Assessing Respiratory Microbiome of Small- and Medium-Sized Cetaceans Using Unmanned Aerial Systems: Breath Sampling Humpbacks is so 2016

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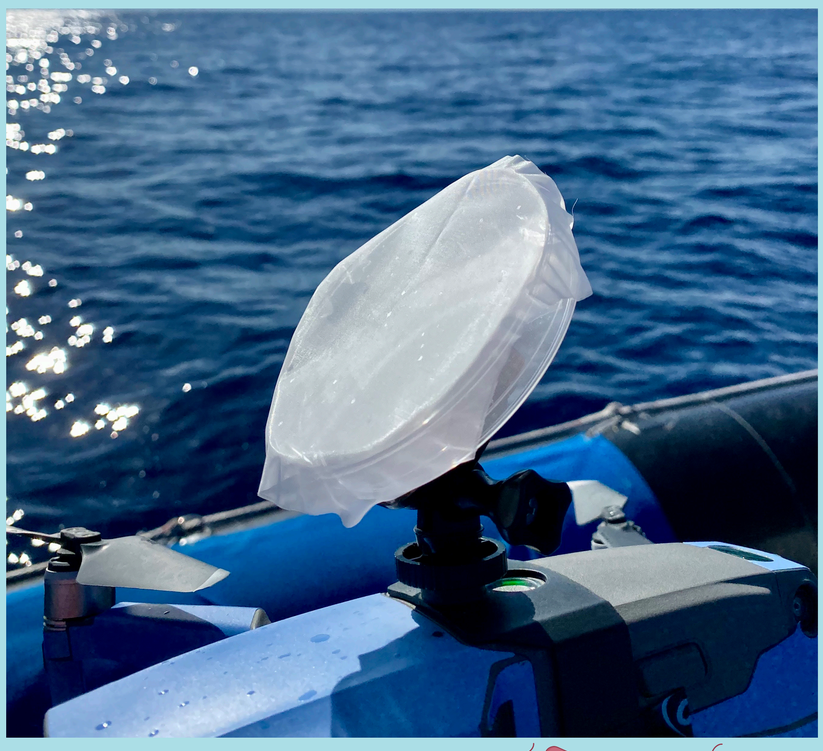
Why is this important?

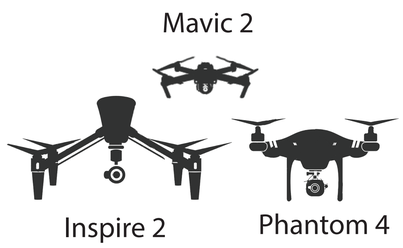
We used off-the-shelf drones to obtain breath samples from odontocetes that are not always approachable by boat for pole-based sampling.

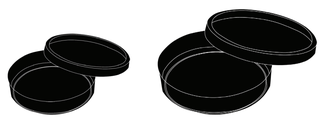
The samples collected contained sufficient material for ribosomal DNA sequencing.

Assessment of respiratory microbiome with a drone has the potential to minimize harassment of individuals, reduce biases in sampling associated with reactions to vessels and maximize sampling at reduced economic costs.

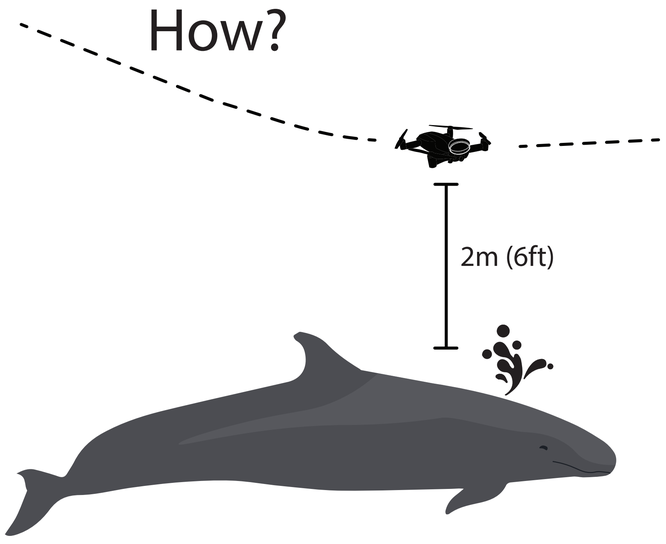


Using commercially available drones we collected 19 breath samples from short-finned pilot whales (n=16), false killer whales (n=2), and a Cuvier's beaked whale (n=1)





100mm/150mm
Nytex-covered petri dishes



Future Directions

Develop protocols to increase the reliability of sample collection while minimizing reactions.

Utilize high throughput sequencing to differentiate between seawater-sourced bacteria & respiratory microbiome.

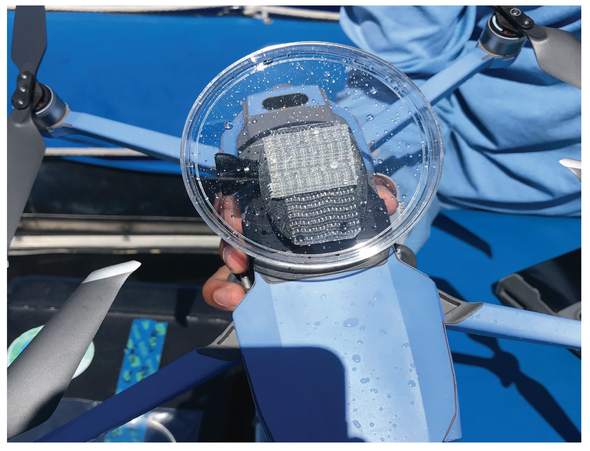
Apply lessons learned and sample more species. In November 2019 we collected a sample from a Cuvier' beaked whale.

What we found

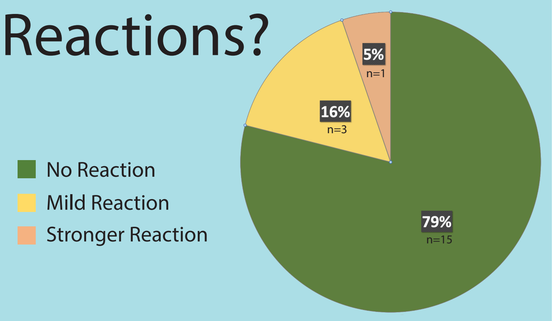
From samples collected in 2018 and April 2019 seven of nine breath and six of seven control samples yielded sufficient DNA for ribosomal DNA sequencing.

Control (seawater) samples were dominated by the common oceanic bacteria Prochlorococcus and SAR11.

Breath samples were dominated by Methylobacterium sp., a facultative methylotrophic bacterium.



Reactions?



Acknowledgments

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