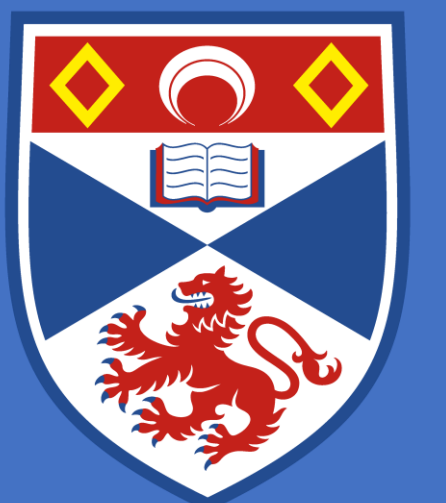


# Performance Review of the Current GPS-Argos Technology and Deployment Protocol in Use for Tracking Cetaceans in Southern Iceland



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## What is GPS-Argos?

GPS-Argos loggers are remote tracking devices that are commonly used on marine mammals such as cetaceans (whales and dolphins). The loggers are an important tool in ecological research as they provide near real-time positional data for a focal individual. They do this by taking positions from the GPS satellite system and relaying these through the Argos satellite system to be made available on the web (figure 1)<sub>1</sub>.

The more positions are successfully relayed through Argos, the better a logger is said to perform as we can remotely observe an animal's path in more detail. Therefore, understanding how to maximise GPS-Argos performance is key to gaining high-resolution data for any study.

## Study Aim

To investigate three factors that are hypothesised to impact performance:

1. Height of Logger placement
2. Angle of Logger antennae
3. Sea-state during deployment



Figure 2: Photograph of a GPS-Argos Logger During Deployment

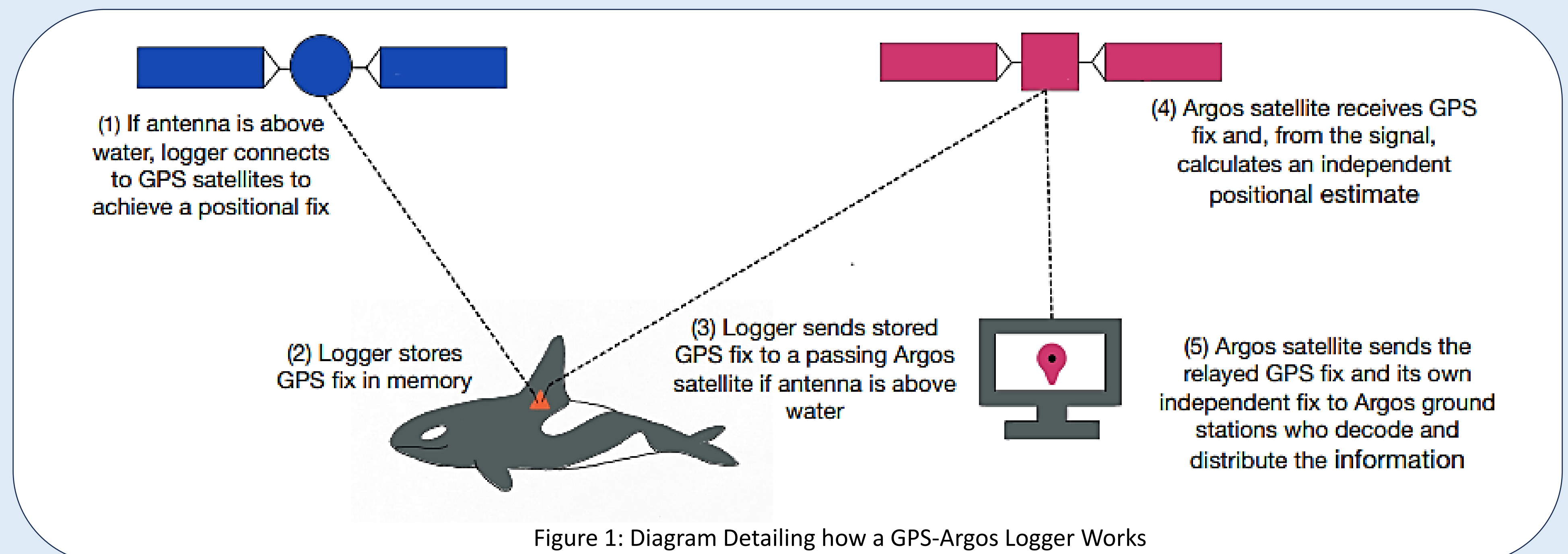


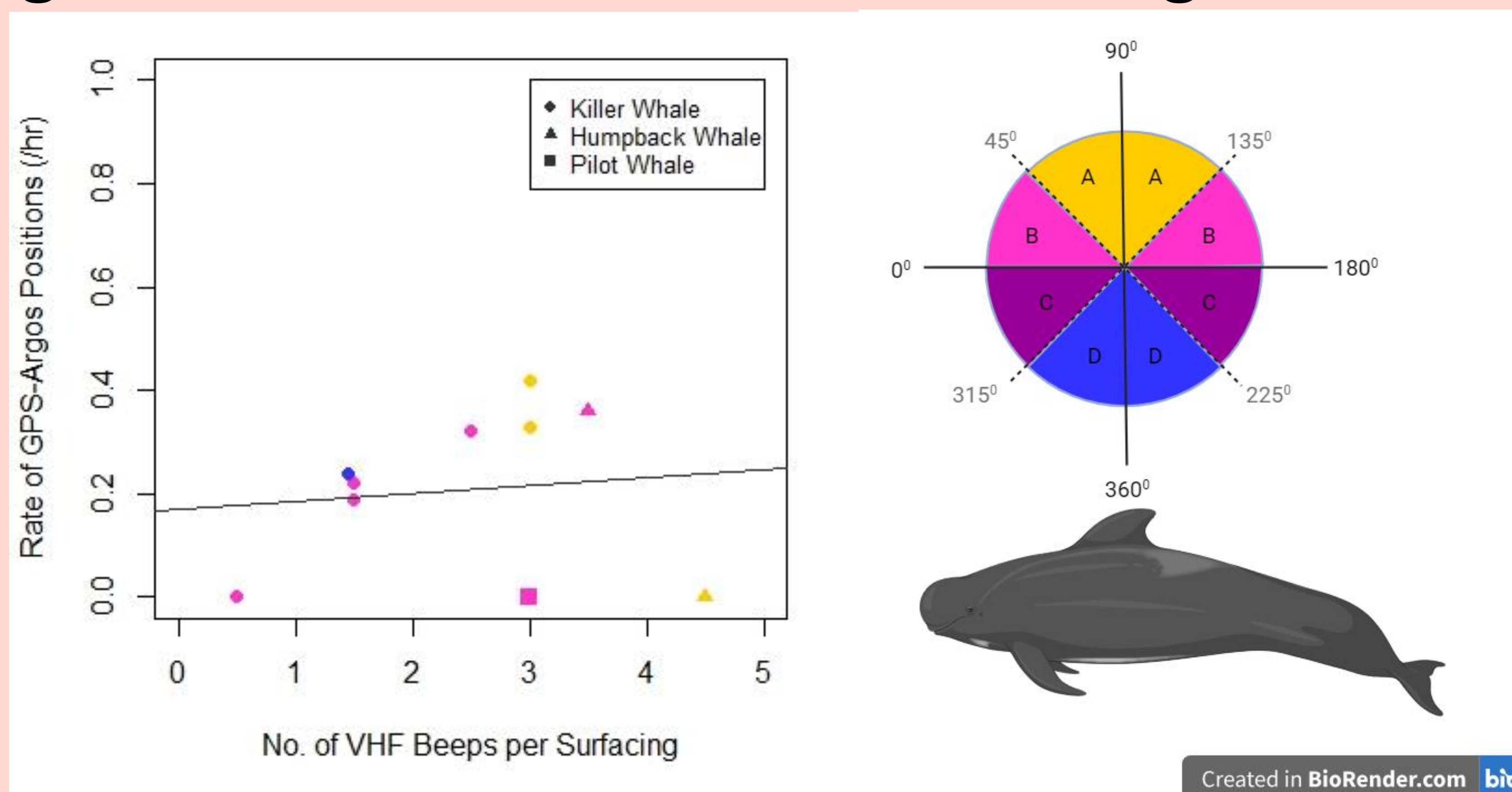
Figure 1: Diagram Detailing how a GPS-Argos Logger Works

## Methods

Overall performance of a logger was quantified as: the rate of GPS positions relayed through Argos per hour (GPS-Argos positions). This is because this measure accounts for both successful GPS and Argos satellite connections.

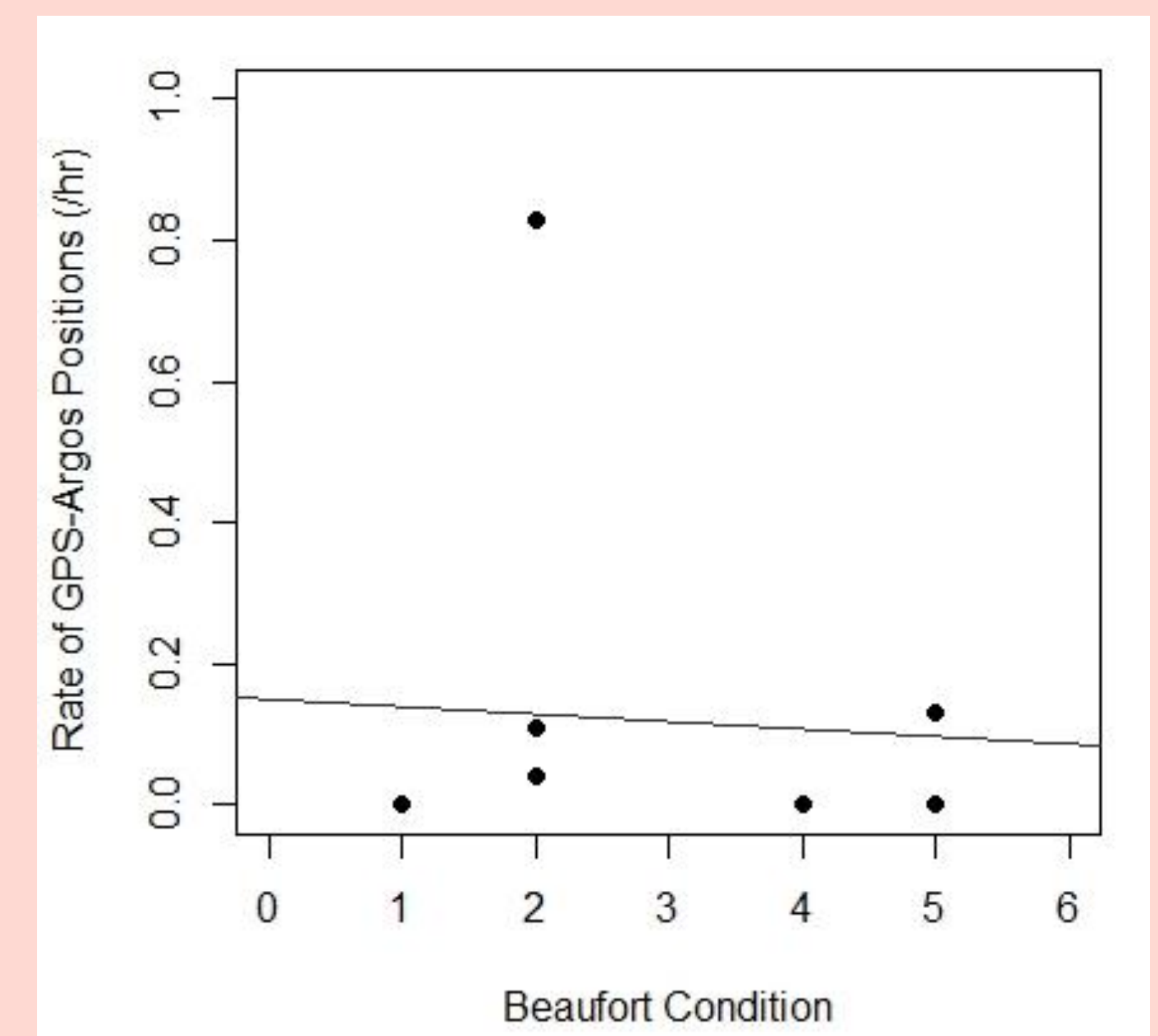
This measure was compared across loggers that had been deployed on cetaceans with a variety of placement heights and antennae angles during the field season of June/July 2023 in southern Iceland

## Height of Placement and Antenna Angle - Results



- Performance showed a positive correlation to no. of VHF 'beeps' per surfacing; a measure closely correlated with height of placement.
- This trend would be even stronger if not for the two outlier data points where GPS-Argos = ~0. These were due to technological errors.
- Performance also appears to be correlated with how 'upright' the antennae angle is.
- However more replicates are required before any robust conclusions on effect of antennae angle can be drawn.

## Sea-State - Results



- The correlation of sea-state and performance was found to be weakly negative.
- This result was expected, given rougher seas will submerge the antennae more often, inhibiting satellite communication.
- However, the trend appears weaker than predicted. Possibly due to an uncontrolled confounding variable.
- This relationship will require further investigation to confirm.

## Conclusions

1. A higher body placement leads to improved GPS-Argos performance.
2. There is some evidence that a more upright antennae angle improves GPS-Argos performance (although more repeats are required to improve reliability).
3. There is little evidence that weather affects GPS-Argos performance as of yet.

In order to attain the necessary replicates to draw robust conclusions as mentioned above, a similar study is currently being carried out in Mozambique using the same loggers as used here.

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References:  
1. Argos-System (2023), <https://www.argos-system.org/about-argos/how-argos-works/>