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Biological and hydrodynamic control of seafloor roughness: Implications to high frequency acoustic scattering

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**14. ABSTRACT**

Biological and hydrodynamic processes can both create and destroy seafloor microtopography. As part of the SAX99 experiments, natural and artificial temporal changes in seafloor roughness were monitored acoustically and quantified using bottom stereo photographs. Feeding activities of benthic megafauna and fish destroyed large-scale roughness features generated by ocean surface gravity waves within a period of weeks to months; whereas, fine-scale roughness created by raking the seafloor decayed to background levels within 24 hours. The effects of fine-scale roughness increased acoustic scattering centered at one-half the acoustic wavelength (a "Bragg" wavelength of 2 cm) by 12-18 dB in artificial manipulations of the bottom. These changes were restricted to roughness that was oriented predominantly orthogonal to the incident acoustic waves. Alternatively, seafloor roughness generated by ocean surface gravity waves had wavelengths of 50-100 cm and wave heights of 10-15 cm. These predictable large-scale roughness features should, by analogy, dramatically increase scattering at lower acoustic frequencies (near 1-2 kHz) and decay within weeks to months after storm events. [Work supported by ONR.]

**15. SUBJECT TERMS**
Biological, hydrodynamic, control, seafloor, roughness, SAX99, temporal changes

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Biological and hydrodynamic control of seafloor roughness: implications to high-frequency acoustic scattering. Michael D. Richardson, Kevin B. Briggs (Marine Geosciences Division, Naval Research Laboratory, SSC MS 39529-5004) and Kevin L. Williams (Applied Physics Laboratory, University of Washington, 1013 NE 40th St., Seattle WA 98105-6698)

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Special facility: Computer Projector for PowerPoint presentation
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