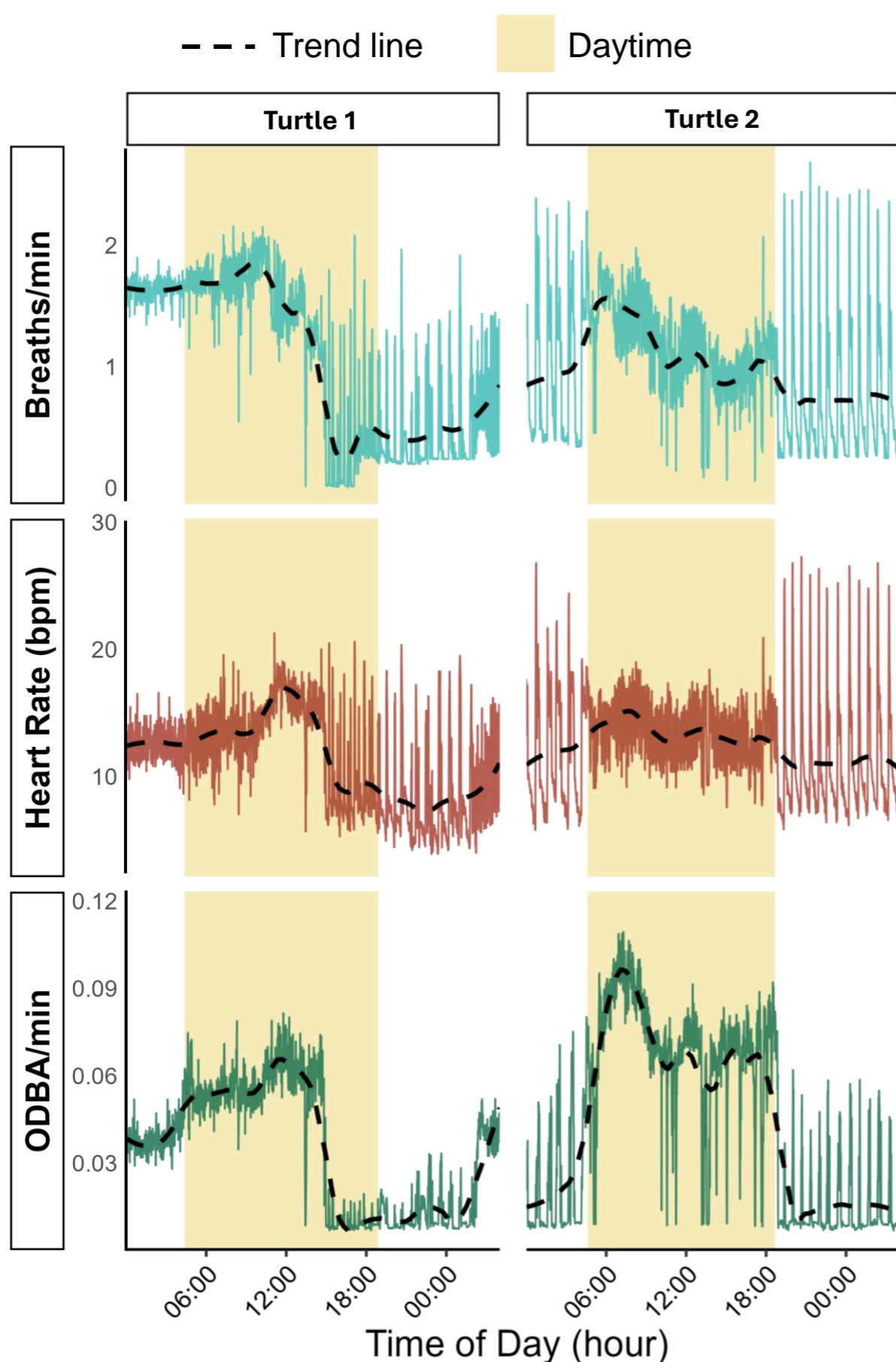


Fig. 2 – Heart rate, inferred breathing frequency, and acceleration (ODBA) data for two individuals during 28 hours (experimental day).

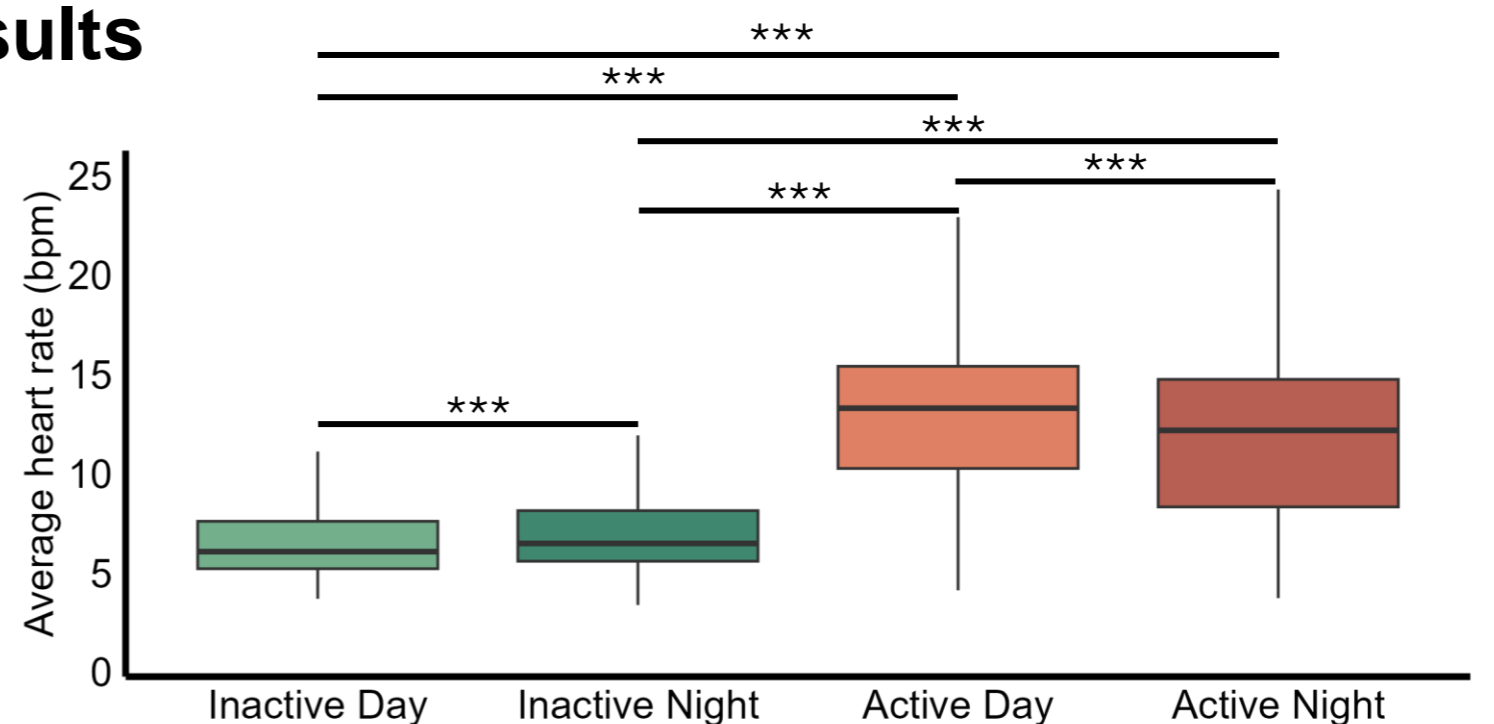


Fig. 3 – Heart rate according to activity and time of day. *** $p < 0.001$

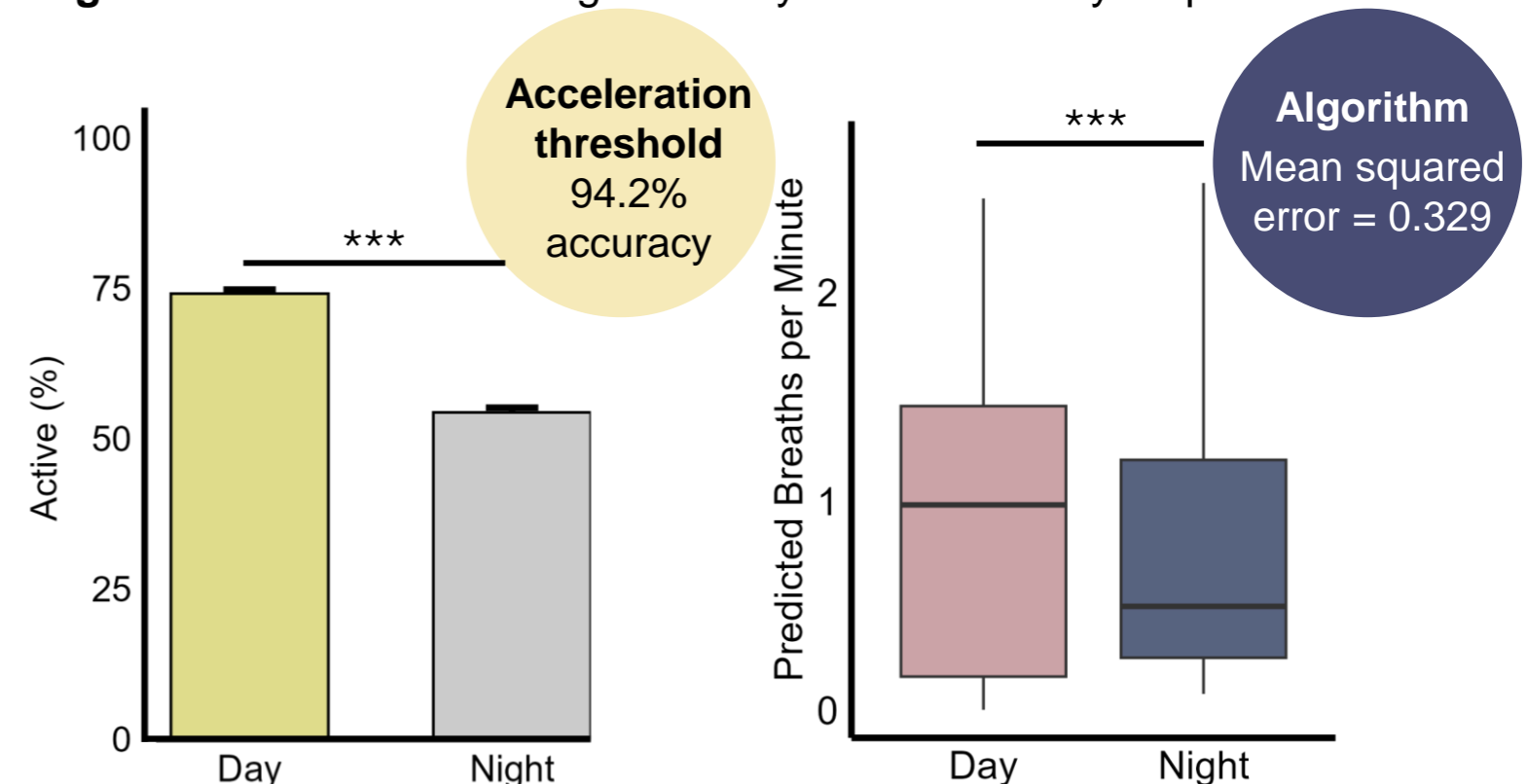
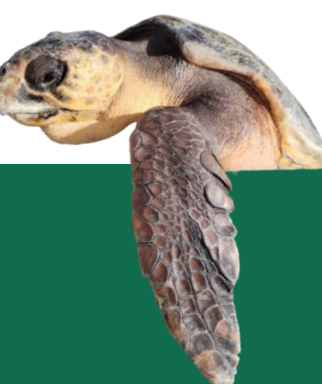


Fig. 4 – Active percentage (left) and predicted breathing frequency (right) by time of day. *** $p < 0.001$

- Heart rate **peaked** during the **day** and **declined** at **night**, aligning with activity cycles.
- Breaths per minute followed a similar pattern compared to heart rate.



Summary

- Activity** was significantly different comparing day and night.
- Heart rate fluctuations followed a **diel rhythm**, which were affected by activity.