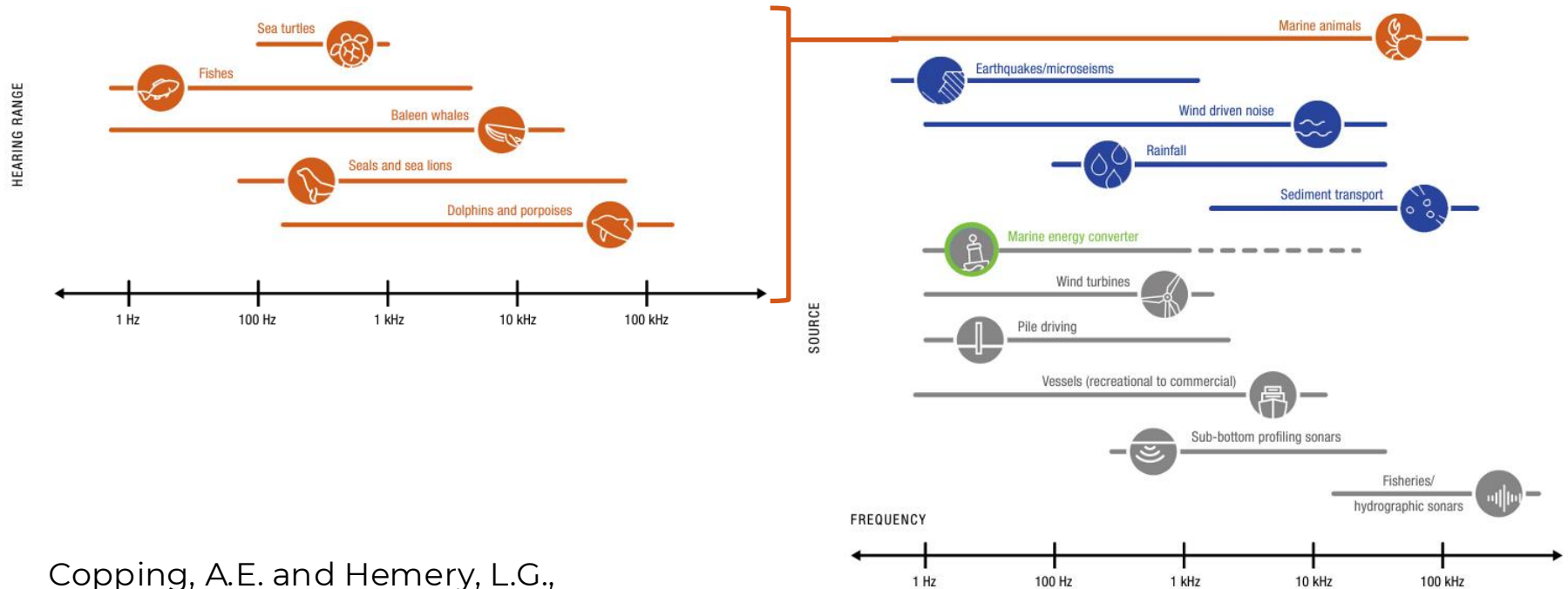


Co-evolution of Underwater Noise Measurements and Wave Energy Converter Design

Dr. Brian Polagye (UW), Dr. Chris Bassett (UW), and Dr. Landon Mackey (C-Power)



Marine Life and Underwater Noise

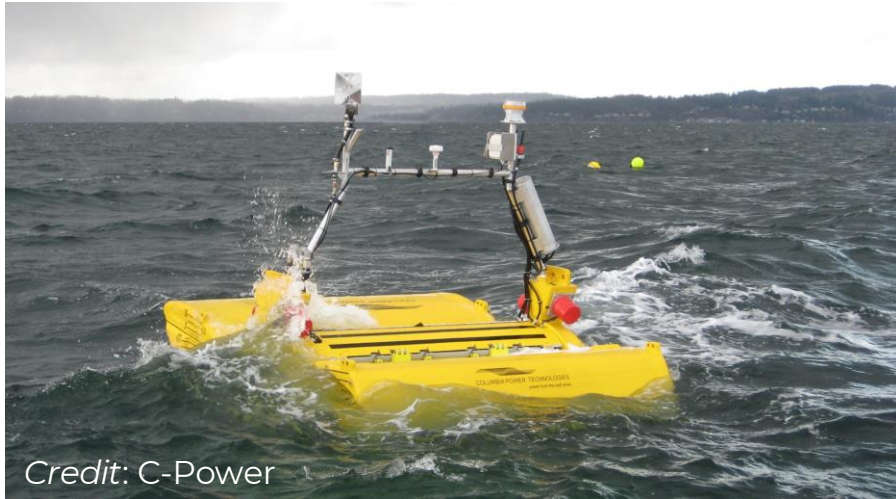


Copping, A.E. and Hemery, L.G.,
(2020) OES-environmental 2020
State of the Science report.

C-Power SeaRAY: 2011



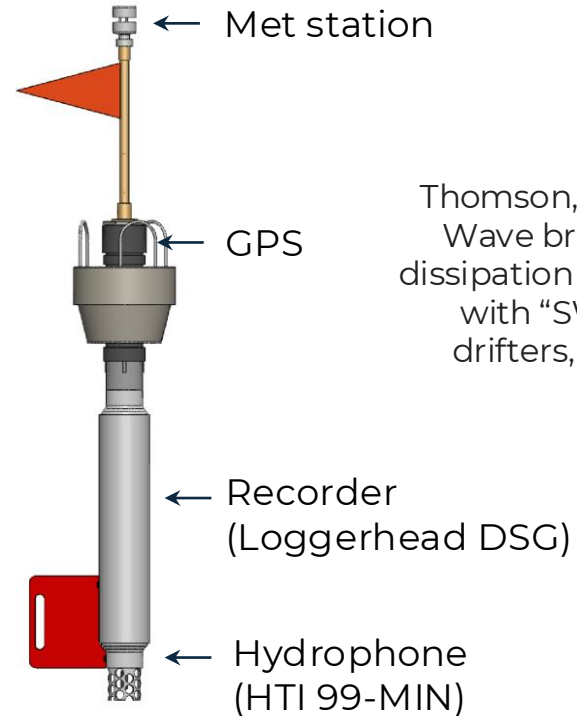
Credit: Chris Bassett



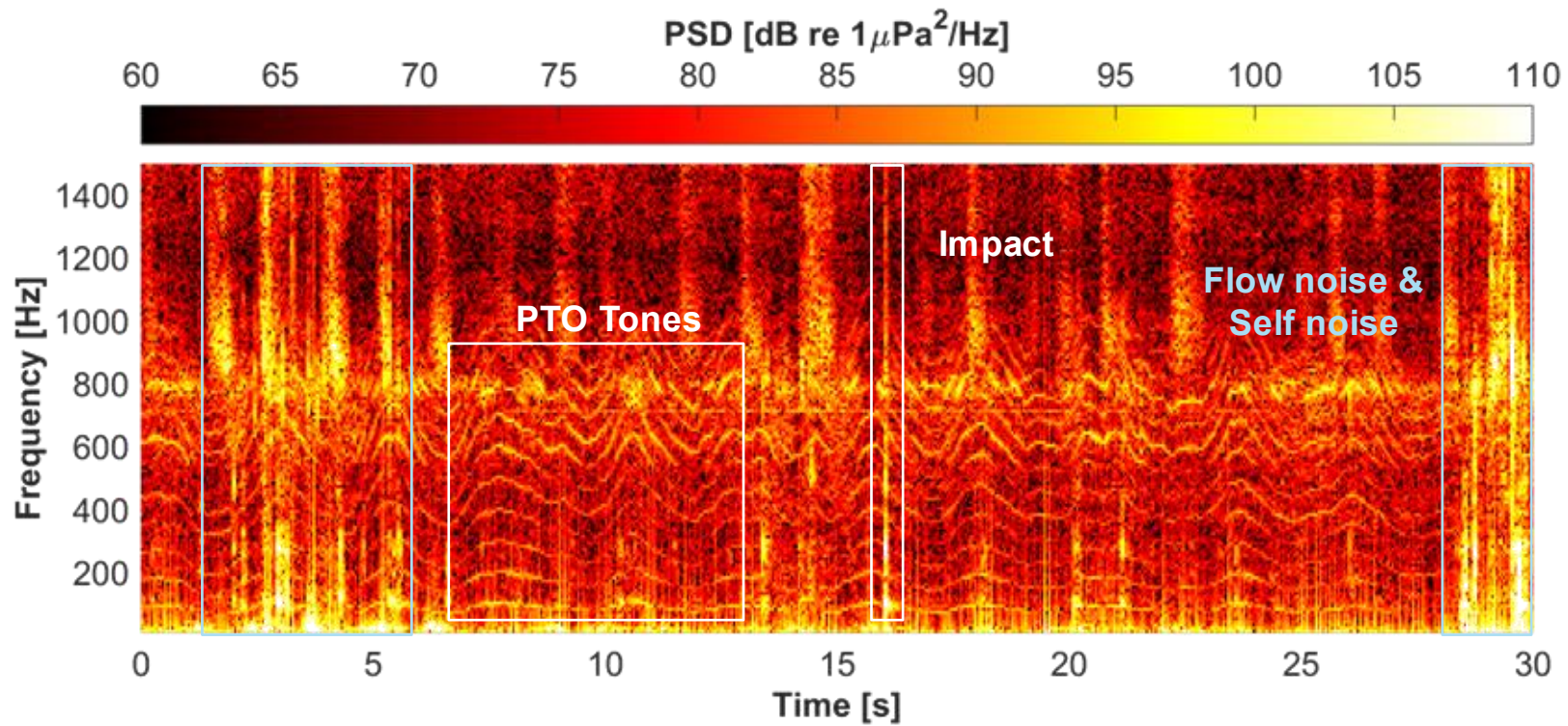
Credit: C-Power

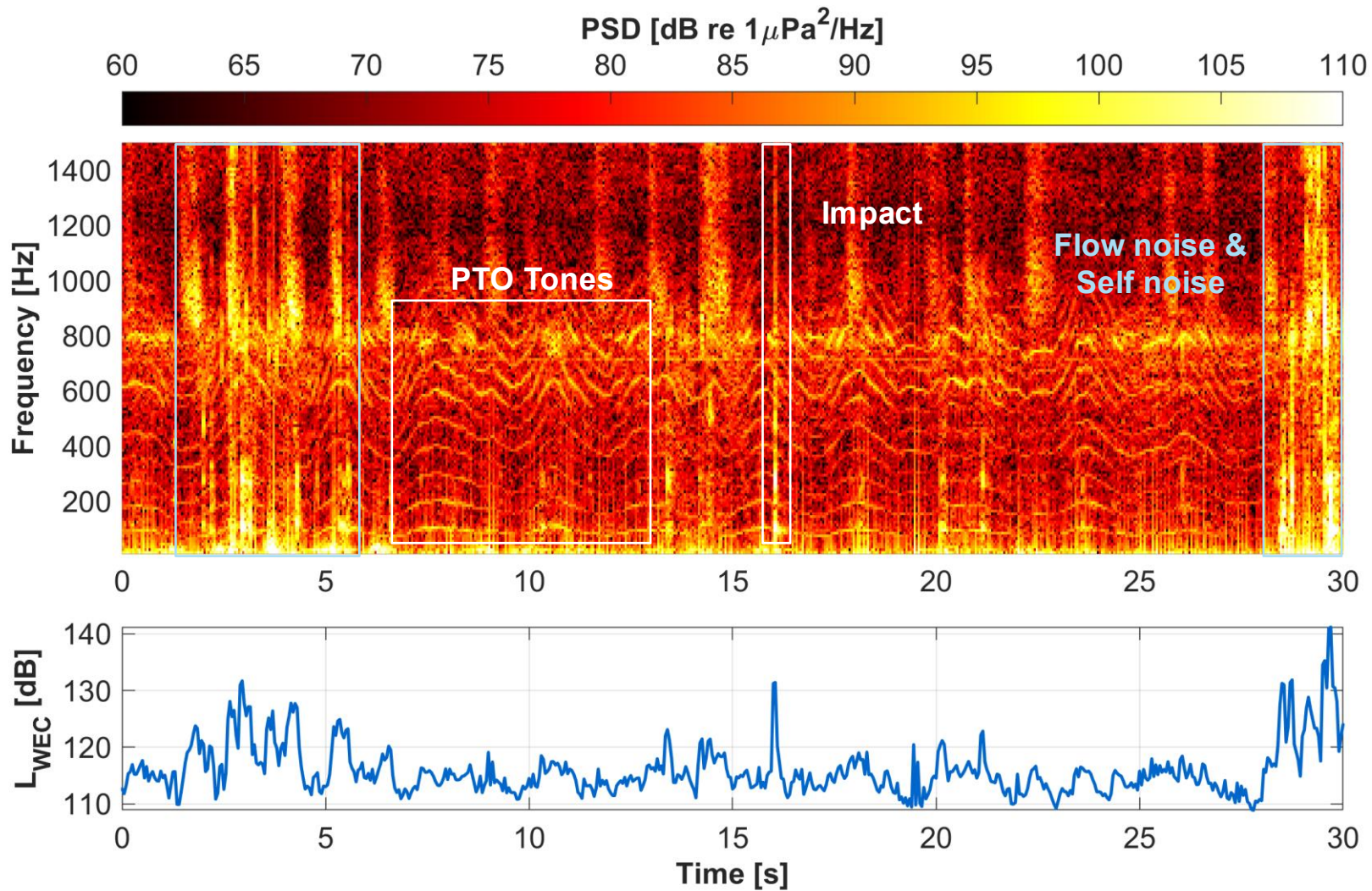
Bassett et al. (2011) Underwater noise measurements of a $1/7^{\text{th}}$ scale wave energy converter, *OCEANS'11 MTS/IEEE*

Acoustic “SWIFT”



Thomson, J. (2012)
Wave breaking
dissipation observed
with “SWIFT”
drifters, *JTech*



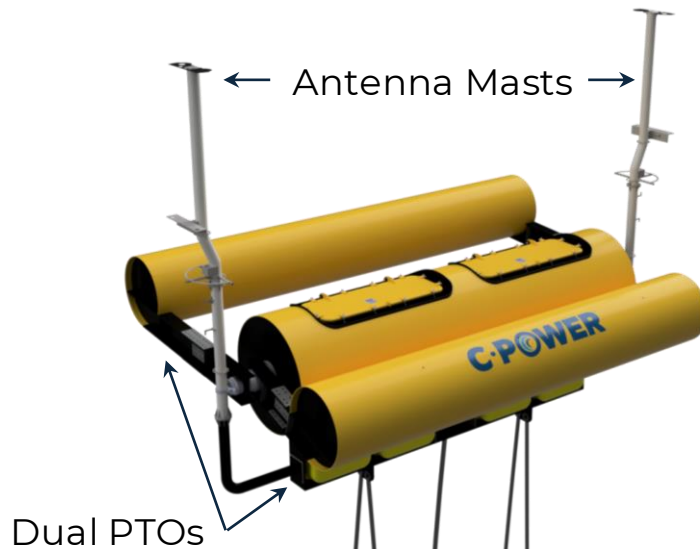
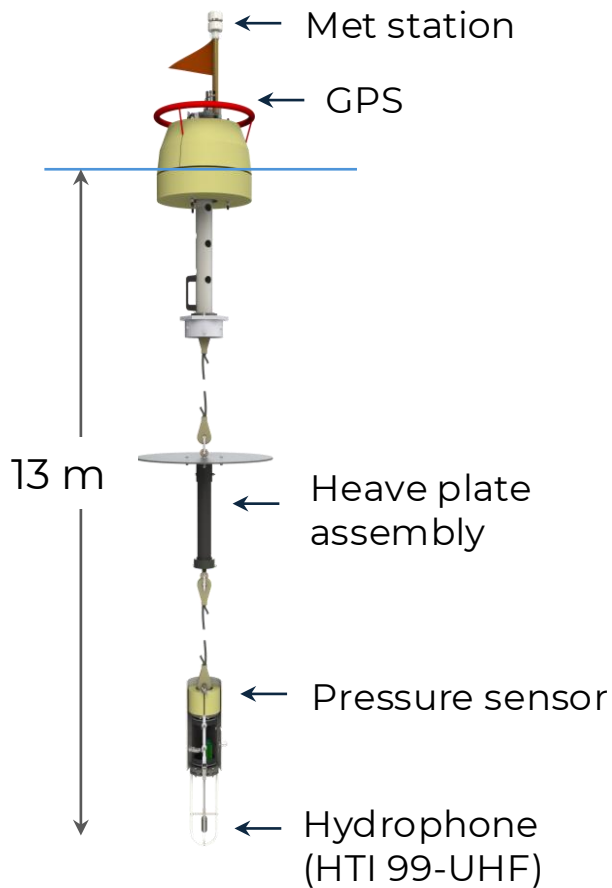


Key Points

- Successful acoustic measurements
 - ...but $H_s < 0.5$ m
- Noise was radiated from the wave energy converter
 - Exceeded ambient levels out to 1500 m
- Measurements highlighted areas for improved WEC design

DAISY

C-Power SeaRAY: 2024



SeaRAY →

Bridle Lines →

Heave plate →

Umbilical →

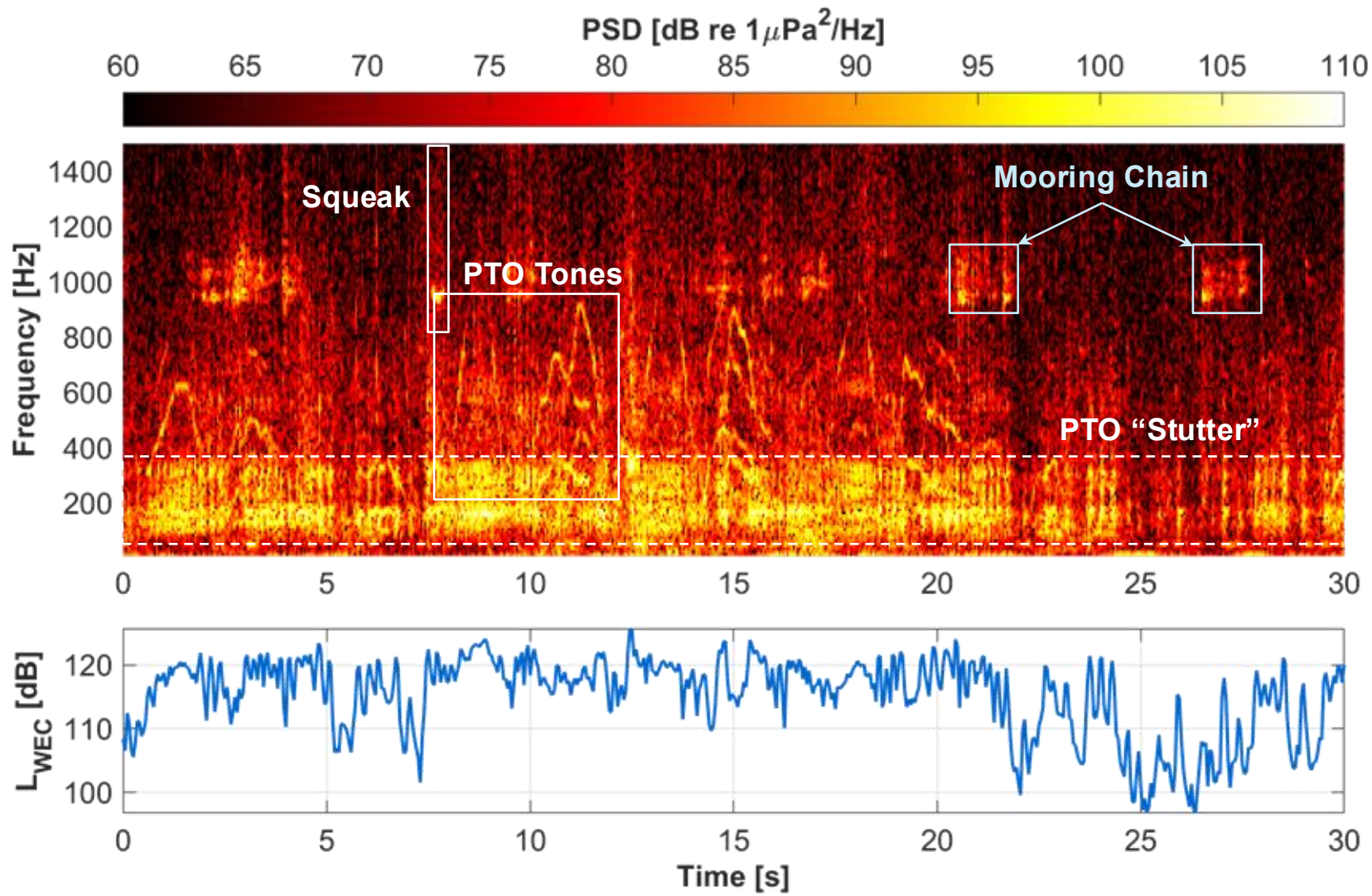
Seafloor Base Station →

Polagye et al. (2025) Performance of a Drifting Acoustic Instrumentation System (DAISY) for characterizing radiated noise from marine energy converters, *J. of Ocean Eng. and Marine Energy*

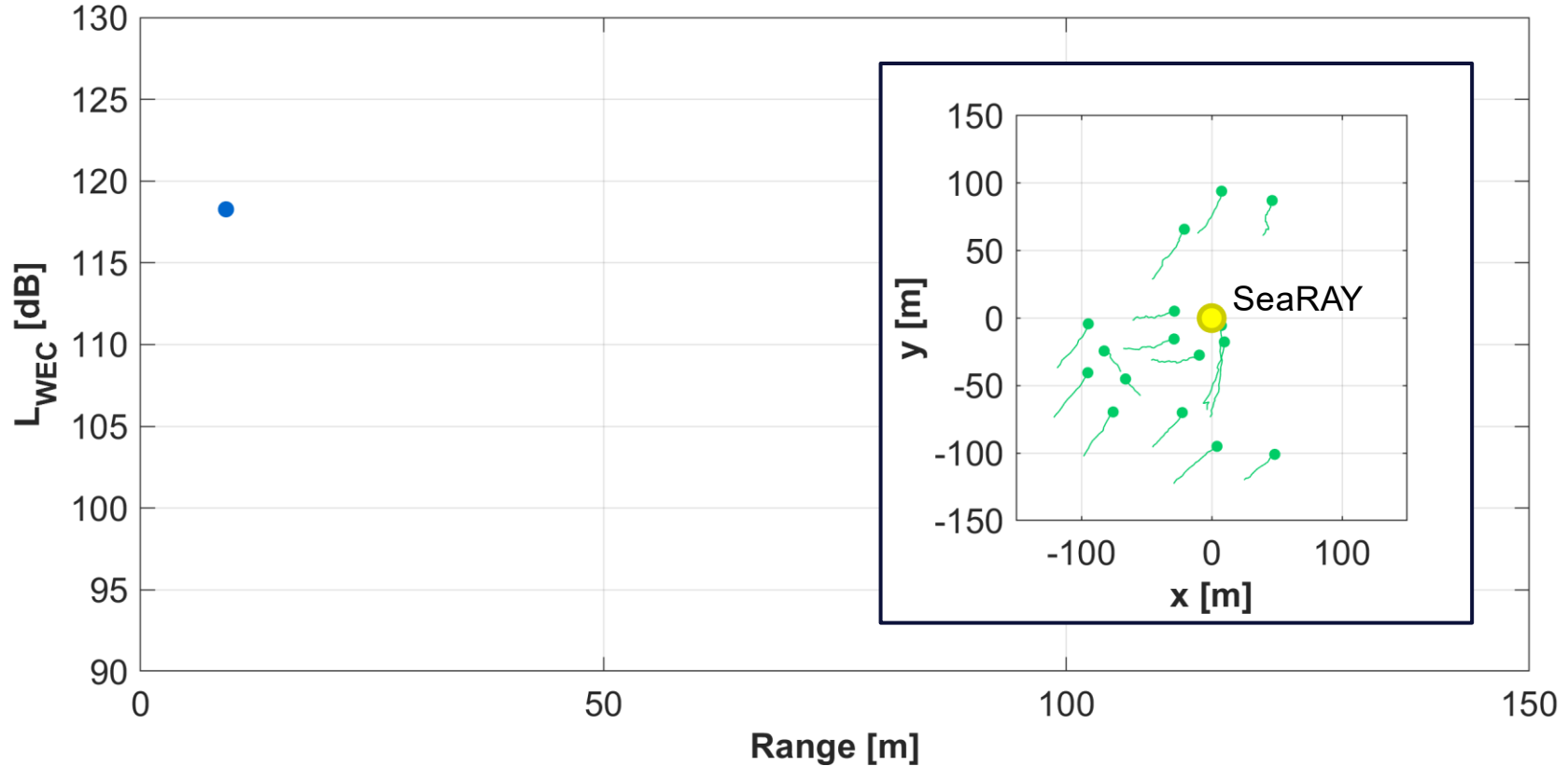




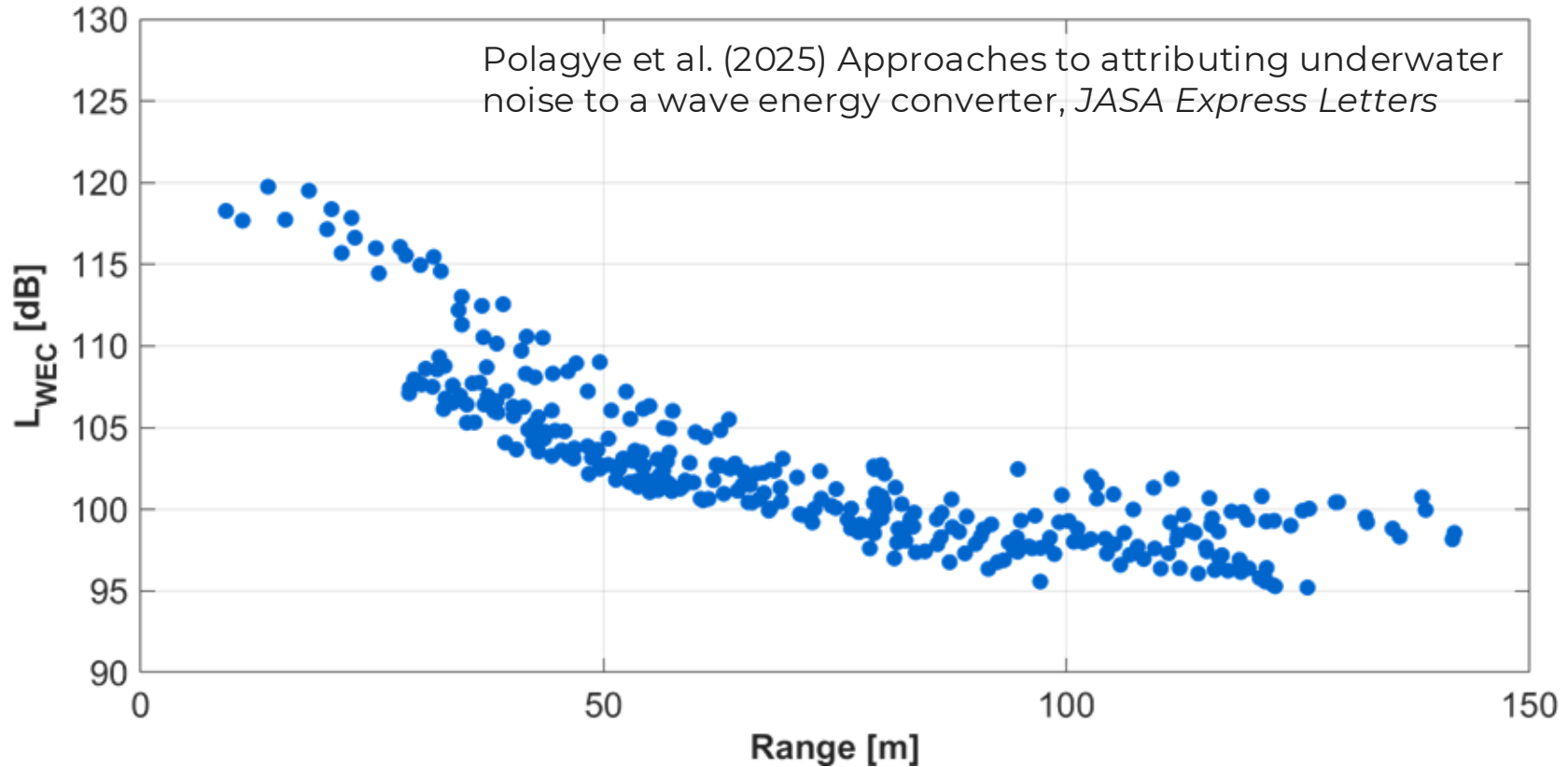
Credit: Aidan Hunt



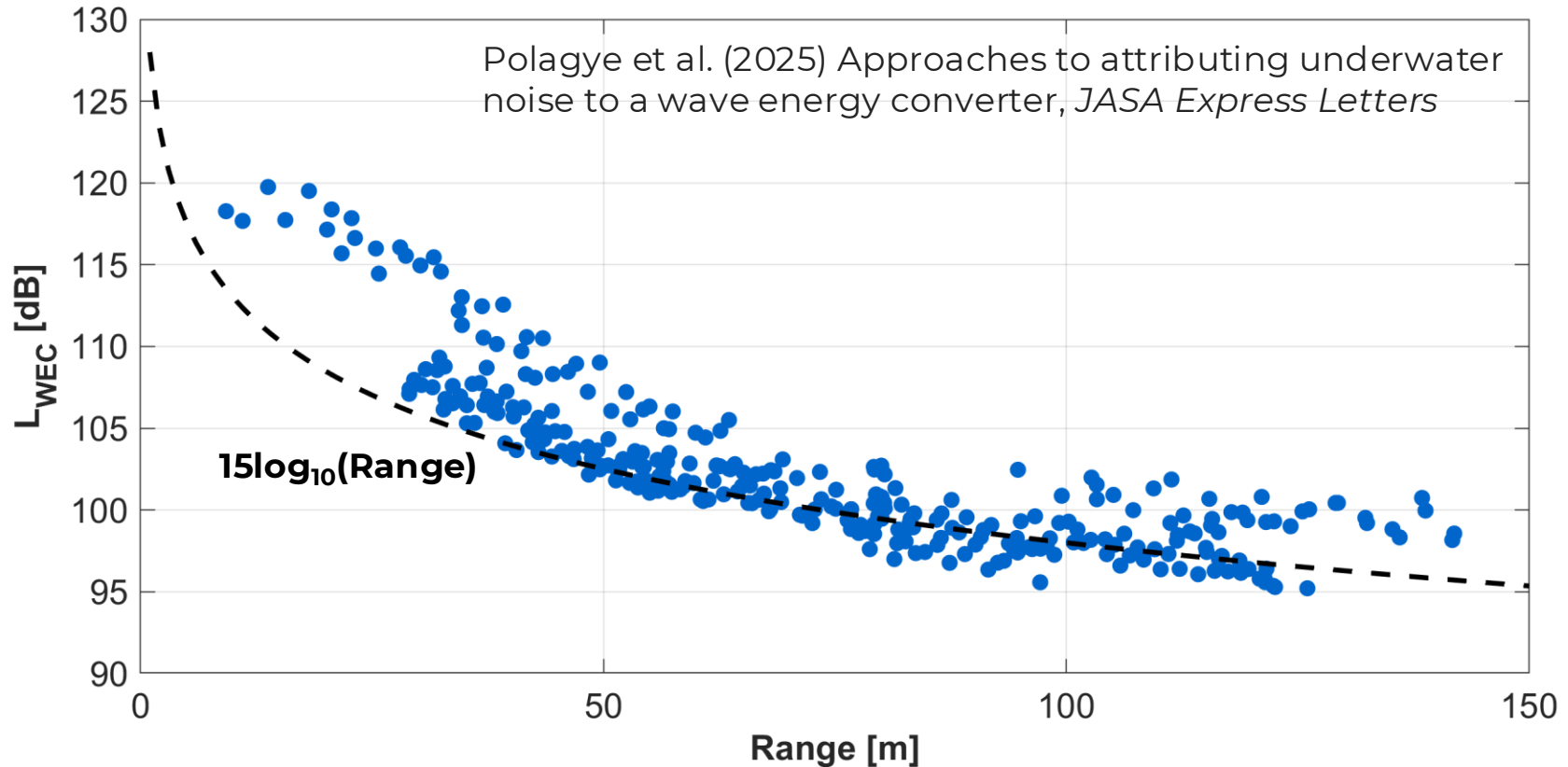
Range Dependence



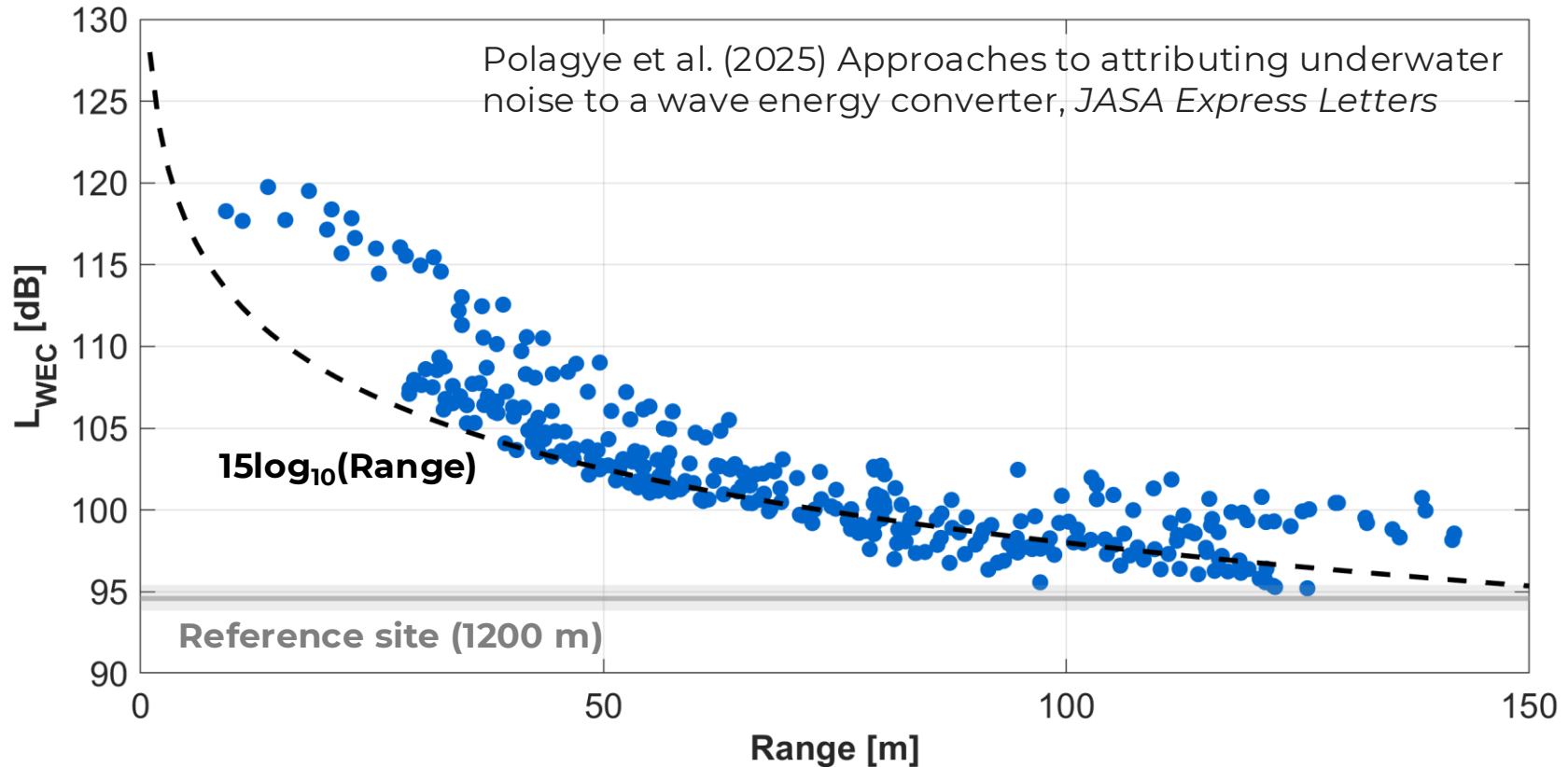
Range Dependence



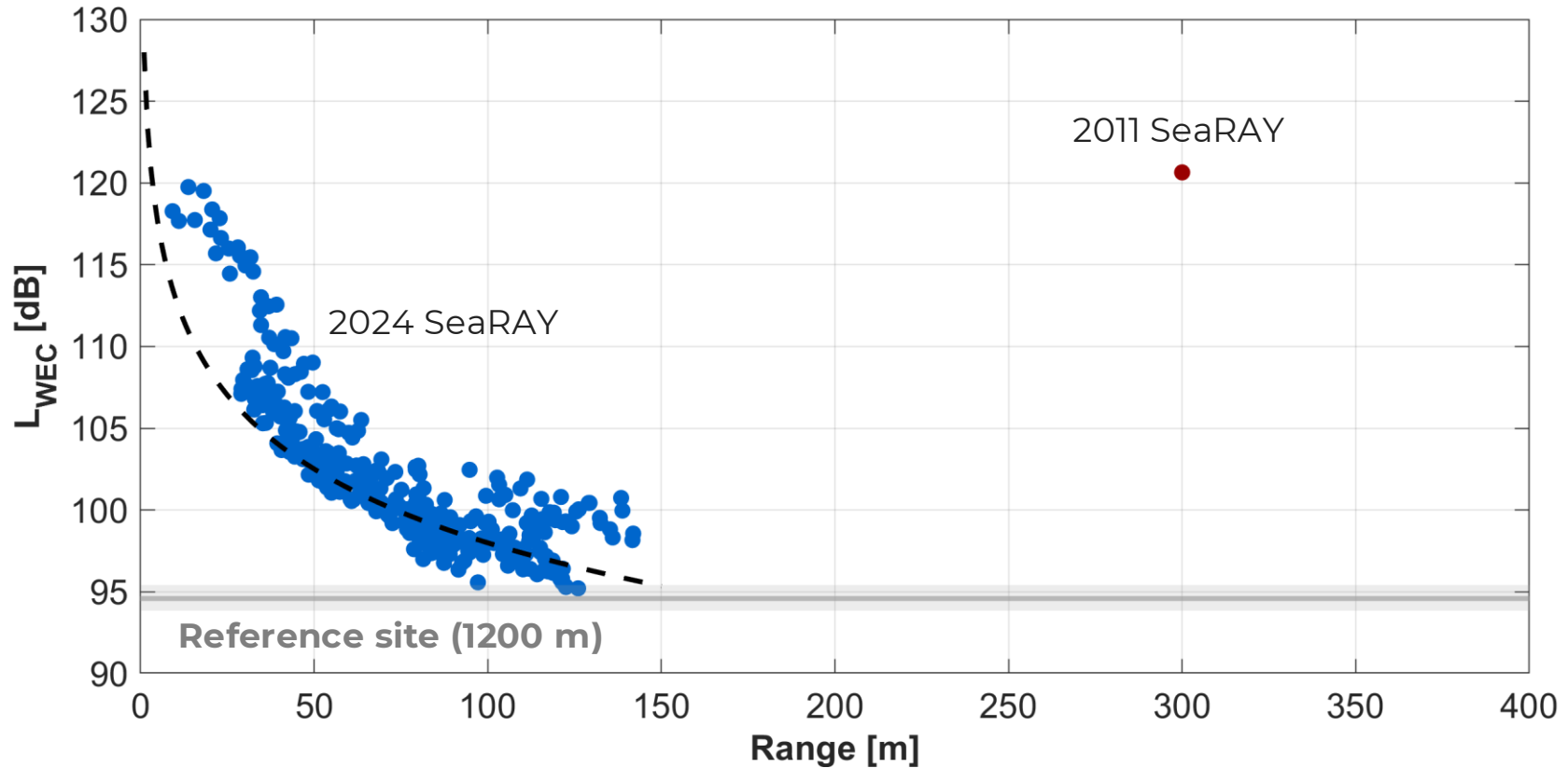
Range Dependence



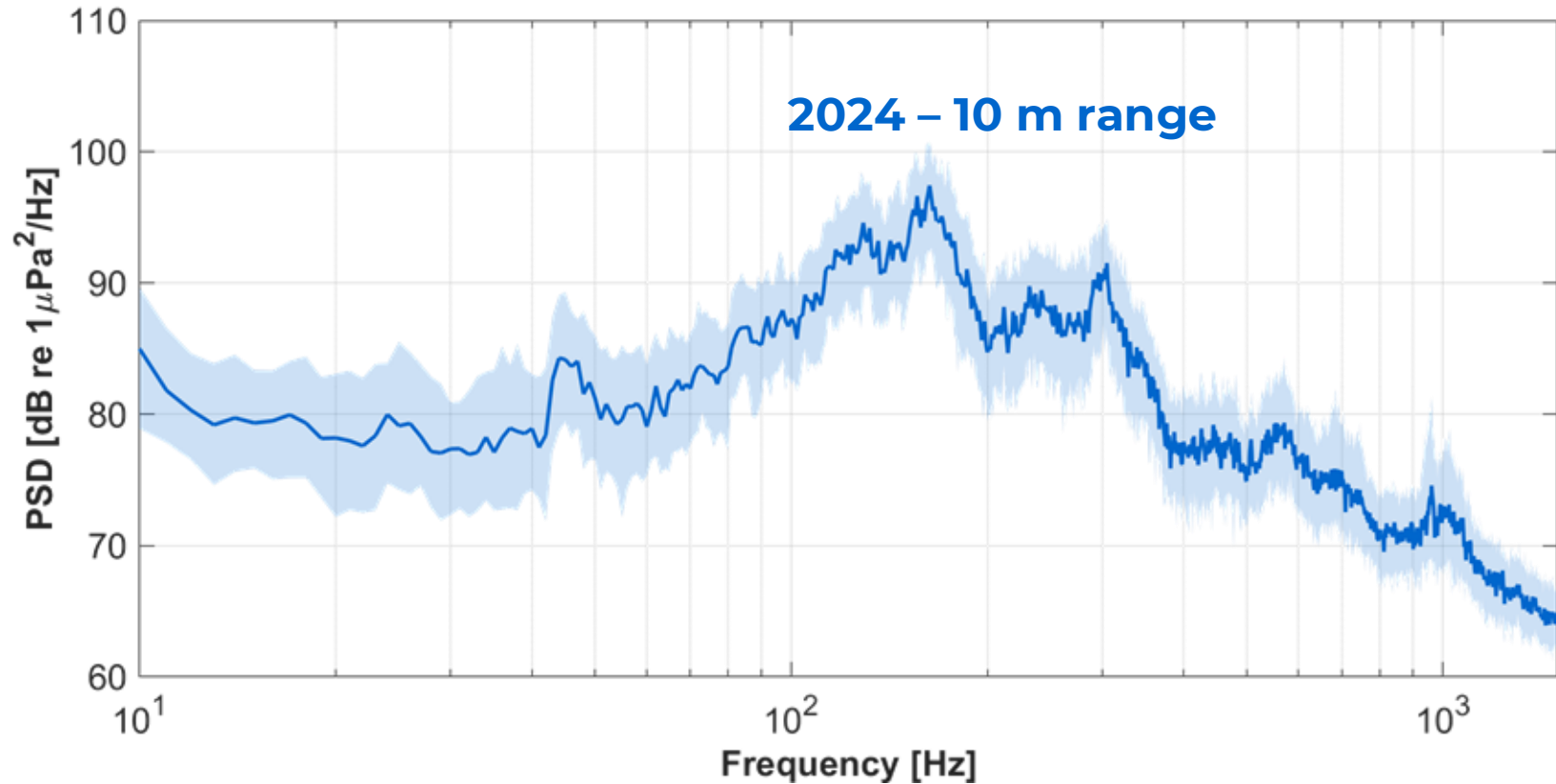
Range Dependence



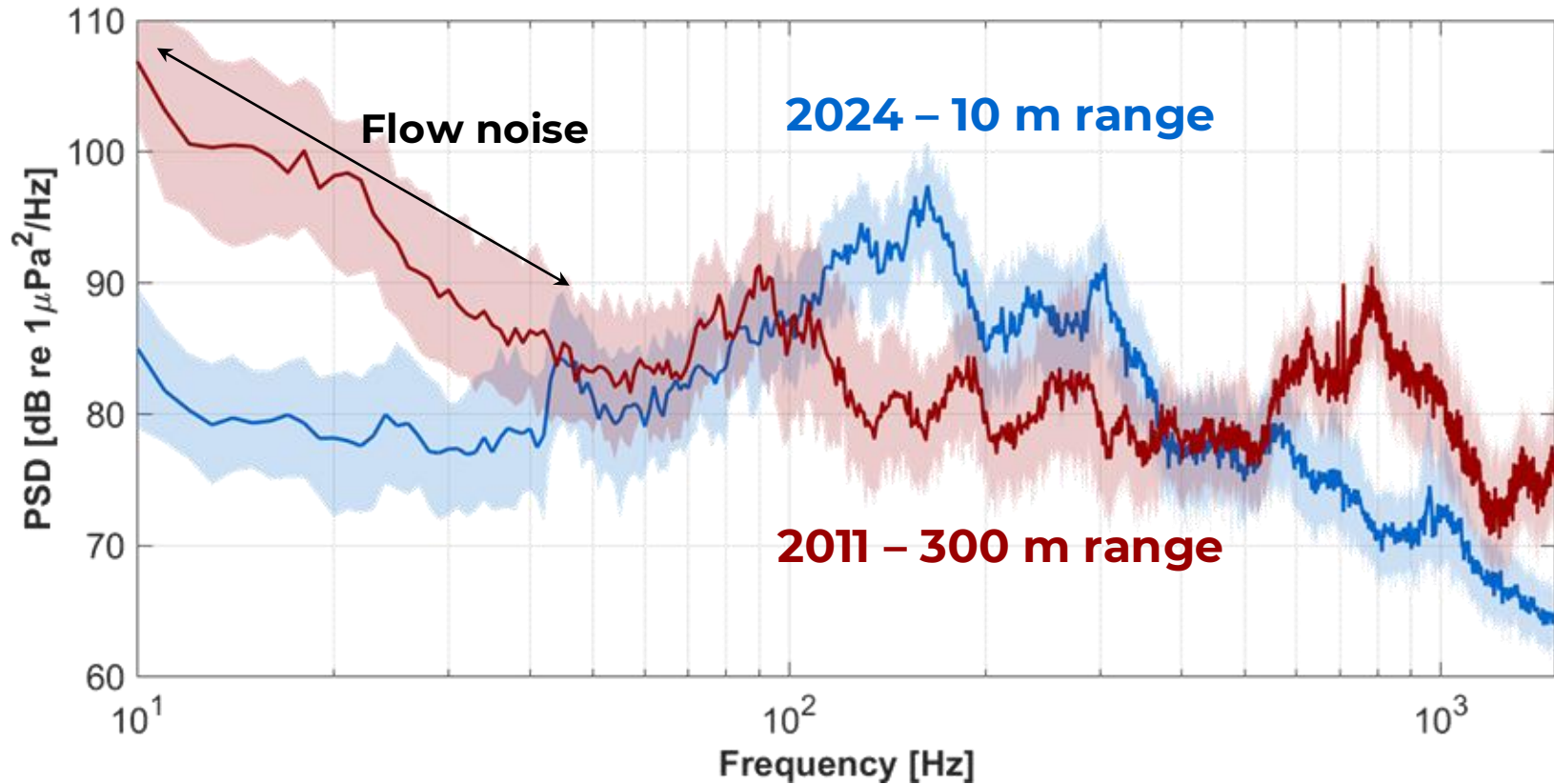
Range Dependence



2011 vs. 2024



2011 vs. 2024

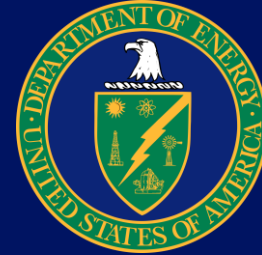


Conclusions

- SeaRAY radiated noise is primarily attributable to its power take-off
- Radiated noise does not necessarily increase with WEC size – *here it declined dramatically*
- Instruments for measuring WEC noise are relatively mature

Acknowledgements

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Mackey



Dr. Aidan
Hunt



C·POWER[®]

An underwater photograph showing a shark's dorsal fin cutting through the water surface in the upper left. The water is a deep, vibrant blue, filled with numerous small, bright bubbles that catch the light, creating a dynamic and textured background. The lighting is bright, suggesting sunlight filtering down from the surface.

Questions?