

# Report Documentation Page

*Form Approved  
OMB No. 0704-0188*

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE <b>30 SEP 1997</b>	2. REPORT TYPE	3. DATES COVERED <b>00-00-1997 to 00-00-1997</b>			
4. TITLE AND SUBTITLE <b>Ambient Noise Measurements and Inversions in Coastal and Continental Shelf Waters</b>		5a. CONTRACT NUMBER			
		5b. GRANT NUMBER			
		5c. PROGRAM ELEMENT NUMBER			
6. AUTHOR(S)		5d. PROJECT NUMBER			
		5e. TASK NUMBER			
		5f. WORK UNIT NUMBER			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>University of California, San Diego, Scripps Institution of Oceanography, Marine Physical Laboratory, La Jolla, CA, 92093</b>		8. PERFORMING ORGANIZATION REPORT NUMBER			
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)			
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)			
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>2</b>	19a. NAME OF RESPONSIBLE PERSON
a REPORT <b>unclassified</b>	b ABSTRACT <b>unclassified</b>	c THIS PAGE <b>unclassified</b>			

# **AMBIENT NOISE MEASUREMENTS AND INVERSIONS IN COASTAL AND CONTINENTAL SHELF WATERS**

M. J. Buckingham  
Marine Physical Laboratory  
Scripps Institution of Oceanography  
University of California, San Diego  
9500 Gilman Drive, La Jolla, California 92093-0213  
phone: (619) 534-7977; fax: (619) 534-7132; email: mjb@mpl.ucsd.edu  
Award number: N00014-96-1-0120  
Category of research: shallow-water acoustics

## **LONG-TERM GOALS**

The objective is to characterize the spatial properties of the ambient noise field in shallow water, and in particular to identify the effects that the seabed has on the spatial coherence of the noise. A full theory of the geoacoustic properties of porous materials is also being constructed, particularly in connection with marine sediments. By combining the theory of the bottom with measurements of the noise field, new inversion techniques for remotely determining the bottom geoacoustic parameters can be developed.

## **SCIENTIFIC OBJECTIVES**

The main scientific objectives are to collect and interpret ambient noise coherence data at several shallow water sites where the bottom properties are known; and to lay the foundations of a new theory of the geoacoustic properties of marine sediments.

## **APPROACH**

Pairs of hydrophones arranged vertically and separated by about 1 m are deployed in coastal waters, where the water depth is in the region of 100 m. Data are recorded on both channels over a bandwidth of 20 kHz. The spatial coherence is computed from the data as a function of frequency and compared with theoretical coherence curves.

With regard to the theoretical treatment of porous media, a new mechanism is being explored, which is based on the idea that the medium shows hysteresis as far as the dissipation is concerned. The idea has not previously been developed, and appears to yield results that are consistent with a wide range of observations.

## **WORK completed**

High quality noise coherence data have been collected at two ‘calibrated’ shallow water sites, where the bottom properties have been established in previous surveys. One site is off the coast of New Zealand and the second is off Eureka, northern California. The data have been analyzed and compared with theoretical predictions.

**in review** (1997).

5. M.J. Buckingham, Theory of wave propagation in consolidated porous media, 'J. Acoust. Soc. Am., **in preparation** (1997).