UNIVERSITY OF MIAMI
ROSENSTIEL SCHOOL of MARINE, ATMOSPHERIC & EARTH SCIENCE

# A Deep Dive into Sperm Whale Echolocation Buzzes:

## Understanding their Foraging and Diving Behavior

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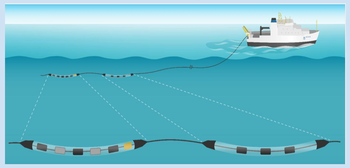
# Background & Methods

**Sperm Whales produce different sounds while foraging, a "Buzz" being the most indicative of actively catching prey.**

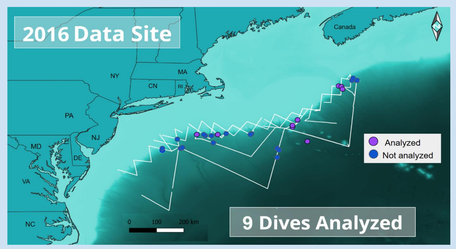
**Passive acoustics** is utilized here as a non invasive and long term monitoring tool to record diving and echolocation behavior, and to assess foraging.

### Towed Array:

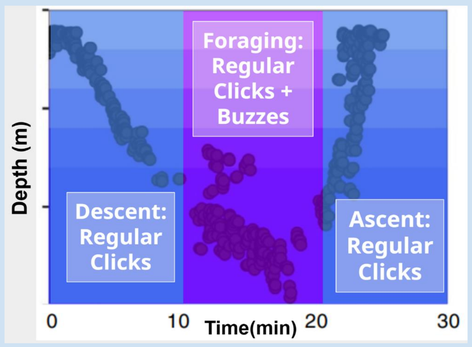


This is the first time a **towed array** was used to study Sperm Whale dive and foraging behavior instead of tags, allowing data collection for a **broader set of individuals.** Over a **longer range.**

Passive Recordings were collected in 2016 off the coast of the Eastern US and Canada.




### Typical Sperm Whale Dive Profile:

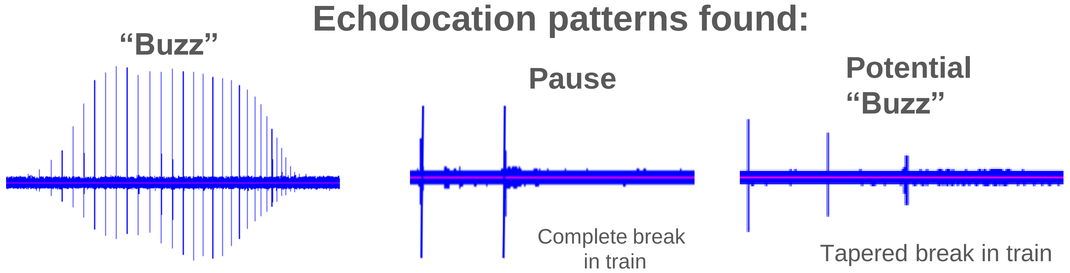


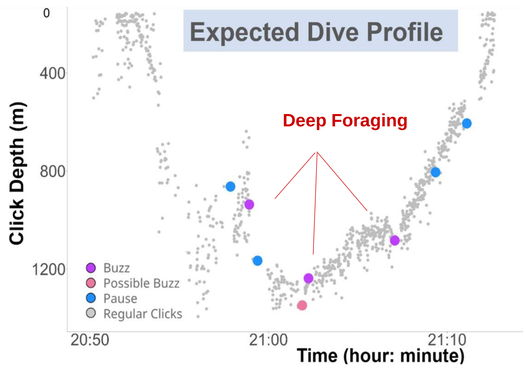

Following expected echolocation patterns throughout a foraging dive, both **"regular clicks"** and **"buzzes"** were searched for in our data.

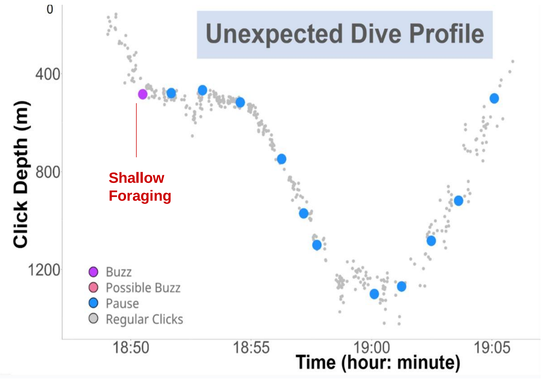
Click types were located, measured and classified using PAMGuard and Raven Software.

# Data & Results

### Echolocation patterns found:



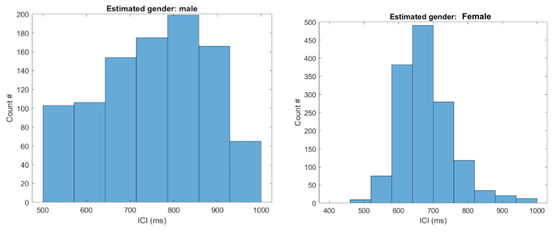



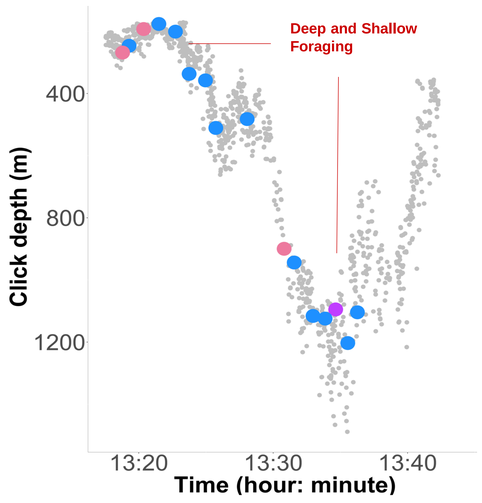

**Average Buzz Depth: 300-1200 m**

**Average Buzz Duration: 1- 5.5 sec**

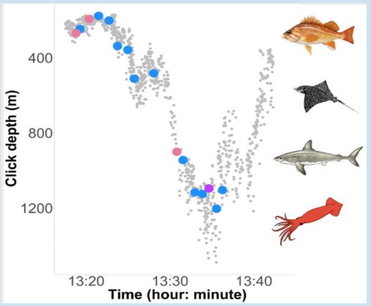
### Estimated Demographic Based on Inter-click Interval (ICI):

**7 Juvenile Female, 2 Adult female, 1 Male**




# Conclusions




**Shallow foraging** can allude to **changes in target prey,** as species are located at different water column depths

Sperm whales from different demographic groups have varying energy needs, which can cause **changes in prey preferences** and can explain the observed alterations in foraging depths.

Foraging variations over time can also allude to **ecosystem dynamic shifts** and the influence of **climate change or anthropogenic influences** in the survey area

**Primary Conclusion: Shallow foraging may indicate variability in whale feeding preferences or ecosystem dynamics**

**Research Goal: Determine if a towed array method can be used to study foraging buzzes, and to better understand Sperm Whale diving behavior.**

**Primary Result: A towed array can successfully record Sperm Whale foraging buzzes, however it is possible that not all buzzes are detected. Foraging is observed at various depths including very shallow waters, which is unusual for this species.**

## Acknowledgements:

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