

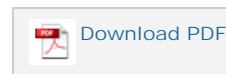


Acoustic detection and long-term monitoring of pygmy blue whales over the continental slope in southwest Australia

Alexander N. Gavrilov^{1,a)} and Robert D. McCauley¹

[+ VIEW AFFILIATIONS](#)

a) Author to whom correspondence should be addressed. Electronic mail: a.gavrilov@cmst.curtin.edu.au
 J. Acoust. Soc. Am. **134**, 2505 (2013); <http://dx.doi.org/10.1121/1.4816576>



[PREVIOUS ARTICLE](#) | [TABLE OF CONTENTS](#) | [NEXT ARTICLE](#) > | [BACK TO SEARCH RESULTS](#)



- Abstract
- Full Text
- References (23)
- Cited By**
- Data & Media
- Metrics
- Related

A 9-yr dataset of continuous sea noise recording made at the Cape Leeuwin station of the Comprehensive Nuclear-Test-Ban Treaty hydroacoustic network in 2002–2010 was processed to detect calls from pygmy blue whales and to analyze diel, seasonal, and interannual variations in their vocal activity. Because the conventional spectrogram correlation method for recognizing whale calls in sea noise resulted in a too high false detection rate, alternative algorithms were tested and the most robust one applied to the multi-year dataset. The detection method was based on multivariate classification using two spectrogram features of transients in sea noise and Fisher’s linear discriminant, which provided a misclassification rate of approximately 1% for missed and false detections at moderate sensitivity settings. An analysis of the detection results revealed a consistent seasonal pattern in the whale presence and considerable interannual changes with a steady increase in the number of calls detected in 2002–2006. An apparent diel pattern of whales’ vocal activity was also observed. The acoustic detection range for pygmy blue whales was estimated to vary from about 50 km to nearly 200 km from the Cape Leeuwin station, depending on the ambient noise level, source level, and azimuth to a vocalizing whale.

© 2013 Acoustical Society of America

Received 26 June 2012 Revised 12 January 2013 Accepted 26 February 2013

Acknowledgments:

The authors thank Dr. David Jepsen of Geoscience Australia, who provided acoustic data from the HA01 CTBT hydroacoustic used for the study presented in this paper.

Key Topics

- Acoustic noise
- Agroacoustics
- Acoustic sensing
- Australia
- Indian Ocean
- Correlation functions
- Testing procedures
- Southern Ocean
- Acoustic noise measurement
- Continental shelf processes

IPC Codes:

G10K11/00

Methods or devices for

Your access is provided by:

Curtin University

Curtin University
 Curtin University
[Register](#) to create your user account, or [sign in](#) if you have an existing account

- [Additional sign in](#)
- [Sign in via Shibboleth/Athens](#)

My cart

- [Export citations](#) ▾
- [Add to my favorites](#)
- [Recommend to library](#)
- [Subscribe to email alerts](#)
- [Submit an article](#)
- [Reprints & Permissions](#)
- [Subscribe to RSS](#)

Access Key

- Free Content
- Open Access Content
- Subscribed Content
- Free Trial Content

Article outline:

- I. INTRODUCTION
- II. DATA COLLECTION
- III. DETECTION METHOD
- IV. DETECTION RESULTS
 - A. Detection statistics
 - B. Detection range
- V. CONCLUDING REMARKS

MOST READ THIS MONTH

An algorithm to improve speech recognition in noise for hearing-impaired listeners

[Eric W. Healy](#), [Sarah E. Yoho](#), [Yuxuan Wang](#) and [DeLiang Wang](#)

Classification of large acoustic datasets using machine learning and crowdsourcing: Application to whale calls

[Lior Shamir](#), [Carol Yerby](#), [Robert Simpson](#), [Alexander M. von Benda-Beckmann](#), [Peter Tyack](#), [Filipa Samarra](#), [Patrick Miller](#) and [John Wallin](#)

Acoustic features mediating height estimation from human speech

[John Morton](#), [Mitchell Sommers](#), [Steven Lulich](#), [Abeer Alwan](#) and [Harish Arsikere](#)

[+ MORE](#)

MOST CITED THIS MONTH

Transformed Up Down Methods in

Psychoacoustics

[H. Levitt](#)

Theory of Propagation of Elastic Waves in a Fluid Saturated Porous Solid. II. Higher Frequency

Range

[M. A. Biot](#)

Stimulated acoustic emissions from within the human auditory system

[D. T. Kemp](#)

[+ MORE](#)

[Terms & conditions](#)

[Privacy](#)

[Advertising](#)

[Help](#)

[Contacts](#)

Follow AIPP:

