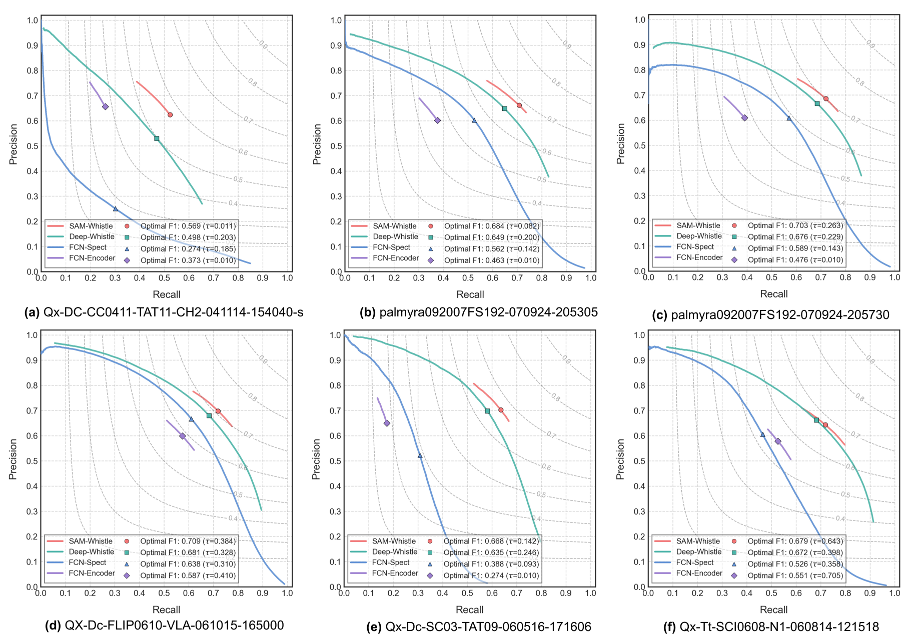
Supplementary Material

Extended Performance Analysis of Time-Frequency Whistle Energy Prediction

This supplementary material expands on the aggregated results in Section 2 of the main text, providing a detailed breakdown of model performance across individual test recordings. Figure S1 presents precision-recall curves for six distinct test recordings spanning different dolphin species, recording platforms, vessel types, and geographic locations.



(a) Qx-DC-CC0411-TAT11-CH2-041114-154040-s **(b)** palmyra092007FS192-070924-205305 **(c)** palmyra092007FS192-070924-205730

(d) QX-Dc-FLIP0610-VLA-061015-165000 **(e)** Qx-Dc-SC03-TAT09-060516-171606 **(f)** Qx-Tt-SCI0608-N1-060814-121518

Figure S1: **Precision-Recall** curves for whistle contour detection on six individual test recordings: a) Southern California Bight common dolphins, towed-array, large research vessel. b, c) Palmyra atoll bottlenose dolphins, towed-array, small vessel, d) Southern California Bight common dolphins recorded from a stationary research platform, e) Channel islands (CA, USA) common dolphins, towed-array, large research vessel, f) Channel islands bottlenose dolphins, dipped hydrophone from a small vessel

The analysis confirms SAM-whistle consistently outperforms baseline methods across all test recordings, with particularly notable advantages in challenging acoustic environments like small vessel recordings with engine noise interference. SAM-whistle's optimal threshold (τ) remains relatively stable across different recordings, supporting our observation in the main text regarding its lower threshold sensitivity. Performance variations appear more influenced by recording conditions and signal-to-noise ratio than by dolphin species, indicating effective generalization across different whistle types. These findings strengthen our conclusion that SAM-whistle's architecture, leveraging pretrained vision transformers, offers robust whistle contour detection across varied acoustic environments - a critical advantage for practical deployment in marine mammal monitoring applications.