

**REPORT DOCUMENTATION PAGE**

Form Approved

OMB No. 0704-0188

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1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 2/16/01	3. REPORT TYPE AND DATES COVERED Final Technical Report / 1/1/96 - 12/31/00	
4. TITLE AND SUBTITLE Surface Gravity Waves on the Continental Shelf and Beach			5. FUNDING NUMBERS ONR N00014-96-1-0407	
6. AUTHOR(S) Robert T. Guza				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Scripps Institution of Oceanography, Center for Coastal Studies 9500 Gilman Drive La Jolla, CA 92093-0209			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Office of Naval Research Attn: Dr. Thomas Kinder 800 North Quincy Street Arlington, VA 22217			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT APPROVED FOR PUBLIC RELEASE			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) A combination of numerical models and field experiments were used to investigate the physical process that effect surface wave properties as the Y propagate across the continental shelf to the beach. A spectral refraction wave model was used to study the wave blocking and refraction near the FRF pier at Duck, North Carolina, during SandyDuck. A cross-shelf transect of directional wave buoys was deployed across the North Carolina shelf during the SHOWEX experiment to observe the evolution of the frequency-directional spectrum from the shelf to the beach. A hybrid Eulerian-Lagrangian wave model was developed to study the potential role of bottom friction in wave evolution across a broad, shallow shelf.				
14. SUBJECT TERMS waves, swell, refraction, bottom dissipation			15. NUMBER OF PAGES 2	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unrestricted	18. SECURITY CLASSIFICATION OF THIS PAGE Unrestricted	19. SECURITY CLASSIFICATION OF ABSTRACT Unrestricted	20. LIMITATION OF ABSTRACT None	

Surface Gravity Waves on the Continental Shelf and Beach  
ONR N00014-96-1-0407  
Robert T. Guza

Observed alongshore gradients in wave energy and propagation direction downwave of the FRF pier were modeled using a spectral refraction model. The model overpredicted energy near the pier when waves were propagated over the bathymetric depression beneath the pier. When pier pile blocking was introduced into the model, more accurate predictions were obtained, suggesting pile induced dissipation and scattering may be important. These findings were reported in Elgar, S., R.T. Guza, W.C. O'Reilly, B. Raubenheimer, and T.H.C. Herbers, Wave energy and directional observed near a pier. *J. Waterway, Port, Coastal and Ocean Eng.*, v127, 1-6, 2001.

A cross-shelf transect of directional wave buoys was deployed across the North Carolina shelf from Sept-Dec 1999, during the SHOWEX experiment to observe the evolution of the frequency-directional spectrum from the shelf to the beach. Several large hurricane events were measured by the transect and many complex local wind wave events. Strong wave attenuation was measured during periods of large waves with light winds when swell arrived from offshore hurricane events. Concurrent bottom surveys using side-scan sonar showed extensive ripple bedforms across much of the shelf during these time periods, suggesting that bottom dissipation is important.

A hybrid Eulerian-Lagrangian wave model was developed to study the potential role of bottom friction in wave evolution across a broad, shallow shelf. The method combines high spatial resolution, energy conserving spectral refraction methods with traditional, lower spatial resolution Eulerian wave energy generation and dissipation numerics. Model simulations that use bottom dissipation rates similar to those found in research literature produced results that were consistent with the observation. The model is described in Ardhuin, F, Herbers, T.H.C., and W.C. O'Reilly, A hybrid Eulerian-Lagrangian model for wave spectra evolution with application to bottom dissipation on the continental shelf, *J. Geophys. Res.*, in press, 2001.

20010306 125